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Statement of Response to “The Case Against Coal Mines in the UK”, published by the Green Alliance in January 2020
West Cumbria Mining – Statement of Response to “The Case Against New Coal Mines in the UK”, Published by the Green Alliance in January 2020

INTRODUCTION AND OVERVIEW

1. This Statement has been prepared by West Cumbria Mining Ltd (WCM). It provides an overview response to a Report released in January 2020 by the Green Alliance, entitled, “The Case Against New Coal Mines in the UK”.

2. This Statement has been produced following careful consideration by WCM in consultation with independent experts specialist in the relevant fields. It is addressed to the consideration of Cumbria County Council’s Development Control and Regulatory Committee. However, it is a public document and it is also intended that it should be publicly available. Accordingly, the aim has been to produce a document which is readily understandable to the non-expert. More technical evidence which supports this statement has been produced elsewhere to the Committee and, is of course, also publicly available. This Statement focuses on matters which may be of specific interest to that Committee.

3. The Green Alliance Report was not in front of the Committee at the time when it originally resolved to grant planning permission for the WCM planning application (March 2019), nor at the time that the decision was ratified (October 2019). Nonetheless, it has been produced and relied upon by the claimant in the current proceedings against this committee’s resolution of 31st October 2019.

4. Whilst the legal relevance of the Green Alliance Report in those legal proceedings may be the subject of ongoing argument, WCM believes it prudent to present a Statement to the Committee on the Green Alliance Report to provide information with the aim of reassuring the Committee that the Green Alliance Report presents no evidence that should have caused the Committee to come to a different decision in either March or October 2019; nor should it justify any change in the Committee’s decision now.

5. The Green Alliance report (hereinafter referred to as “the Report”) was co-authored by five persons, none of whom have specialist expertise or knowledge of the steel making industry, the coal mining industry, nor of the economics and market forces that drive these industries.

6. It is the over-riding view of the authors of this Statement, prepared by members of West Cumbria Mining Ltd and with specialist input from mining experts, steel industry experts, and coal quality and marketing experts, that the Report is flawed and misleading.

7. Whilst the Report attempts to make a case against new coal mines in the UK, it does not recognise the clear difference between thermal coal (used for power generation) and metallurgical coal (used for steel making), in the sense that there are market-ready, established, technologies for non-coal forms of power generation, but that there are no market-ready, established or scaleable technologies for non-coal forms of steel making.

8. Further, the Report confuses the terms ‘net zero’ and ‘zero carbon’ and in so doing it attempts to portray a zero coal future for steel making. No steel making company has either committed to, or recognises, a zero coal future for steel making, and no government or regulatory obligation proposes this.

9. The Report does not recognise that if the West Cumbria Mining project does not go ahead, steel makers in the UK and Europe will simply continue their business as usual, which is to continue to import an equivalent amount and grade of coal from the east coast of the USA. In effect, therefore, the Green Alliance are condoning the continuation of emissions arising from the rail transport and shipping of USA coal, which results in tens of thousands of tonnes of carbon dioxide, particulate and sulphur dioxide emissions as the USA coal is shipped to Europe.

10. West Cumbria Mining’s very clear position is that producing steel making coal in the UK for use in the UK and Europe, to the UK’s high environmental standards, providing over 500 directly employed jobs for 50 years, is far preferable to an environmental and social perspective than simply importing it from thousands of miles away. In this respect there is agreement with the Report, which calls for a more active industrial strategy and investment in former mining and industrial areas. This is exactly what West Cumbria Mining will deliver, in an area where there are currently no other alternative investment plans and pockets of significant poverty and deprivation.
11. This Statement gives detailed responses to matters raised in the Green Alliance Report.

Will Woodhouse Colliery be ‘carbon neutral’?

12. This question is raised by the Report on the basis of an out of context quote from the Council’s Addendum Report (October 2019). It is important to state and for the Committee to recall that, to date, West Cumbria Mining have never claimed that the mine would be carbon neutral.

13. The Climate Change Act 2008 (as amended) requires the UK to have ‘net zero’ emissions by 2050. WCM is therefore bound by legislation to ensure its operations are net zero, or carbon neutral - i.e. that any GHG emissions arising from WCM’s operations are offset by an equivalent amount of carbon or GHG offset credits from 2050 onwards.

The Scale of Emissions from Using Coal

14. The Report states that, when used, the coal extracted from the mine over its proposed 50 year extraction period “would emit around 420 million tonnes CO₂e” based on emissions factors produced by the Department for Business, Energy and Industrial Strategy 2017.

15. The Report compares this figure to the total annual emissions tonnage of the UK, which it states was around 450 million tonnes in the year 2018. The Report states that the UK’s annual emissions figure will “come down” as the UK progresses towards its net zero target.

16. However, the Report fails to recognise three important factors. First, the Report suggests that the emissions from the use of the coal should be considered by the UK. However, it omits to acknowledge that some of WCM’s coal will be used in Europe, where these end-use emissions will occur as part of any Steel works development, that there is no statutory requirement for the UK to include these emissions in its carbon budgets. Indeed, the Climate Change Act 2008 (as amended), clearly defines emissions to be taken into account in UK carbon budgeting as at Section 29 1(a) “UK emissions, in relation to a greenhouse gas, means emissions of that gas from sources in the United Kingdom;.” Accordingly, the emissions from non-UK steel makers should not be considered in the context of compliance with UK carbon accounting and budgets.

17. Second, emissions from the use of the coal in the UK steel making industry (and indeed any EU users) will be counted by the users of the coal. The UK steel making industry, whilst it remains governed by the transition arrangements with EU, is part of the EU Emissions Trading Scheme (EU ETS). This scheme, which has been operational since 2005, requires certain companies (including steel makers) to report upon and reduce their emissions. UK steel makers will report upon the emissions they generate from coal use, whether it’s Cumbrian coal or coal from anywhere else in the world. This approach is in line with carbon assessment and accounting methods set out by a number of organisations including the Institute for Environmental Management and Assessment (IEMA), the World Business Council on Sustainable Development, and the World Resources Institute. WCM has followed these standard methodologies in its own GHG Assessment, which has been undertaken by an independent specialist organisation.

18. Post-Brexit transition, the UK is committed to either remaining in the EU ETS or, alternatively, there are government statements on record that a similar alternative scheme for the UK will be implemented.

19. For the Report to suggest that non-UK and end-use emissions should be considered by the UK and WCM is to suggest that, in effect, the emissions will be double counted, as well as being likely to be highly inaccurate. Plainly this is not the correct approach.

20. Third, the Report fails to account for the fact that emissions from steel making will also reduce in the future, building upon reductions seen since the introduction in 2005 of the European Union Emissions Trading Scheme, as well as a series of industry initiatives and commitments to reduce emissions from steel making. The primary objective of the Emissions Trading Scheme is to reduce emissions from heavy industries (including steel making), by introducing a ‘cap and trade’ system for emissions. Since 2005, there has been a 21% reduction in emissions from EU heavy industries as a result of this Scheme, and the EU plans to accelerate the emissions reductions targets in this scheme from now onwards.
21. In addition to this, the EU steel industry has also formed a partnership of 48 global organisations in industry and academia, linked to the steel industry, to undertake research and development with the aim of reducing emissions from steel making. This partnership, known as Ultra Low CO₂ Steelmaking (ULCOS) has set its objective of reducing emissions from steel making by 50% by 2050, although it has said that early research has shown that a 70% reduction is highly possible prior to this deadline.

22. Therefore, the projected emissions figures given in the Report are highly inaccurate, as they are based on 2017 emissions factors which take no account whatsoever of the continuing regulatory requirements and industry commitments and initiatives to reduce emissions from steel making.

23. The Report goes on to equate each of the proposed jobs with an annual CO₂e emissions figure, which WCM would challenge for the same reason as the future projected emissions from the use of the coal.

Can Cumbrian Coal Influence the Development of New Steel Making Technologies?

24. WCM accepts that the overwhelming majority of emissions from coal come from the end use of the product - i.e. after WCM has sold the coal to the steel makers. Therefore, WCM has no influence whatsoever over how the steel makers use the coal or improve their processes to reduce emissions. The use of the coal is no part of the Proposed Development before this committee.

25. Such emissions are not usually required to be considered because they are excluded under both the UK Climate Change Act and the GHG assessment methodologies mentioned earlier as well not being indirect (or secondary) effects of the Proposed Development for the purposes of the EIA directive. Nevertheless, WCM has gone onto consider whether granting consent for the Proposed Development would result in a material change to GHG emissions produced from using WCM coal at UK and EU steel plants – this is known as comparing the ‘Do Nothing’ scenario (not granting consent for the Proposed development) and the ‘Do Something’ (in this case granting consent for the Proposed development). This shows that there would be no material or significant increase in GHG submission as a result of granting consent. Indeed, the reverse is likely to be true.

26. Suggestions have been made in the Report that WCM coal would inhibit the development within the steel industry of lower emissions steel making methods. It is important for WCM to respond to those suggestions.

27. Several factors are relevant to our response. First, due to the lack of market knowledge amongst the authors of the Report, there is no recognition in the Report that WCM’s market share of global metallurgical coal production, even at full annual production rates, will be a fraction of 1%. This fact puts into perspective the claims made in the Report that the production from WCM will inhibit the development of a move to cleaner steelmaking - it cannot be true that a producer of less than 1% of global metallurgical coal will have any influence on the market, let alone moves in the steel making industry to curb its emissions.

28. In fact, the opposite is true - its coal will contribute to cleaner steel making, for two reasons. First, the significant reductions in transport mileage compared with an equivalent product from the USA, means that transport related emissions are significantly reduced; and secondly, that the higher environmental standards in the UK will ensure that WCM coal will be mined much more cleanly and responsibly than equivalent coal from the USA, which is frequently open cast strip mining.

29. Steel makers in Europe continue to develop their response to the regulatory and voluntary emissions reductions requirements by developing a range of approaches, including using less coal, employing carbon capture and storage, and developing carbon offset schemes.

30. The Report states that steel can be produced using hydrogen, generated by renewable energy. However, the Report does not state that large scale industrial production, storage and transport for this method has yet to be proven as practical, safe and cost effective. The Direct Reduced Iron (DRI) method of steel making cited in the Report uses natural gas, itself a fossil fuel; but the Report does not mention the complex geo-political issues with securing reliable supplies of natural gas. Therefore, the future success of DRI is far from certain and cannot be relied upon in the way that the Report suggests.

¹ This is addressed in more detail by the Expert Statement produced by Dr Bristow.
Environmental Performance

31. There is no acknowledgment in the Report that there are significantly higher environmental standards for the relevant industries in the UK when compared with the USA. Research shows that the UK is consistently ahead of the USA in environmental performance; indeed, President Trump is seeking to withdraw the USA from the Paris Climate Agreement. There are no greenhouse gas (GHG) emissions reduction targets in the USA. This is all in stark contrast to the UK, where Prime Minister Johnson has committed to making the UK the cleanest, greenest country on earth. West Cumbria Mining are fully supportive of this, as well as the recent overturn by Mr. Johnson of David Cameron's previous policy which had effectively ended the development of onshore wind turbines.

32. Since steel is the major component of many renewable energies such as wind turbines, metallurgical coal for steel making is needed more than ever to build the green infrastructure needed to reduce emissions.

