DECARBONISATION OF BRITISH STEEL

SYNDEX ASSESSMENT

Non-Confidential Summary of the assessment presented on 21/11/2024

EXECUTIVE SUMMARY

British Steel aims to transition from traditional blast furnace operations to Electric Arc Furnaces (EAFs) at its Scunthorpe plant. This shift is expected to reduce the company's carbon emissions by 85%, aligning with the UK's Net Zero targets.

The Syndex assessment evaluates various operational models, ultimately recommending maintaining two blast furnaces until the EAFs are operational. The report argues that closing the blast furnaces prematurely could jeopardize supply continuity and financial stability,. The report assesses a solution with a 300t EAF in the current steel plant and a solution with two smaller EAFs in a new steel plant. The 300t EAF option appears to offer better cost-efficiency and easier integration with existing infrastructure, while the 2x150t EAF proposal provides more operational flexibility but at a higher cost and with potentially overestimated production capabilities.

The financial analysis indicates that some of the scenarios result in significant risks, including anticipated reductions in production volumes and ongoing monthly losses. The plan outlines a phased approach to restoring market share, but challenges in re-establishing presence in high-margin sectors are expected.

Syndex is evaluating three financial alternatives for British Steel, focusing on EBITDA projections from 2025 to 2032, both before and after carbon costs. All options show initial losses in 2025, exacerbated by carbon costs. The one blast furnace option is financially unviable due to high fixed cost . Maintaining the two blast furnaces in operation allows to minimise the financial losses. With an additional support of c. £200m provided by UK Government for the cost of additional CO_2 emissions, this solution is the most competitive amongst all the scenario's analysed.

The recommended configuration for EAF technology is two 150-ton EAFs installed in a purpose-built steel plant at Scunthorpe whilst maintaining a two blast furnace operation at least until the commission of the EAFs.

Energy price reductions, if retained by British Steel, significantly improve the financial outlook, making the two blast furnace options profitable by 2027. Support on carbon cost will be the critical factor in making the blast furnace options financially viable. The business models do not factor potential market improvement or new market opportunities.

Key market opportunities include entry into the merchant bars and the plate market, which has significant import penetration, including through partnerships and tooling agreements,

Any potential closure of blast furnace before EAFs are commissioned will result in dependence on external suppliers and introduces substantial supply chain vulnerabilities, especially in critical sectors like rail and construction, hinges on securing a steady supply of semi-finished products. The timeline for establishing reliable sources for these materials is projected to take up to 12 months.

The transition to EAF technology poses serious implications for employment, with workforce reductions anticipated as operations become more automated. Current staffing levels of around 4,000 could decrease to between 2,100 and 2,300 roles post EAF commission, representing a loss of 1,700 to 1,900 positions (42.5% to 47.5% reduction). Maintaining the blast furnaces would allow a smoother transition.

1. ASSESSMENT OF STRATEGIC ALTERNATIVES FOR MARKET TRANSITION

British Steel's decarbonization plan focuses on transitioning from traditional blast furnace operations aiming for completion as soon as possible following an agreement with UK Government. This shift, is intended to reduce the company's carbon footprint by 85%, aligning with the UK's Net Zero targets. This approach is motivated by significant financial losses and a need to provide low-carbon steel to meet market demand and regulatory expectations.

1.1. THE BEST OPTION: A TWO BLAST FURNACES MODEL AT LEAST UNTIL THE EAF START OPERATION

We have analysed in details several scenario considered by British Steel. For confidentiality matter this analysis is not presented in this summary. This document focuses exclusively on the recommended solution presented by Syndex.

Maintaining a two blast furnaces model until the hot commissioning of the Electric Arc EAF is now not only financially advantageous but also strategically critical. This approach provides greater security against potential disruptions in any potential transitional supply of semi-finished products, raw materials (scrap and HBI), and homologation challenges.

In our assessment, maintaining both blast furnaces until the commissioning of the EAF is a critical condition for the success of British Steel's transition.

1.2. THE DIFFERENT MODELS CONSIDERED BY SYNDEX

The options considered by Syndex, from the different scenarios considered by British Steel, are as follows:

- Two EAFs with 130t capacity each or one 300t EAF
- Establishing a new steel plant or integrating the EAFs into the existing steel plant
- Installing an EAF in one location and another in a different site, combined with two new steel plants

The productivity of 130t EAFs has been evaluated based on a projected annual liquid steel capacity. The assumptions of tap-to-tap time and operational availability may result in limited flexibility for the operations. Comparable setups suggest the potential output of 2x 130t EAFs may fall short of the anticipated required levels. Adjustments to the capacity, such as adopting 150t EAFs, could mitigate this risk.

For the potential of a 300t EAF, global references (in limited number) demonstrate its viability. Examples include installations achieving production levels consistent with anticipated business targeted output. While a 300t EAF represents a significant scale, existing operational examples reduce concerns about untested technology.

Integrating EAFs into the existing steel plant has prompted concerns regarding the condition of assets and logistical challenges. Discussions and site assessments indicate that while the refurbishment of assets and infrastructure upgrades are necessary, these issues are not insurmountable. A cost analysis estimates significant investments would be required, including upgrades to slab casters, degassers, and cranes.

The overall cost for integrating a 300t EAF within the current steel plant infrastructure is estimated to be substantially lower than the cost of constructing a new steel plant with two 130t EAFs. However, the optimal configuration and location depend on minimizing complexity and ensuring effective integration with existing operations. Establishing a new steel plant may present strategic advantages in certain configurations, particularly when multiple smaller EAFs are considered.

Table 1. Syndex Comment & View on Potential Scenarios