33. Furthermore, in order to protect the environment, the most responsible course of action is to accept and manage that every action an individual, community or company takes should be assessed and managed. By so doing, responsibility is taken and impacts are understood. For example, in calling for renewable energy infrastructure which the Report mentions, at a rate never seen before in order to meet the net zero by 2050 target in the UK, it must be accepted that there is no scaleable, viable or proven technique to produce the steel needed for things such as wind turbines other than the use of coking coal.

34. To simply stop the use of coal in steel making today would cause the development of green infrastructure, and all other applications which steel is used for, to grind to a halt. Whilst alternative steel making technologies are being trialled, they are many decades away from becoming viable alternatives to coal. This quite apart from the other uses of steel in such things as medical devices, infrastructure, domestic appliances etc.

35. To call for no new coal mines in the UK is therefore to condone mining of coal in countries with lower environmental standards and greater environmental impact. This is known as 'offshoring' environmental responsibilities, and is frequently seen when individuals and communities are not willing to accept the reality or impacts of the requirements of their everyday lifestyles.

36. By producing coal for steel making in the UK with its world-leading environmental standards, in the fully enclosed buildings which WCM have proposed, and for this coal to travel to the market on rail and by ship, without a single road mile within the UK is surely the most responsible way to produce this material.

Future Demand for Coal in Steelmaking

37. WCM's steel industry experts have predicted that, through research and development, in the next 30-40 years there will be some reduction in the demand for coal in steel making, as efficiencies are found. However, this does not equate, as the Report would suggest, to zero coal, or even zero carbon steel making. Further, given that WCM's coal will represent such a small fraction of the global metallurgical coal market, this, in WCM's opinion, securing the future for WCM coal into the British and European steel making markets.

38. Steel making can become net zero emissions through the use of carbon capture and storage and offsetting, but to describe a future zero carbon steel making scenario is disingenuous. However, the Report attempts to do this by quoting a paper called "Industrial Transformation 2050 - Pathways to Net Zero Emissions from EU Heavy Industry", written by Material Economics, in which the Report claims it is stated that zero carbon steel is possible by 2050. WCM could not find a statement to this effect in the Material Economics report; whilst it was found that the Material Economics report refers to zero carbon electricity, it is important to note that there are many components to steel, including quarried materials such as limestone, so the notion that all of the components of steel as well as its manufacturing process can be zero carbon is therefore erroneous and misleading.

39. The Report states that one of the world's largest steelmakers, Arcelor Mittal, has pledged to reduce its carbon emissions in Europe to zero by 2050. This misrepresents what Arcelor Mittal has actually said - Arcelor Mittal's Climate Action Report (May 2019) states that it seeks to achieve carbon neutrality by 2050, not go zero carbon by 2050.
40. This distinction is important, because, crucially, net zero means that there will still be some carbon emissions, but these will be offset by the producer, resulting in an overall net zero balance. This is not the same as zero carbon, a scenario in which there would be no carbon emissions at all.

41. Therefore, contrary to the apparent claim in the Report that steel making could be zero carbon by 2050, WCM believe that Arcelor Mittal’s (and other steel making companies’) operations will still emit carbon by 2050, however the use of carbon capture and offsetting measures will mean that these operations are net zero. We pause to observe that the use of the word ‘net’ in any events indicates a likely trade off.

42. Indeed, Arcelor Mittal’s Climate Action Report states that there is “not enough scrap available in the world to make all steel through the electric arc furnace”, a statement which WCM strongly agrees with, and which is evidenced by the current market and future predictions. Therefore, it is inevitable that coal will still be used in steel making for some decades to come.

43. The Report states that in August 2019 the UK Government announced a £250million clean steel fund, to transition to lower carbon steel making. The timing of the announcement of this fund was five months after the Committee decision on WCM’s planning application, which was made in March 2019.

44. In addition, although the Fund was announced in 2019, it is more accurate to say that it is in the early stages - what actually happened in August 2019 was that the Government launched a call for evidence to support the development of a clean steel fund. The Fund itself is not expected to be opened until 2024.

45. Within the call for evidence document,² it is acknowledged that whilst UK steel making is a large emitter of GHGs, it is also of vital importance for the UK economy. Indeed, the Crossrail project in London has seen 26 miles of tunnel built using almost exclusively British made steel. With the significant infrastructure spend announced by the UK Chancellor in his budget on 11 March 2020, there has never been a more important time for sustainable British steel.

46. The Call for Evidence document notes that even if hydrogen is used as a fuel, it still needs to be blended with coking coal or, alternatively if it is not blended with coking coal, this is a longer term strategy which requires large changes to equipment and significant additional cost, as well as overcoming the barrier of securing a supply of low carbon hydrogen to start the trialling technologies. In other words, such alternatives are several decades away and, until that time, the global outlook and demand for metallurgical coal for use in the steel industry is strong.

Concluding Comments

47. WCM has reviewed and responded to the Green Alliance Report with the assistance of in-house and independent experts. The Report contains many statements and assertions which are inaccurate, partial and/ or misleading.

48. In this Statement, WCM aims to provide CCC Development Control and Regulatory Committee members with a balanced and accurate picture of the coal and steel industry and markets, supplies, and its commitments to reduce emissions in line with the United Nations Framework Convention on Climate Change ‘Paris Agreement’ and the UK requirements of the Climate Change Act.

49. The requirements of the Climate Change Act 2008 are clear - non-UK emissions should not be taken into account in UK carbon budgeting and the UK’s goal to reach net zero by 2050.

50. The approach to the EIA assessment of GHG emissions produced by the steel works and their relevance to this planning application has been explained. Additionally, it is to be recalled that the UK steel makers themselves are legally bound to report on those emissions.

51. WCM is fully supportive of UK emissions reductions commitments and the goal of net zero by 2050, and believes it can support them through producing a much more local product than is currently available. WCM will abide by all regulations in force relating to climate change, notably the commitment to be carbon neutral by 2050 in accordance with the requirements of the Climate Change Act.

² Department for Business, Energy & Industrial Strategy (2019) Clean Steel Fund Call for Evidence
52. WCM believes that the future requirements for metallurgical coal for steelmaking are strong, and will continue to be until at least the end of the century.

53. WCM believes that it is vital for the UK to secure its supplies of high quality metallurgical coal to support its steel making industry. The coal will be mined in a more highly controlled and monitored environment than its equivalent from the USA, and will be transported a matter of hundreds, and not thousands of miles to its end user.

54. For these reasons, WCM coal is the more sustainable option that can contribute to the UK and Europe’s moves to green infrastructure as well as becoming carbon neutral by 2050. The proposed development is an exciting opportunity for the area to bring not only socio economic benefits but also help improve the global environment.
Attachment 1 - Green Alliance Report
The case against new coal mines in the UK
The case against new coal mines in the UK

By Rebecca Willis, Mike Berners-Lee, Rosie Watson and Mike Elm

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Green Alliance
Green Alliance is an independent think tank and charity focused on ambitious leadership for the environment. Since 1979, we have been working with the most influential leaders in business, NGOs and politics to accelerate political action and create transformative policy for a green and prosperous UK.
Summary

This insight summarises evidence on coal mining, the use of coal in steel manufacture and the carbon emissions arising from the steel industry.

We focus on the UK, and the proposed development of a new mine at Woodhouse Colliery, Cumbria. We set the proposals for the mine in the context of UK and global legislation on climate mitigation, and future plans for reducing coal use in steel production, through reuse, recycling, more efficient production methods, and new technologies to produce steel without coal.

We conclude that decarbonisation of the steel industry, and a phase out of coal use, is both necessary and possible, making the new coal mine in Cumbria unnecessary. In fact, the new mine would hinder the development of low carbon alternatives to conventional steel production.

We argue for a more active industrial strategy to encourage low carbon jobs and investment in former mining and industrial areas. Finally, we make recommendations for the government to remove ambiguities surrounding its approach to fossil fuel extraction, and to stimulate investment in alternative sources of power.
There are currently a number of proposals for new coal mines in the UK, for example, Highthorn Mine in Druridge Bay, Northumberland and West Cumbria Mining’s proposal for the new Woodhouse Colliery, near Whitehaven in Cumbria. The developers of Highthorn mine, which is currently subject to legal proceedings, have asserted that coal from the mine will be needed for electricity generation. West Cumbria Mining states that coal from Woodhouse Colliery would be used by the steel industry, both in the UK and abroad.

**Woodhouse Colliery, Cumbria**

We focus here on the proposal for Woodhouse Colliery, analysing claims made by West Cumbria Mining and the planning authority, Cumbria County Council. This is the first coal mine to seek planning permission following the UK’s adoption of a target of net zero carbon emissions by 2050.

The mine would be partly on land and partly under the sea. Planning permission has been sought from Cumbria County Council for the land-based portion of the development. Permission was granted in March 2019, and the decision was ratified in October 2019. Shortly after, the secretary of state, Robert Jenrick, said that he would not intervene in the decision, despite having the power to do so. Planning permission for the section under the seabed is required from a separate authority, the Marine Management Organisation. This has not yet been submitted.

The planning application estimates that the mine would produce 2.43 million tonnes of metallurgical coal per annum, to be used in steel production, as well as 350,000 tonnes of ‘middlings coal’, which cannot be used for steel, and would either be sold for combustion or disposed of.\(^1\)

Overall, UK domestic coal production in 2016 was four million tonnes, from 13 mines, employing a total of 629 people.\(^2\) The developers of the new mine say that the whole development (including the section under the seabed) would create 146 jobs during construction, and 518 jobs once the mine is open, with potential for additional local jobs in the supply chain.\(^3\)

Both West Cumbria Mining and Cumbria County Council have said that steel consumption worldwide is forecast to rise; that “aside from electric arc furnaces you can’t make steel without coke [metallurgical coal]”; and that the coal would be used by UK and EU steelmakers to replace imported coal.

Cumbria County Council’s Planning Officer Report states that carbon emissions will be reduced by 5.3 million tonnes over its lifetime because, if the coal is used in UK steel production, this will reduce the transport emissions from imported coal. “The report makes no estimate of emissions from the extraction and processing of the coal, although this is a material factor in planning decisions. It makes the assumption that the carbon savings from reduced coal transport will outweigh emissions from the mine itself. As they state in a subsequent report, “we consider that the greenhouse gas emissions of the mining operations would be broadly carbon neutral.””\(^4\)

In terms of emissions from the combustion of the coal, the report says “there would be no increase in CO\(_2\) as the opening of the mine would be offset by the very likely reduction in production elsewhere due to competition.””\(^5\) They describe this as “a carbon neutral situation.”"
Will Woodhouse Colliery be ‘carbon neutral’?

In assessing the planning application, Cumbria County Council has twice stated that the proposed mine would be “carbon neutral”.

First, the council’s report claims that coal from the Cumbrian mine would substitute for coal produced elsewhere, leading to no net increase in coal production worldwide, which they describe as a “carbon neutral situation”. However, economic theory suggests that an increase in supply of a commodity, such as coal, would reduce the price, leading to increased demand and, therefore, increased emissions. In the case of the steelmaking industry, this would, in turn, decrease the incentive to use coal more efficiently, recycle more steel or produce steel using alternative processes, even though all these are technically possible.

Second, the report says that the coal produced would be used mostly in the UK and EU, substituting for imported coal, and, therefore, reducing emissions from the transportation of coal. This, it says, compensates for the emissions from the mining operations, and thus “the greenhouse gas emissions of the mining operations would be broadly carbon neutral.” However, no figures are provided to substantiate this claim.

The phrase ‘carbon neutral’ refers to a situation in which no additional greenhouse gas emissions are produced, because the those produced are ‘balanced’ by those removed from the atmosphere, for example through carbon capture and storage (CCS) or carbon storage through land management. This is not the case for Woodhouse Colliery.

If there were savings from reduced transportation of coal, these would not cancel out or neutralise the emissions from the mine operations. In the context of the UK’s target of net zero greenhouse gas emissions by 2050 and global efforts to keep carbon emissions in line with a scenario compatible with no more than a 1.5°C increase, absolute reductions of emissions are required, rather than balancing off one set of emissions against another.

“In the context of the UK’s target of net zero greenhouse gas emissions by 2050 absolute reductions of emissions are required.”
UK legislation

The UK has a statutory (legally binding) target to reach net zero emissions by 2050, under the 2008 Climate Change Act, amended in 2019. Having ratified the Paris climate agreement of 2015, it has also agreed the goal to limit global average temperature rise to between 1.5°C and 2°C.

The UK has a clear policy on coal for electricity generation. It has pledged to phase out unabated coal-fired power generation by 2025, and it is a founding member of the international Powering Past Coal alliance. There is currently no phase-out date for the use of coal in steel manufacturing. But, in August 2019, the government announced a Clean Steel Fund of £250 million, which is designed, in its words, “to transition to lower carbon steel production through new technologies and processes, placing the sector on a pathway consistent with the UK Climate Change Act (net zero).”

In England, new developments, including mines, are controlled by planning legislation and must follow the National Planning Policy Framework (NPPF). The overall aim of the NPPF is to achieve sustainable development, which includes “mitigating and adapting to climate change, including moving to a low carbon economy.” The NPPF contains clear guidance on planning permission for the extraction of coal. It says:

“Planning permission should not be granted for the extraction of coal unless:

a) the proposal is environmentally acceptable, or can be made so by planning conditions or obligations; or

b) if it is not environmentally acceptable, then it provides national, local or community benefits which clearly outweigh its likely impacts (taking all relevant matters into account, including any residual environmental impacts).”

The Climate Change Act 2008 also requires local authorities to take into account whether projects are likely to contribute to sustainable development, particularly where they are likely to increase carbon emissions.

Planning permission for coal mines can be granted by the local planning authority, following the national policy detailed above, unless the secretary of state decides that it is a matter of national importance. In which case, they can ‘call in’ the application to be determined by national government, rather than the local authority. Reasons to call in the development include a potential conflict with national policy or a risk of national controversy.

Legislation and targets in the EU and elsewhere

The EU is a signatory to the Paris climate agreement and, in December 2019, set a target of net zero emissions by 2050. The Paris agreement was ratified by all major economies, except the United States. All signatories are committed to develop national plans compatible with the Paris goal of net zero emissions by the middle of this century.

There have been many assessments of the climate implications of extracting fossil fuels, including coal, oil and gas. The United Nations Environment Programme’s 2019 report, The production gap, states that “governments are planning to produce about 50% more fossil fuels by 2030 than would be consistent with a 2°C pathway and 120% more than would be consistent with a 1.5°C pathway.”

An assessment published in the journal Nature in 2015 reported that “globally, a third of oil reserves, half of gas reserves and over 80 per cent of current coal reserves should remain unused from 2010 to 2050 in order to meet the target of 2°C.” (Note that this relates to a 2°C target, not the stricter 1.5°C target subsequently agreed at Paris in 2015.) A report by the NGO CarbonTracker estimates that 17 per cent of known fossil reserves could be burned to be consistent with the Paris climate agreement.
The UK government acknowledges that most existing reserves should not be burned. In 2016, the climate minister Nick Hurd stated that “between 70-75 per cent of known fossil fuels would have to be left unused in order to have a 50 per cent chance of limiting global temperature rise to below 2°C.”

The scale of emissions from using coal

West Cumbria Mining plans to extract 2.43 million tonnes of coking coal per year and 0.35 million tonnes of middlings coal every year for 50 years. When used, this would emit around 420 million tonnes CO$_2$e. This figure excludes emissions arising from the extraction process itself.

To put this in perspective, the UK’s entire annual emissions in 2018 were only slightly higher, at 450 million tonnes. And this figure will come down as the UK progresses toward its net zero target.

Annual emissions from use of the coal extracted, at 8.4 million tonnes per year, would be more than double the net annual emissions from the whole of Cumbria, which is currently 3.79 million tonnes per year. 
How to reduce the climate impact of steelmaking

Currently, 95 per cent of new steel is made in a blast furnace, using metallurgical coal. Three steel plants are operational in the UK, at Scunthorpe, Sheffield and Port Talbot, although the future of some plants is uncertain due to global over capacity in steel production. According to the industry body, The Energy Transformations Commission, "energy-related emissions from the steel and iron industry currently amount to circa 2.8 Gt of CO\textsubscript{2} per annum accounting for almost 8% of total global energy system emissions".

To meet carbon targets and prevent dangerous warming, carbon emissions from steel production must be reduced. There are four broad strategies for this: first, use less steel; second, recycle more steel; third, improve the efficiency of steel production in a blast furnace; fourth, produce steel without coal. These are outlined below:

1. Use less steel
Steel can be reused and remanufactured, resulting in far lower carbon emissions. For example, steel plates for shipbuilding can be re-rolled and used in new ships. A report by the World Steel Council describes the various possible processes. Many construction projects over use steel. Material Economics states that many construction projects use 30-50 per cent more steel than necessary.

2. Recycle more steel
Steel can be recycled, using electric arc furnaces. There are two such plants in the UK: Celsa Steel in Cardiff and Liberty Speciality Steels in Rotherham. This process is much less energy intensive than making new steel, and carbon emissions can be reduced to nearly zero if the electricity used is renewable. A 2019 report from Professor Julian Allwood of Cambridge University states that "the global steel industry is transforming from using iron ore to recycling scrap. Global arisings of steel scrap are likely to treble in the next thirty years and we will never need more blast furnaces than we have today." In 2017, only 20 per cent of UK steel was produced in electric arc furnaces, against an EU average of 40 per cent. Nine million tonnes of scrap steel were exported for recycling overseas.

3. Improve the efficiency of steel production in a blast furnace
Steel production in conventional blast furnaces has become more efficient, but there is potential for greater efficiency savings. A report from Material Economics states that adopting best available technologies in blast furnaces results in efficiency improvements of around 15 per cent. If bio-based fuels are substituted for some of the coal input, this can result in 50 per cent emissions reductions. Arcelor Mittal, the world’s largest steel producer, launched the Torero demonstration project in Ghent, Belgium in 2018, converting waste wood into biocoal to substitute for conventional coal.

4. Produce steel without coal
About five per cent of new steel is made using the Direct Reduced Iron process, which enables coal to be replaced by natural gas. Whilst still using fossil fuels, this process is less carbon intensive. In 2018, under the Hybrit project, construction began on a pilot plant for fossil-free steel production in Luleå, Sweden. The plant will use hydrogen, generated by renewable energy, in place of metallurgical coal. In 2019, Arcelor Mittal launched a project in Hamburg to test hydrogen steelmaking on an industrial scale with an annual production of 100,000 tonnes of steel.
A combination of the methods described could significantly reduce the demand for metallurgical coal and carbon emissions. The Energy Transformations Commission states that "a complete decarbonization of the steelmaking industry is achievable by mid-century, with a modest impact on end-consumer prices and cost to the overall economy". The Industrial Transformation 2050 report similarly states that zero carbon steel is possible by 2050. In 2015, the Science Based Targets Initiative developed a pathway for the global iron and steel industry. This mapped a 31 per cent reduction in emissions by 2050, alongside a 55 per cent rise in global steel production. The savings came largely from efficiency improvements and alternative processes to those that use coking coal. Arcelor Mittal has already pledged to reduce its carbon emissions in Europe to zero by 2050, and it will shortly publish targets for its operations in the rest of the world.

These shifts are likely to intensify as countries develop carbon reduction strategies, in response to their Paris commitments. However, they are ignored by the planners’ report on Woodhouse Colliery, which predicts a stable demand for metallurgical coal.
Does the world need more coking coal for steel production?

In 2015, when a global 2°C temperature rise was widely regarded as an acceptable mitigation target, the Science Based Targets Initiative produced its Sectoral Decarbonisation Approach, including a pathway for the global iron and steel industry. This entailed a 31 per cent reduction in emissions by 2050, based on a 55 per cent rise in steel production. The savings came largely from efficiency improvements and alternative processes to those that use coking coal.

Since this pathway was developed, the world has acknowledged the need for greater emissions reductions. At the same time, alternative production processes have matured to make it possible.

### CO₂ intensity of steel production

<table>
<thead>
<tr>
<th>Method</th>
<th>tCO₂ per ton of steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Oxygen Furnace (BOF)</td>
<td>2.3</td>
</tr>
<tr>
<td>BOF, with best available technology</td>
<td>1.9</td>
</tr>
<tr>
<td>BOF, with biofuels</td>
<td>1.1</td>
</tr>
<tr>
<td>Direct Reduced Iron (DRI)</td>
<td>1.1</td>
</tr>
<tr>
<td>BOF + Carbon Capture and Storage (CCS)</td>
<td>0.9</td>
</tr>
<tr>
<td>Electric Arc Furnace (EAF)</td>
<td>0.4</td>
</tr>
<tr>
<td>EAF + zero carbon electricity</td>
<td>0.1</td>
</tr>
</tbody>
</table>
Areas of the UK that previously relied on jobs in manufacturing and extraction, including coal and steel, have been hit by job losses, less secure employment, lower wages and economic difficulties. Whitehaven, the nearest town to the proposed Woodhouse Colliery, is no exception. It was reliant on its coal industry for 300 years, until the last pit closed in 1986. The Marchon chemical works was a major employer for 60 years, but closed down in 2005; the mine proposals would use the former Marchon site. Now, 11,000 local people work at the Sellafield nuclear reprocessing site, but 3,000 jobs will be lost as the site plans to end the reprocessing of nuclear material.

The potential jobs offered, if the planned mine goes ahead, were a significant factor in the decision to grant planning permission. The leader of Cumbria County Council said that “the need for coking coal, the number of jobs on offer and the chance to remove contamination outweighed concerns about climate change and local amenity.”

However, there is strong evidence to suggest that ex-industrial areas such as Whitehaven could also be revitalised through a shift to a low carbon economy. A 2019 report by IPPR North estimates that up to 46,000 jobs could be created in the north of England, in the power sector alone. Reports from the LSE and the TUC also cite the potential for jobs in a ‘green transition’. For example, GreenPort in Hull has become a hub for wind energy, and Siemens has established a wind-blade factory there. However, as these reports make clear, for such opportunities to be realised, there is a need for government leadership, a clear strategy to promote the low carbon transition and for more powers and responsibilities to be given to local areas.

Jobs and carbon

West Cumbria Mining estimates that around 518 jobs will be created (of which 80 per cent will be within 20 miles of Whitehaven). Using the company’s breakdown of job types and industry standard salaries, it is possible to estimate the annual salary remuneration for the entire workforce, including management, at £11.8 million per year. This is less than three per cent (2.87 per cent) of the commodity value of the coal that would be extracted, which we estimate to be £411 million per year, using commodity prices for coking and middling coal.

The carbon emissions would be around 6,000 tonnes CO₂ per year for the lifetime of the mine. This compares with under seven tonnes of CO₂ per person per year in the UK at present, a figure which must fall to net zero by 2050. The carbon footprint of the salaries paid would be almost three quarters of a tonne of CO₂ per £1 earned by the workforce (700kg CO₂ per £).
A consistent approach is needed

As the evidence shows, the case for new coal mines in the UK, whether for steelmaking or for power generation, is weak. The permitting of the West Cumbria Mining development rested on a number of assumptions: that there will be continued demand for metallurgical coal in the UK and elsewhere; that steel is, and will continue to be, produced using metallurgical coal; and that there is no alternative strategy to bring jobs and economic regeneration to the region. As we have shown, these assumptions can be robustly and clearly challenged.

There is a need for a consistent strategy around fossil fuel extraction and use in the UK. The imperative to reduce the risks of climate change, and to meet targets set both nationally and internationally, means that there should be a moratorium on new extraction projects; an active industrial strategy prioritising low carbon industries; and more powers and responsibilities given to local areas to allow them to manage local climate strategies and invest in green jobs.

“The case for new coal mines in the UK, whether for steelmaking or for power generation, is weak.”
Endnotes

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33 IPPR North, March 2019, A just transition: realising the opportunities of decarbonisation in the North of England
34 Grantham Research Institute on Climate Change and the Environment, 2018, Investing in a Just Transition in the UK
### Job Type Breakdown

<table>
<thead>
<tr>
<th>Job Type</th>
<th>Percentage of Total</th>
<th>Absolute No</th>
<th>Annual Salary per Person</th>
<th>Assumed Salary per Person (£)</th>
<th>Total Salaries for all Employees per Year (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production</td>
<td>71%*</td>
<td>355</td>
<td>16 - 25k</td>
<td>21,000.00</td>
<td>7,455,000.00</td>
</tr>
<tr>
<td>U/G Support</td>
<td>12%</td>
<td>60</td>
<td>16 - 25k</td>
<td>21,000.00</td>
<td>1,260,000.00</td>
</tr>
<tr>
<td>Surface Support</td>
<td>5%</td>
<td>25</td>
<td>16 - 25k</td>
<td>21,000.00</td>
<td>525,000.00</td>
</tr>
<tr>
<td>CHPP</td>
<td>7%</td>
<td>35</td>
<td>18 - 36k</td>
<td>27,000.00</td>
<td>945,000.00</td>
</tr>
<tr>
<td>Technical</td>
<td>2%</td>
<td>10</td>
<td>22 - 60k</td>
<td>36,000.00</td>
<td>360,000.00</td>
</tr>
<tr>
<td>Management</td>
<td>3%</td>
<td>15</td>
<td>45 - 70k</td>
<td>57,500.00</td>
<td>862,500.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
<td><strong>500</strong></td>
<td></td>
<td><strong>57,500.00</strong></td>
<td><strong>11,407,500.00</strong></td>
</tr>
</tbody>
</table>

Source: Woodhouse Colliery: planning application environmental statement - non-technical summary. Production increased from 70 per cent to bring jobs total to 500. Total salary is then scaled up slightly, pro rata, to reflect the total employment estimate in the planning application.

Based on the planning application figures of 2.43 million tonnes of coking coal and 0.35 million tonnes of middlings coal extracted per year and commodity prices of $207 and $107 per tonne (from focus-economics.com).

UK emissions stand at 450 million tonnes CO₂e and the population is around 66 million, so per capita emissions, on a production basis, are around 6.8 tonnes per year.
Attachment 2 - Statement from Industry Expert
1. INTRODUCTION

I have been asked to read and examine the report published by the Green Alliance, entitled “The case against new coal mines in the UK”, dated January 2020 (hereinafter I refer to this as “the Report”).

Notwithstanding its title the Report focusses on the proposed development of a new mine at Woodhouse Colliery, Cumbria, and a planning application made by its proposed operators West Cumbria Mining (WCM). The mine would produce a type of coal used in steel making, known as metallurgical coal. This is a type of hard coking coal (HCC) and is a premium product with significantly different properties to thermal coal that is used for power generation. Hard coking coal comprises only a small proportion of total coal reserves and is therefore relatively scarce.

1.2. As instructed I reviewed the Report in February 2020 and prepared this Statement assessing the content of the Report in March 2020.

1.3. This Statement is correct to the best of my knowledge at the time of writing. This expert statement comprises my professional views. It is prepared on the basis that I have a duty of impartiality regardless of the interest of my client’s and a wider duty to the planning authority and the public at large to provide independent expert evidence within my area of competence and expertise.

1.4. This Statement uses the following headings:
1. Introduction
2. Summary Findings
3. Author: Qualifications and Experience
4. Overarching comments in my review of the Report
5. Scope of my detailed response
6. Blast furnace production and the coking coal and steel markets
7. Product substitution
8. The potential effect of cheaper metallurgical coal on the steel industry
9. De-carbonisation of the steel industry
10. Conclusions
Appendix – Qualifications and Experience – further detailed background

2. SUMMARY FINDINGS

2.1. In summary my expert finding is as follows –

2.1.1. On the question of Product Substitution -

2.1.2. It is most likely that the extraction of WCM coal would offset the extraction of metallurgical coal elsewhere, most probably leading to a reduction in the extraction of an equivalent grade of metallurgical coal in the USA through product substitution.

2.1.3. It is most unlikely that this product substitution would result in any net increase in GHG emissions. If anything, it is likely to result in a reduction due to the higher levels of environmental regulation in the UK, methane capture technology and the reduced transportation distances when compared with coal imports from the USA.

2.1.4. Regarding the effect of cheaper metallurgical coal on the steel industry -

2.1.5. At peak production WCM coal will represent only 0.26% of the global metallurgical coal market which is too small to influence global prices. Therefore, the premise in the Report that the proposal will decrease the incentive to use coal more efficiently, recycle more steel, or produce steel using alternative, lower emissions processes, is ill conceived.

2.1.6. The price of steel is a result of many varied factors and care should be taken not to overplay the importance of the metallurgical coal price in this context given that metallurgical coal is just one of a number of inputs in to the steel making process.
2.1.7. On the question of de-carbonisation of the steel industry -

2.1.8. Due to its limited availability, I do not consider that the use of more scrap steel will significantly or materially reduce the demand for new steel from blast furnaces before the end of the century; the Report’s statements on projected emissions from the Mine are significantly overstated in my view. In my judgement the ability to achieve coal-free steel production is most unlikely to be realised in the 50 year lifespan proposed for the Mine. Accordingly, I do not consider that the extraction of WCM coal is likely to have any materially adverse effect on the de-carbonisation of the steel industry.

2.2. The above findings are explained in further detail in the remaining sections of my Statement.

3. AUTHOR: QUALIFICATIONS AND EXPERIENCE

3.1. My name is Dr Neil Bristow and for the last 30 years I have developed expertise in the steel, iron ore, coal (metallurgical and thermal), coke, and ferro-alloy markets and business research and analysis, strategy development, and competitor analysis.

3.2. I hold the following Memberships and Committee positions:

3.2.1. Member of American Iron and Steel Association; (AISI serves as the voice for the USA steel industry);

3.2.2. Associate Fellow of Australian Institute of Management;

3.2.3. Member, Advisory Committee of Met Coke International Coke Conference, USA; (International Coke Conference provides senior decision makers from the USA and global coke, coal and steel markets to hear the latest market trends, as well as technical and operational developments within the industry);

3.2.4. Member, Advisory Committee of Euro Coke International Coal Conference, Europe; (The Eurocoke Summit provides senior decision makers from the global coke, coal and steel markets to hear the latest market trends, as well as technical and operational developments within the industry); and,

3.2.5. Member, Steering Committee of International Coal, Coke and Carbon Forum (the most influential annual forum for the steel commodities market comprising a unique group of senior leaders in both the steel and coal industry).

3.3. I have developed a particular specialism in forecasting accuracy, market analysis, strategy development, innovation and insightful scenario thinking, technical trends and raw materials technology development. This specialism has been widely acknowledged (see for example “Dr Bristow is an internationally recognized industry expert”\(^1\) and “Dr Bristow is an internationally recognized expert in areas of steel and steelmaking raw materials, long term trends and scenarios”\(^2\)).

3.4. I have led numerous major research studies and have chaired and presented at a wide range of international meetings and conferences, across iron ore, coking and thermal coal, and coke. I have authored numerous market and technical papers.

3.5. Further detailed evidence of my background and experience is contained in the appendix to this paper.

4. OVERARCHING COMMENTS IN MY REVIEW OF THE REPORT

4.1. I note that the authors of the Report have no qualifications or experience in the coal industry, nor the steel industry or the way in which those markets in those industries operate. If they did I would have expected them to cite them. In particular, it is apparent that the authors have no experience in the economics or logistics of mining, shipping and critical resource protection. This may explain the following overarching fundamental flaws and omissions in the approach which the authors to the Report have taken to the topic.

\(^1\) Exclusive Interview: Dr. Neil Bristow Explains That Yes, There Is Life Left In Coke!
\(^2\) https://www.metcokemarkets.com/eurocoke-summit/advisory-board
4.2. The Report is also partial (in the sense of limited) in its appraisal. For example there is no acknowledgement in the Report that if all coal used in the steelmaking process was stopped tomorrow, the transition to a green economy would rapidly cease because this transition relies upon metallurgical coal to produce one of the most fundamental materials required for a green economy - steel. The use of metallurgical coal has been, and will continue for decades, to be one of the primary ways in which to make iron, a key constituent of steel.

4.3. It is important not to underestimate the importance of steel in the green economy, as a fundamental material for the sustainable future of our planet. There is no alternative material for making such things as wind turbines, railway lines, bicycles, improved water and other basic utilities infrastructure, as well as fundamental equipment that is essential to our everyday lives, ranging from kettles to cookers, and transportation, including cars and buses. More recently the role of steel in medical and hospital equipment has been highlighted [UK steel industry is ready to aid in coronavirus crisis 24 MARCH 2020]. The importance of the steel industry to the UK is reflected in the government recent support of British Steel [see e.g. ‘British Steel rescue: UK extends funding ahead of decision on Jingye’ Guardian 28 February 2020]. There is no prohibition on the burning of coke in UK Steel works and as far as I am aware no government proposals to do so. Frankly, for the reasons I touch on in this expert statement I am not surprised.

4.4. Throughout my career I have been involved with alternative steel making processes, i.e. those that use less or no coal. I can personally attest that such alternatives are not currently scalable, nor commercially viable, and whilst research into such methods is ongoing, the development is expected to take a number of decades. At present the closest would be Direct Reduction, which is predominantly natural gas based and therefore poses its own greenhouse gas emission problems.

4.5. Metallurgical coal is used to make a product which is recyclable, and which, through its use in renewable energy generation, actually offsets the GHG emissions that arise in the making of steel.

5. SCOPE OF MY DETAILED RESPONSE

5.1. I will address, and seek to provide clarity on, a number of issues raised in the Report under the following broad headings:

• Product substitution;
• The potential effect of cheaper metallurgical coal on the steel industry; and
• De-carbonisation of the steel industry.

5.2. Before addressing the specific points identified above, it is helpful to provide a broad overview of blast furnace steel production and the global market for steel and metallurgical coal (also known as met coal, or coking coal), which provides important context for the rest of this Statement.

6. BLAST FURNACE PRODUCTION AND THE COKING COAL AND STEEL MARKETS

6.1. Steel is used in a huge variety of applications, the diversity of which requires the steel industry to produce a range of grades and qualities of steel. There are over 3,500 different steel grades, encompassing unique physical, chemical and environmental properties, and over 10,000 different steel products in commercial use today. The most common way to make steel, and the method that is used for up to 75% of the world’s steel production, involves a sequential process using metallurgical coal and other ingredients. Metallurgical coal is baked at high temperatures in an inert atmosphere to make metallurgical coke. Coke is then placed in a blast furnace along with iron ore, and other materials, to make liquid iron. This is then placed in a basic oxygen furnace and oxygen is injected and other materials added to make steel. Hence, metallurgical coal is only one of a number of components that are necessary for the manufacture of steel. Each step in the steel making process is described in more detail below.

Coke making

6.2. Coking [metallurgical] coal is converted to coke by heating the coal in a coking oven. This drives off volatile materials to leave almost pure carbon. The physical properties of coking coal cause the coal to soften, liquefy and then re-solidify into hard but porous lumps when heated in the absence of air.

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[6] Direct Reduction Iron (DRI) also called sponge iron, is produced from the direct reduction of iron ore to iron by a reducing gas or elemental carbon produced from natural gas or coal. Direct reduction refers to solid-state processes which reduce iron oxides to metallic iron at temperatures below the melting point of iron
6.3. This process takes between 12 to 36 hours. Once pushed out of the oven, the hot coke is then quenched with either water or air to cool it before storage, or is transferred directly to the blast furnace for use in iron making.

6.4. The coke making process releases gases which contain a high degree of energy. These gases are captured and then recycled in other parts of the steel making operations as a fuel. This reduces the amount of energy required from the grid in steel production, which in turn lowers total greenhouse gas emissions arising from this process.

Iron making

6.5. A blast furnace is fed with iron ore, coke and small quantities of fluxes (minerals such as limestone, which are used to react with impurities in the iron ore and coke). Air, which is heated to about 1,200°C, is blown into the furnace through nozzles in the lower section. The air causes the coke to burn, producing carbon monoxide at around 2,100°C, which reacts with the iron ore, as well as heat to melt the iron. Finally, the tap hole at the bottom of the furnace is opened and molten iron and slag (impurities) are drained off.

Steel making

6.6. The most commonly applied process for steelmaking is the integrated steelmaking process via the Blast Furnace and Basic Oxygen Furnace. In the basic oxygen furnace, iron is combined with varying amounts of steel scrap (less than 30%) and small amounts of flux. A lance is introduced into the vessel and blows 99% pure oxygen into it, causing a temperature rise to 1,700°C. The scrap melts, impurities are oxidised, and the carbon content is reduced by 90%, resulting in liquid steel.

6.7. Other processes can follow, called secondary steelmaking processes, where the properties of steel are determined by the addition of other elements, such as boron, chromium, manganese and molybdenum, amongst others. In these processes, over 90% of carbon is removed from most steels. These secondary processes create the required grade and quality of steel.

6.8. Optimal operation of the blast furnace demands the highest quality of raw materials; the carbon content of coke therefore plays a crucial role in terms of its effect in the furnace and on the hot metal quality. A blast furnace fed with high quality coke requires less coke input, results in higher quality hot metal and better productivity, together with a lower blast furnace fuel rate, i.e. lower carbon emissions.

6.9. Figure 1 below shows the steel making process in graphic form.

Figure 1: The Steel Making Process
6.10. It takes up to 770 kg of coal to produce 1 tonne of steel through this production route.

Sources of steel for the steel market

6.11. The majority of steel made every year is ‘new’ steel from raw materials (around 75%). This steel can be manufactured to a range of qualities, from high-quality ‘hot rolled’ steel for use in engineering, automotive and aviation sectors, to the lower grade steels for construction applications.

6.12. Looking to the future, it is likely that the blast furnace process will still constitute at least 60% of all steel production over the next few decades (this is explained in more detail at section 8 below).

6.13. The remainder of steel making is using scrap steel as a primary ingredient in an electric arc furnace. Scrap steel is usually only able to produce relatively low grade long steel products, for example construction products such as reinforcement bar or steel mesh. This is because recycled steel contains impurities such as copper and tin, which are difficult to fully remove in the recycling process, and make the resulting steel unsuitable for high grade applications.

6.14. Around 85% of scrap steel in Europe is already recycled. The ability to recycle scrap steel depends upon the quality of the scrap steel and its intended use following recycling. Prior to use, the scrap steel needs to be cleaned of the contamination caused by its previous use before being heated at a high temperature in order to reduce it to a molten state and drive off remaining contaminants. The processing and cleaning of scrap is itself energy intensive, resulting in GHG and other emissions.

6.15. The market for recycled steel products is of course heavily constrained by the availability from time to time of scrap steel to feed into the recycling process. Around 51% of all steel made is ‘locked in’ within infrastructure, for example bridges, tunnels and buildings, which typically has a long lifetime before it will be decommissioned and demolished. Other medium to long term uses of steel include rail lines, engines, aerospace uses etc.

Demand for New Steel

6.16. In February 2020, the British Government launched its hugely ambitious plans for the ‘COP 26’ UN climate conference which it will host in November. Subject to any COVID-19 delays this will be a major event and could lead to a new global agreement to speed up carbon emission reductions. The path to significantly reducing global emissions can only be achieved if new low carbon technologies are built and deployed around the world. This will require the mass manufacture, construction and installation of renewable technologies as well as other low carbon power generation on a scale never before witnessed.

6.17. On 2 March 2020, the Prime Minister, Boris Johnson, announced a change in UK energy generation policy, reversing what was effectively a moratorium on onshore wind turbines announced by a previous Conservative administration. This will generate an increased demand for wind turbines and the associated infrastructure required to install and operate them. With the takeover of British Steel in Scunthorpe completed on 9 March 2020, the future for the British steel making industry looks more positive than it has for some time.

6.18. To achieve the green infrastructure, low emissions vision, the world will require high grade steel which cannot currently be produced from recycled steel, due to the issues raised by the presence of impurities in scrap steel, as discussed earlier. Manufacturing of one wind turbine of 1MW capacity requires around 200 tonnes of coking coal. The proposed mine at Whitehaven will produce this coal, and will become a local supplier for the British steel industry, as well as a much more local supplier than the USA to the European steel industry.

6.19. Additionally, global demand for steel will increase as less developed countries for example India, improve their infrastructure and standard of living, requiring steel containing products from railways to bicycles, construction and domestic appliances.

Market forces in the steel industry

6.20. Demand for steel is driven by a country’s economic outlook and Gross Domestic Product (GDP) growth. Stronger economies with GDP growth generate infrastructure spending and improved quality of life, which in turn increases steel demand. This requires an increase in iron production, which requires coking coal.
6.21. Steel makers make steel to order. The process of making steel is expensive and energy intensive, so for manufacturers to make it without a market for it would result in the need for steel to be stockpiled. Stockpiled steel degrades over time by processes including age hardening and rusting, which results in a devalued product, or, in the worst case, a product which may need reprocessing before it can be sold. The money invested by the manufacturers in making it is then lost.

6.22. Historic market data shows that when steel production increases, coking coal production increases, and not the other way around. This is illustrated in Figure 2 below, which shows world coking coal production plotted alongside world steel production, in millions of tonnes per year from the years 1981 to 2006. It shows that world coking coal production generally lags behind world steel production, clearly demonstrating that steel production does not rise in response to coking coal production. Similar to the quality degradation occurring when steel is stockpiled, coking coal also degrades when it is stockpiled, causing it to be devalued and losing its properties as a coking coal product.

Figure 2. Graph showing world coking coal and steel production (millions of tonnes) from 1981 to 2006

7. PRODUCT SUBSTITUTION

7.1. The Report states that product substitution is contrary to economic theory, which suggests that an increase in the supply of a commodity would reduce its price and therefore increase demand for it. This is fundamentally incorrect. I set out below and explain why it is not appropriate to apply this generic principle to the metallurgical coal market.

7.2. West Cumbria Mining (WCM) coal, just like any other coal for steel making, will be mined to order. WCM will not be increasing the supply of a commodity - rather, there will be an increase in permitted reserves, albeit a fractional one as I now describe. To suggest that the product will have any influence at all on global coal prices is incorrect and also misleading. There are two reasons for this.

7.3. First, at maximum permitted output, WCM coal will represent 0.26% of the global metallurgical coal market. This is too small a percentage to influence global metallurgical coal prices. The pricing structure of the other 99.74% of the market will remain exactly as it is currently; there will be no flooding of coal onto the market from Woodhouse Colliery.

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8 See p. 3 of the Green Alliance Report.
7.4. Secondly, it is not competent business strategy to ‘flood’ a market with a product with the aim of reducing its sale price, particularly in the mining industry. The mining industry is one in which the costs of production, overheads, and risks are high, so to intentionally go into business with the aim of reducing operating margins makes no economic sense.

7.5. Unlike, for example, the automotive industry, in which products are made and stored prior to sale in anticipation of future market conditions, coking coal is not mined and stockpiled awaiting a buyer. There are simple economic reasons for this.

7.6. First, to incur the expense of mining a product requires a rate of return upon the sale of the product which is not achieved if the product is not sold. Therefore, it simply is not viable to mine metallurgical coal to then place it in a stockpile with uncertainty around a future buyer.

7.7. Secondly, to mine a product without a buyer and place it in a stockpile whilst it awaits a buyer incurs a great loss through product degradation. The longer the product is exposed, the more it degrades. Stockpiling would therefore cause it to degrade to such an extent that the properties which make it desirable for the steel making market will have deteriorated so that it can only be classed as a much lower grade with a considerably reduced value.

7.8. Coking coal is mined on demand. If better or equivalent grade coal can be mined from a closer location at a similar price, that coal will replace the coal that is currently being exported from further afield. In the present case, the WCM coal will substitute the equivalent volume of USA coal that is currently being exported to Europe by being shipped across the Atlantic.

7.9. In my judgement, the USA would not continue to mine the same grade of coal for sale to other countries because a) there is no proven market for them to do that, and b) because shipping to alternative major steelmaking countries in Asia and India involves such high transport costs that it would question the economic viability. Instead, the most likely outcome is that there would be a corresponding reduction in the extraction of this coal.

7.10. Indeed, the closure or scaling back of mines in the USA as a result of reduced demand from Europe was recently highlighted in the Argus blog. Additionally, the Chief Executive of Glencore stated in February 2020 that: "We don’t want to dig the material out of the ground if it’s not required in the market". This related specifically to demand for thermal coal, however the same argument holds true for metallurgical coal - if the demand is not there, the material will not be mined. In the mining industry, when the market is not there, mining rates are adjusted accordingly.

7.11. In previous market research, I have seen it reported that "the revival of the coking coal industry was driven by an increase in world steel demand." Further market insight reports that, "Met [metallurgical coal] pricing is usually tied to global economic growth because an expanding economy means more construction which means more steel which in turn means more met coal demand", according to Jude Clemente, a widely published expert in natural resources markets.

7.13. Mining is an operation which involves considerable cost and capital outlay. Accordingly, the maintenance of a sufficient cashflow is an essential part of securing the economic viability of mining operations. If faced with a market downturn, mining companies stop production to avoid incurring the costs of mining in the absence of achieving a return on those costs. Therefore, stockpiling mined coal to await an upturn in business is not financially viable and is not common industry practice. Paragraph 7.7 discusses the difficulties of stockpiling coal as a result of its degradation in stockpiles.

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7.14. The economic profitability of a mine is linked to its production costs, known as FOB costs. These are the costs associated with the mining, processing, transport, port charges and royalties of the coal. Mines that sell coal above their FOB costs produce a profit; those that sell below their FOB costs produce a negative return. Market knowledge accumulated over many years of experience enables me to comment on the likely profitability of the WCM mine, comparing it with mines producing similar grades of coal across the world. This is explained below.

7.15. I have compared the projected FOB cost bases of the WCM mine to mines producing metallurgical coal in the rest of the world. The FOB cost bases of the WCM mine are advantageous compared to other world mines producing a similar grade of coal for several reasons. First, the UK operates one of the most attractive royalty regimes when compared with the rest of the world. Second, salaries for miners are lower than for other countries. Third, the freight costs of coal from the UK to the rest of the UK, and the UK to Europe, are significantly lower than the freight costs of anywhere else in the world to the UK and Europe.

7.16. WCM’s predicted operating costs in steady state production are lower than around 75% of other world hard coking coal mines, due to lower cost bases and significantly lower transportation costs.

7.17. Independent market analysis proves this point. Figure 3 below shows the FOB costs for world exports of metallurgical coal in the year 2016, and compares these with the projected FOB costs for the WCM mine. Figure 3 shows that the projected FOB costs of the WCM mine are lower than around three quarters of other world metallurgical coal producers.

Figure 3. Export Metallurgical Coal Cost Curve (FOB) where the x-axis is the total annual quantity of export metallurgical coal globally, and the y-axis is the range of FOB cost of the various producers going from lowest (left) to highest cost producers (right).

7.18. Metallurgical coal is a premium product attracting a high price due to its specific properties. Weathering of coking coal starts as soon as the coal is mined, and it will continue until it is charged in the coke oven to produce coke. In mines, coal exists in a water-saturated, oxygen-free environment. Any disturbance of this environment such as a change in the temperature, moisture content or oxygen partial pressure, results in changes of chemical properties and physical stability. This dynamic behaviour of coal is termed ‘weathering’ and includes the aerial oxidation of the organic and mineral matter [chemical weathering], the microbial oxidation of pyrite [biological weathering] and changes in the moisture content that result in particle size degradation [physical weathering]. During transportation and stockpiling, coal is in contact with air for periods of time that may exceed 6 months. During this time, reaction with oxygen in the presence of water, sunlight and possibly elevated temperatures may take place. Different coals follow different trends during weathering. The weathered coal affects its beneficiation process as due to oxidation coal’s surface property
gets changed and the coal surface become more hydrophilic. Therefore, the sooner the mined coal reaches its intended destination for use in steel making, the better the retained quality of this coal - meaning that less time spent in transit is advantageous for steel makers.

7.19. For example, one of the key differentiators in terms of the price for metallurgical coal is its Free Swelling Index (FSI). FSI is a measure of a coal's swelling properties when heated under prescribed conditions without physical restrictions. As FSI reduces so purchasers will apply a 'penalty' to the selling price. Figure 4 below shows test results which evidence the fact that the FSI is significantly reduced over time.

7.20. The cumulative effect over time is such that the value of the coal is significantly reduced as its suitability for steel making is eroded.

7.21. WCM coal will be classed as a 'High Volatile A' coal, due to its specific characteristics. This is a high-quality hard coking coal (HCC) used for steel making. The USA is currently the major source of a similar grade of coal for the European steel making market and exported 47million tonnes of metallurgical coal in 2019, with around 60% of this being High Volatile A, as per Figure 5 below.

7.22. The primary reason that production from Cumbria will very likely result in an equivalent decrease in production in the USA is economic - Cumbrian coal will be significantly more cost competitive than the USA coal due to lower operational coal production costs. Many USA mines are low height and as a result expensive to operate and mine efficiently.

7.23. The operating costs of the Cumbrian mine will be much lower than the majority of other mines producing HCC coal and this cost advantage is of significant interest to steel makers. I consider that the WCM mine will be more cost-competitive than over 75% of USA mines producing a similar grade of coal, as shown in Figure 3 and explanatory text above.

7.24. This cost advantage is coupled with another significant advantage that Cumbrian coal has over the USA HCC producers, of significantly less transport costs. USA HCC mines are several hundreds of miles distant from shipping ports, involving lengthy rail journeys to take the product to the ports. The east coast of the USA is several thousands of miles distant from Europe, therefore transport costs of HCC coal from the USA mines to Europe are significantly higher than the transport costs of Cumbrian HCC coal to Europe.
7.25. At least 50% of the USA coal mines are described as “marginal producers”, which means that they operate with high levels of production costs (due to various factors including the distances and costs involved in transportation) and are only able to make profits when the coal selling price is high (typically above US$140/t). Indeed, recent evidence shows that high cost coal mines in the USA are closing down due to falling coal prices.13

7.26. If USA mines were to try to compete on cost against WCM, they would simply become uneconomic - these established mines have fixed operating costs, which would make it very difficult for them to compete. Indeed, to undertake such measures to compete for such a small fraction of the market that WCM will hold is highly likely to be unattractive to those operators, whose most economic route would simply be to scale back production or close the mine.

7.27. Target customers in the UK and Europe all source the majority of their High Vol A metallurgical coal from the east coast of the USA, as there are no other more cost-effective sources. Reliance on one geographical source presents risks arising from transport delays, geo-political or tariff changes, and supply security. As a result, these customers are continuously seeking to diversify their supply sources to de-risk the supply of the raw materials required particularly for scarce High Vol A premium coking coals.

7.28. Cumbrian produced coal will be available to the European market in a matter of hours, rather than weeks, and this has significant advantages for steel producers, including significantly reduced shipping costs, significantly shorter lead-in times from order to delivery, and the ability therefore to be more responsive to last-minute demand, with better coal quality due to less degradation caused by coal being transported in a ships’ hold for long periods as it crosses the Atlantic. The largest producing area of metallurgical coal that would compete with coal produced by WCM in the USA is central Appalachia, which is rail linked over distances of, on average, 600km, to ports at Norfolk, Virginia and Baltimore, Maryland. Coal is shipped primarily to Rotterdam from these locations, over distances of 7,738 km (4179 nautical miles) from Norfolk, and 8,035 km (4339 nautical miles) from Baltimore. Comparing the travel distances for coal from West Cumbria Mining operations to Rotterdam, the rail route from Pow Beck valley to Redcar is 215 km and the shipping distance from Redcar (Port of Teeside) to Rotterdam is 674 km (364 nautical miles). This is demonstrated by Figure 6 below.

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**Figure 6: Shipping distances from WCM as compared to coal imported from USA**

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7.29. It is unrealistic to conceive that European steel makers would continue to buy USA High Vol coal over and above Cumbrian High Vol coal when the Cumbrian coal is significantly cheaper, much more readily available, has better retained quality due to shorter shipping distances, and has fewer upstream carbon emissions arising from transport of the product due to far shorter travelling distances. This is further supported by information that I understand has been obtained by WCM from EU steelmakers, including two separate letters of support from British Steel and Tata Steel UK, signalling strong interest in a UK produced coal for sustainability reasons.

7.30. High Vol A metallurgical coal is a premium price product, due to its relative scarcity, which makes it an EU Critical Raw Material. Steel makers will not simply buy more High Vol A metallurgical coal than they need once Woodhouse Colliery comes on stream, because High Vol A metallurgical coal is only one of several ingredients required in steel making.

7.31. Cumbrian High Vol A metallurgical coal is therefore most likely also be preferred by UK and European steel makers because of its significantly reduced travel distances, and consequent reductions in transport related environmental emissions. This has been most recently confirmed in discussion between WCM and one of Europe’s largest steel producers, Tata Steel. Indeed, it is these factors that are the fundamental aspects of WCM’s business case for investors in developing the mine.

7.32. It is my understanding that WCM has undertaken market research over the last 5 years to demonstrate these principles, using industry experts and trade bodies. From this, it is clear that there is a very high level of interest from UK and European steel makers, who are interested because of the proximity of this resource so close to their plants. Paragraph 7.44 below describes the size of the European Metallurgical coal market, and confirms that it is large enough to accept all the proposed output from WCM.

### Comparative Greenhouse Gas emissions from substituted coal

7.33. At full production Woodhouse colliery will employ 500 people and generate GHG emissions from the following:

- 7.33.1. Testing and possible use of emergency Diesel Generators
- 7.33.2. Mobile machinery/plant [CAT D6 / Driftrunners / MSVs / Trucks]
- 7.33.3. Fugitive Emissions from the mining operation
- 7.33.4. Energy imported from the electricity grid
- 7.33.5. Purchased Goods and Services (e.g. such as diesel)
- 7.33.6. Employee Commuting
- 7.33.7. Waste generated in operations

7.34. It is safe to assume that another underground mine of similar conditions mining and processing the same product will require a similar number of people and equipment.

7.35. However, I am aware that there are distinct differences between the environmental regulatory regimes and aspirations of the UK and Europe when compared with the USA. For example, since 2005, in Europe the EU Emissions Trading Scheme has been solely focussed on reducing GHG emissions from heavy industry, including steel making and other heavy installations. This scheme has seen a 21% reduction in GHG emissions from those industries since 2005. There is no similar scheme in the USA, where, in fact, the regime has been relaxed under the Trump Administration (for example their withdrawal from the Paris Climate Agreement).

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7.36. There are additional regulatory requirements in the UK for companies which either exceed annual turnover thresholds and/or who are quoted on the stock market which relate to improving energy performance and reducing carbon emissions. These are:

7.36.1. Energy Savings Opportunity Scheme (ESOS) Regulations 2014: for large companies (or ‘undertakings’) in the UK it has been mandatory since 2014 to complete an assessment of energy consumption, appoint an independent assessor, and identify energy saving opportunities.

7.36.2. Streamlined Energy and Carbon Reporting (SERC) Regulations 2018: require quoted companies to measure and report energy use and carbon emissions and KPIs to reduce energy use.

7.37. There is no such equivalent in the USA. In my judgement and experience, the regulatory imperatives for industry to reduce GHG emissions in the UK are far stronger than those in the USA.

7.38. Additionally, President Trump has given notice that the USA will no longer participate in the 2015 Paris Agreement on climate change mitigation. The UK has given no such notice and remains committed to the Paris Agreement. Indeed, Prime Minister Johnson, in December 2019, undertook to make Britain the “cleanest, greenest” country on earth. This is in stark contrast to the objectives of the USA. It is reasonable to conclude that coal mined in the UK will contribute less to GHG emissions than an equivalent operation in the USA or any other country where coal mining and industry have far lower levels of environmental regulation. For example, Indonesia, where it was announced in February 2020 that coal mines will be subjected to a reduced level of environmental regulation, to relax the rules surrounding mining and encourage investment in the coal mining industry there.

7.39. I understand that WCM is committed (and obliged by planning condition) to install a methane capture and drainage system at the mine, in order to prevent the uncontrolled release of methane. Methane is a naturally occurring gas trapped in the coal, and is released upon the coal’s exposure to air. Methane is many times more potent as a greenhouse gas than CO₂ - its impacts are 34 times greater than CO₂ over a 100 year period. The capture and drainage system will ensure that the methane released from the coal is reduced and mitigated. Instead it will be put to beneficial use, as it is an asset as an energy source for the mine, with no atmospheric impact. Methane capture and use is not widely used in mining, and indeed, recent research has shown that methane from coal mines in the USA is a significant factor in the USA’s GHG emissions.

7.40. There is an increasing amount of renewable and lower emission energy generation supplied to the grid in the UK. WCM will therefore be sourcing its power from the ever ‘greener’ UK generating market.

7.41. WCM coal production will result in a significant reduction in transport emissions when compared with coal imported to Europe from destinations including the USA. This is because WCM coal is mined thousands of miles closer to its end-destination than USA coal.

7.42. Coal imported from the Appalachian region of USA, where the majority of USA HV met coal mines are located that transport coal to Europe, undergoes rail-transport distances of around 600 kilometres from mine to shipping port, and then 7,000 – 8,000 kilometres of shipping haulage from the USA to Europe.

7.43. Coal exported from Cumbria to Europe requires rail-transport distances of 215 kilometres to the port of Redcar, where the shipping distance to Europe is around 668 kilometres.

7.44. At present the EU’s annual demand for coking coal is at around 53 million tonnes, with annual imports of around 40-44 million tonnes mainly coming from distant countries such as the USA. Therefore the market for WCM coal within Europe is significant [approximately 15 times WCM’s proposed maximum annual production]. Steel manufacturers will always seek to reduce the costs and improve the security of supply of their raw materials, particularly in the light of the very high production costs of steel.

7.45. There is more than sufficient demand for WCM’s metallurgical coal in the EU market and there is no economic reason why WCM coal would be exported further afield when it can meet the EU demand and, in doing so, provide a more cost effective, better quality product than the USA High Vol A coal.

7.46. In light of all the points which I have set out above, it is my view that it is most likely that the extraction of WCM coal would offset the extraction of metallurgical coal elsewhere, most probably leading to a reduction in the extraction of an equivalent grade of metallurgical coal in the USA through product substitution.

7.47. Moreover, it is unlikely that this product substitution would result in any increase in GHG emissions. If anything, it is likely to result in a reduction due to the higher levels of environmental regulation in the UK, methane capture technology and the reduced transportation distances when compared with coal imports from the USA.

8. POTENTIAL EFFECT OF CHEAPER METALLURGICAL COAL ON THE STEEL INDUSTRY

8.1. The Report states that if the extraction of WCM coal would result in a reduction in metallurgical coal prices this, in turn, would decrease the incentive to use coal more efficiently, recycle more steel, or produce steel using alternative, lower emissions processes.

8.2. I have already explained why the proposed mine in Cumbria would not result in a net increase in the supply of coal, because the Cumbrian mine only represents a potential increase in permitted reserves, rather than an increase in supply. Added to which is the fractional percentage of Cumbrian coal when compared with global met coal production [as described above]. Accordingly, I cannot agree with the premise of the suggestion that there would be a corresponding reduction in the global price of met coal. Such a premise is based on a fundamental misunderstanding of the nature of metallurgical coal production, coking coal quality and the steel market.

8.3. Metallurgical coal is just one of a number of inputs into the steel making process, and in fact metallurgical coal is used not to make steel directly, but to make one of steel’s key constituents, coke, which is a key part of the manufacture of blast furnace pig iron - which itself has several inputs.

8.4. Additionally, all the other inputs into the steel, including the cost of energy to make it, would have to show similar price trends at the same time in order for there to be an influence on the price of steel. Therefore, it is economically naïve to suggest that metallurgical coal production from Cumbria, representing less than 0.26% of the global metallurgical coal market, will affect the price of steel.

8.5. The price of steel is a result of many varied factors, including the price of raw materials (particularly iron ore and limestone), but also demand as a result of changes in economic conditions, competition, industrial and economic growth expectations, economic stimulus measures, levels of public investment in infrastructure, business sentiment etc.

8.6. Therefore, in this complex and often changing picture, to try to overplay the importance of the price of metallurgical coal in steel making serves only to result in a misconceived understanding of the market.

8.7. This is further illustrated by looking at the historic relationship between the price of metallurgical coal and the production of steel. Figure 7 below shows a plot of the last 30 years of world steel production against the price of Hard Coking Coal (HCC - the same grade as the Cumbrian coal), which shows that there is no correlation between the two. This evidence supports my view and the position articulated by WCM [and the reality of how this market works] that steel demand is market driven, not driven by the price of HCC coal.
8.8. There is no doubt that as less developed countries continue to develop, and implement infrastructure and lifestyle improvements, that steel demand will continue to grow. The World Steel Association have also issued projections for future steel consumption which all show continued and sustained growth in global steel demand [see Figure 8 below].

8.9. In order for these demand increases to be met, new steel from raw materials needs to continue to be made. Given there are no scalable or commercially viable alternative steel making technologies which would meet the projected demands, the blast furnace route will continue to dominate in the coming decades.

8.10. In my opinion, the balance of blast furnace production over the next 30 years will remain at a minimum of 60% of global production. This takes into account the design life of existing blast furnaces. It is important to note that these can be retrofitted with emissions capture technologies, as and when these become available, so in my opinion blast furnace production will still be at least 50% of production output over the next 50 years.
8.11. Finally, even if the extraction of WCM coal did in any way affect the price of coal and steel, for the reasons set out in more detail below, I do not consider that any price differences would have a material effect on the de-carbonisation of the steel industry.

9. **DE-CARBONISATION OF THE STEEL INDUSTRY**

9.1. The Report sets out a number of strategies which can be used to reduce the impact of steelmaking on climate change.\(^{20}\)

9.2. I have already dealt with the first of these [the use of less steel] above. I will address the remaining three strategies in more detail below.

**The role of recycled steel**

9.3. I have indicated above that there will be some increase in Electric Arc Furnace (EAF) output, however it is important to consider the current and future availability and recycling opportunities for scrap steel.

9.4. Scrap steel availability is generally stable in Europe; in order to generate the scrap, infrastructure has to be demolished, and this, coupled with the fact that steel is generally ‘locked in’ to its major uses for several decades (within buildings, bridges, tunnels, rail lines, etc.),\(^{21}\) means that scrap levels are finite. Indeed, around 85% of scrap steel in Europe is already recycled.\(^{22}\)

9.5. Arcelor Mittal, one of the world’s largest steel producers, published a report in 2019\(^{23}\), which is referenced in the Report. Arcelor Mittal provide commentary on the availability and use of scrap steel. Arcelor Mittal’s Report [page 2] states that there is, “not enough scrap available in the world to make all steel through the electric arc furnace”; and at page 10 that, “the strong demand for steel in the developing world means that end-of-life scrap is only sufficient for a modest share (approximately 22%) of metallic input for global steel production.”; and that, “the availability of end-of-life scrap lags demand for steel by several decades, typically 10-50 years or more after production depending upon application. This means the world will still be reliant on primary steel making from iron ore until nearer the end of this century.” At page 12, the Arcelor Mittal Report states, “As living standards improve and infrastructure across the globe matures, demand for steel will eventually plateau. After that, enough end-of-life scrap will be available to meet the bulk of steel demand, leading to a fully circular steel value chain. Since this transition is unlikely to become reality much before the end of the century, iron and steelmaking from iron ore will continue to play an important role in meeting global steel demand well beyond 2050.”

9.6. The World Steel Association predicts a growth in scrap steel availability, and this is considered by the Association’s Head of Raw Materials, Dr Baris Bekir Çiftçi, who predicts 1.3 billion tonnes of scrap steel becoming available on the world market by 2050.\(^{24}\) However, this only represents 46% of forecast global steel production in 2050, according to SSAB, a leading steel producer.\(^{25}\)

9.7. It must also be recalled that the recycling of steel using the electric arc furnace demands very significant quantities of electricity and cannot produce high grades of steel which are required for specific purposes and uses; it mainly produces the lower grades of steel only, which can only be used for general construction purposes (for example, reinforcement bar in concrete buildings and structures). This is because the quality of available scrap steel is generally deteriorating, as it contains rising and higher levels of copper and tin. High grade steel is generally only produced from raw materials, rather than recycled scrap. Thus, even if scrap steel availability were to increase dramatically, it would still not be able to meet the considerable demand for new higher-grade steel.

9.8. As such, I do not consider, certainly at the European level, and most likely at the global scale, that the use of more scrap steel will significantly reduce the demand for new steel from blast furnaces before the end of the century. Indeed, as scrap quality declines, additional high quality metallics are being used in the EAF such as cold blast furnace pig iron.

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\(^{20}\) See p. 6 of the Green Alliance Report.

\(^{21}\) Much steel is ‘locked in’ within infrastructure [currently 51% of all steel produced is used in buildings and infrastructure which have a long life prior to returning to scrap, [source data from the World Steel Association](https://circuareconomy.worldsteel.org/).

\(^{22}\) [https://www.worldsteel.org](https://www.worldsteel.org)

\(^{23}\) Arcelor Mittal (2019) Climate Action Report

\(^{24}\) [Worldsteel forecasts 1.3Bt of scrap availability, 46% of SSAB’s 2050 forecast of 2.8Bt for total steel production.](https://ssabwebsitecdn.azureedge.net/-/media/hybrit/files/hybrit_brochure.pdf?m=20180201085027)
Blast furnace efficiency

9.9. The Report states that when the coal from West Cumbria Mining is used, it will, “emit around 420 million tonnes CO₂e.”\(^{26}\) This estimate is over the extraction lifetime of the mine, which is 50 years. The Report’s authors have equated this figure with being just under a year of the UK’s entire annual emissions of 450 million tonnes - although the Report then states that the UK’s annual emissions figures will come down as the UK progresses to its net zero target.

9.10. However, the Report’s authors have omitted to mention the considerable and continued efforts of the EU steel making industry to reduce its emissions, and therefore that Report’s statements on projected emissions from the Mine are significantly overstated in my view.

9.11. European steelmakers have always sought to be world leaders in efficient steel production and have made significant progress in the efficiency of making steel and reducing emissions as part of this process. Indeed, European steelmakers are now the most efficient globally and have reduced their emissions significantly in comparison to other global steelmaking sources [the European Commission publishes specific data which supports this view]\(^{27}\). Whatever steps are taken to improve efficiency, it will not remove the need for metallurgical coal (and thus coke) as a key and integral ingredient in the European steelmaking industry well beyond 2050. Currently, global steel production is overwhelmingly reliant upon coal - over 75% of steel produced uses coal, with the remainder produced using electricity. Steel is a man-made alloy of iron and carbon - carbon is found in coal.

9.12. I fully support the drive within the industry to reduce its greenhouse gas emissions. However, this will take time. During the considerable transition period that will be required, WCM can support these initiatives in two ways:

9.12.1. By introducing methane capture technology at the Whitehaven mine;


Other alternative production methods

9.13. Steel makers have publicly stated their commitments to reducing carbon emissions from steel making. This is evidenced by the Ultra-Low CO₂ Steelmaking (ULCOS) partnership, a pioneering partnership of 48 companies and organisations across 15 European countries, whose aim is to achieve a step change in CO₂ emissions from steel making, notably a target of achieving at least a 50% reduction in CO₂ emissions per tonne of steel by 2050. Having said that, ULCOS is working on a technique which should achieve up to 70% CO₂ emissions reductions, using a cyclone-converter iron-making process in conjunction with carbon capture and storage.

9.14. The Direct Reduced Iron (DRI) method relies on natural gas or coal, and is typically used in countries with large domestic reserves of steam coal or natural gas. Therefore there are still GHG emissions from this technology.\(^{28}\) Over the coming decades, as steel making methods are refined to use less metallurgical coal, there will be a per tonne reduction in the amount of metallurgical coal required for steel making. However, the current alternative methods are not yet commercially tested or viable, and are certainly several decades away from being a meaningful competitor to the blast furnace method. 20% of the current ~100Mtpa production of DRI uses coal as the reductant, mostly in India. Most other production is centred on countries where gas is very low cost, i.e. Iran and Russia.\(^{29}\)

9.15. The technologies being proposed by ArcelorMittal referred to on p. 7 of the Report are variants of the current DRI processes; the Arcelor project is based upon a hydrogen fired Midrex unit. The timeframe targets to achieve industrial viability are relatively long, i.e. 2040-2050, and as another steel maker, SSAB, states,\(^{30}\) there are significant challenges to be overcome:
- Hydrogen – large scale industrial production, storage and transport has yet to be proven as practical, safe and cost effective;
- Electricity – by definition has to be fossil-free, easier in some regions than others, and

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\(^{26}\) Green Alliance, page 5
\(^{28}\) World Coal Institute [2009] Coal and Steel
\(^{30}\) [https://ssabwebsitecdn.azureedge.net/-/media/hybrit/files/hybrit_brochure.pdf?m=2018020315027](https://ssabwebsitecdn.azureedge.net/-/media/hybrit/files/hybrit_brochure.pdf?m=2018020315027)
9.16. It is expected that it will be possible to achieve coal-free steel production in the future. However, it is difficult to envisage a significant reduction in the blast furnace route in the coming decades. Perhaps SSAB’s forecast increase of 150Mtpa of primary steel by 2050 may include some coal-free production, but that is equivalent to 30 Port Talbot steel making facilities, all based upon yet-to-be proven large scale technology and currently without supporting infrastructure. Accordingly, in my judgement the ability to achieve coal-free steel production in Europe, which is the intended market for WCM coal, is most unlikely to be realised in the 50 year lifespan proposed for the Whitehaven mine.

9.17. Furthermore, given its tiny fraction of the global met coal market, production at Woodhouse Colliery will not in any way impact the ongoing drive within the steel industry to reduce its carbon emissions. As discussed, this drive to reduce emissions from the steel making industry has already seen significant improvements through efficiency, and the ULCOS initiative in conjunction with the EU ETS and the goals for zero carbon by 2050 will ensure that emissions are continually reduced and/or offset. Energy reductions to date are described in paragraph 9.13 above.

Continued role for met coal during transition period

9.18. The tiny projected market share of the proposed Cumbrian mine will not be sufficient to influence long-established regulatory regimes and the drive across the entire steel industry to reduce emissions in the goal to net zero by 2050. Instead, I consider that it can help the steel industry reduce its emissions (as described above at paragraph 8.10).

9.19. I am also aware that environmental scientists accept that coal use for steel making is required as part of a transition to a low carbon future, in particular for the use of steel in manufacturing wind turbines, solar panels and other forms of renewable energy. For example, Professor Roger Pielke Jr, a Professor in the Environmental Studies Programme at the University of Colorado, in an interview broadcast on 11 January 2020, states that in order to move away from using oil and gas for electricity consumption (the most significant source of global GHG emissions), that 1,500 wind turbines would need to be built every day for the next 30 years just to keep the lights on as gas and coal power stations are closed. This is not accounting for the proportion of the world’s population that does not yet have good or reliable access to power, so it is reasonable to assume that power demand will increase beyond this. Professor Pielke goes on to state that the significant amount of wind and solar renewable energy needs a source of significant concentration of energy, for example coking coal, to produce steel and concrete required for wind and solar. Indeed, Professor Myles Allen, a physicist who has spent 30 years studying global climate change, and is a former lead author of the 3rd Assessment of the Intergovernmental Panel on Climate Change in 2001, stated in an interview recently that fossil fuels are a necessary part of the future, albeit that carbon capture and/or emissions reductions are essential.

9.20. WCM will not be producing ‘more’ met coal than is currently being produced due to the likely effect of product substitution. However, even if it was, the small proportion of WCM coal in the context of the global met coal market will have no impact on industry or other research initiatives to become more efficient. Furthermore, and in any case, as I have explained above, it will take many decades for these alternatives to become commercially viable and for the continued need for met coal to be phased out.

9.21. Therefore, I do not consider that the extraction of WCM coal is likely to have any materially adverse effect on the decarbonisation of the steel industry.

10. CONCLUSION

10.1. I disagree with many of the assertions in the Report, for the reasons given in this Statement.

10.2. It is apparent that the authors of the Report do not have the relevant industry or market knowledge or understanding to substantiate the claims made in the Report. Whilst the European steel industry is already on the journey to reducing its GHG emissions, further developments will be made in the future as a result of continued regulation and industry commitments. Projected emissions figures given in the Report therefore hold no weight when properly examined.

31 https://www.bbc.co.uk/sounds/play/m000d73d
32 https://www.bbc.co.uk/sounds/play/m000fgcn
10.3. The fraction of global metallurgical coal production that the Cumbrian mine would produce, even at full production, is, in my opinion, far too insignificant to have any bearing or material impact at all on metallurgical coal prices or steel prices, for the reasons I have given.

10.4. In the meantime, the WCM project has clear advantages as it becomes a local supplier of coal to the UK steel industry, and a much more local source of coal to the European steel industry than its USA equivalent. Additionally, the environmental governance and standards of production for mining are significantly higher in the UK than the USA, and I see the WCM project as being a leader in its field. I note that the predicted benefits of the project to the community as identified in WCM’s planning application, including 500 direct jobs (as well as considerably more indirect jobs) in a local community which holds some of the most economically deprived areas in the country, are entirely consistent with my own experience of this industry.

Signed Dr Neil J Bristow

Dated 5/5/2020

APPENDIX - QUALIFICATIONS AND EXPERIENCE OF THE AUTHOR, DR. NEIL J. BRISTOW

Schedule 1 I have a first-class honours degree in Chemistry and a Ph D. in Physical Chemistry from the University of Nottingham. I have authored and co-authored a number of scientific papers in various academic journals.

Schedule 2 On leaving University I worked in the Research Laboratories of Unilever Research at Port Sunlight in the Wirral, working on polymer science and surface adsorption. I then moved to the Dental area where I worked in new product formulation and designing prototype dental products for which I developed and hold a number of patents.

Schedule 3 I joined BHP in their Newcastle Research Laboratories in the Raw Materials research group and worked for 7 years on all aspects of iron and steelmaking research including iron ore development and sintering, coking coal evaluation and cokemaking, Blast Furnace (BF) burden evaluation and ironmaking, Pulverised Coal Injection (PCI), alternative ironmaking and cokemaking, and ran and participated in a number of sinter, coke and BF trials at the former Newcastle, Whyalla and Port Kembla steelworks.

Schedule 4 I was involved in raw materials analysis and assessment for the Newcastle COREX project, Western Australian DRI/HBI (Direct Reduced Iron & Hot Briquetted Iron) work, alternative cokemaking and coking coal assessment for potential new cokemaking based on heat recovery coke technology. I visited as part of these roles a number of open cut and underground coking coal mines around the world including USA and Australia.

Schedule 5 I moved to the Market Research area of BHP in San Francisco and led and managed the market and industry analysis of bulk commodities for BHP. This involved market supply and demand analysis, competitor and industry analysis, advising steel industry strategy for them BHP Steel, coking coal and iron ore price forecasting, cost analysis and supported the wider Minerals development strategy, being seconded onto the wider BHP Strategy teams to provide expertise. During this time, I visited a number of international coking coal mines in Canada, USA and Indonesia.

Schedule 6 On returning to Australia I held a number of roles in BHP Coal in Brisbane, leading market and competitor strategy, heading up the wider Minerals market analysis function in Melbourne. I was also a Team Leader of the team dealing with coal and iron ore strategic analysis in Brisbane. I also worked on the merger between BHP and Billiton providing bulk market and industry analysis to the merger teams.

33 Winner of the Elizabeth and J D Marden Prize.
Schedule 7  Following the merger, I was appointed Chief Analyst of the Carbon Steel Materials groups in Singapore. This role involved managing an international team investigating and analysing the growth of China and India, understanding bulk commodity markets and industries (including technology changes in iron and steelmaking, the rise of global steelmaking, coking coal, iron ore and manganese industry, producers and quality trends, marketing strategy, major steelmaking customer strategies, understanding of new coking coal, iron ore and manganese ore reserves together with pricing, cost curve development and forecasting and supply and demand analysis). I was also the technical adviser for commodity research for coking coal and iron ore and Chairman of the Analysts forum, a group of key commodity analysts assessing and managing market research across the wider BHP Minerals Group.

Schedule 8  My role in Singapore also saw me travel extensively to steelmaking organisations across Asia, North America and Europe, and visit numerous conventional and non-conventional and heat recovery cokemaking facilities, advising cokemakers on coking coal quality and coking coal blending. During this period I made numerous presentations to international conferences on coking coal and iron ore, ran workshops on coking coal, and led collaborations on coking coal with industry players at Research groups such as CANMET. I also co-authored research papers on coking coal.

Schedule 9  I was also seconded to the merger team for the proposed merger between Rio Tinto and BHP Billiton, working out of London. Working in the Anti-trust team I provided industry, market and competitor analysis for both iron ore and coking coal and made presentations to the European Anti-trust Commission.

Schedule 10  After leaving BHP I established my own Consultancy, H & W Worldwide Consulting Pty Ltd, providing a range of consultancy services in coal (particularly coking coal, iron ore and manganese ore), ferroalloys, nickel and stainless steel to a range of industry producers, Hedge funds, brokers, commodity funds and start-up companies. Consultancy services include market strategy and analysis, price forecasting, market and competitive analysis, entry strategy and competitor analysis, technical marketing and technology advice, technology reviews on iron, cokemaking and steelmaking, and bespoke consultancy services.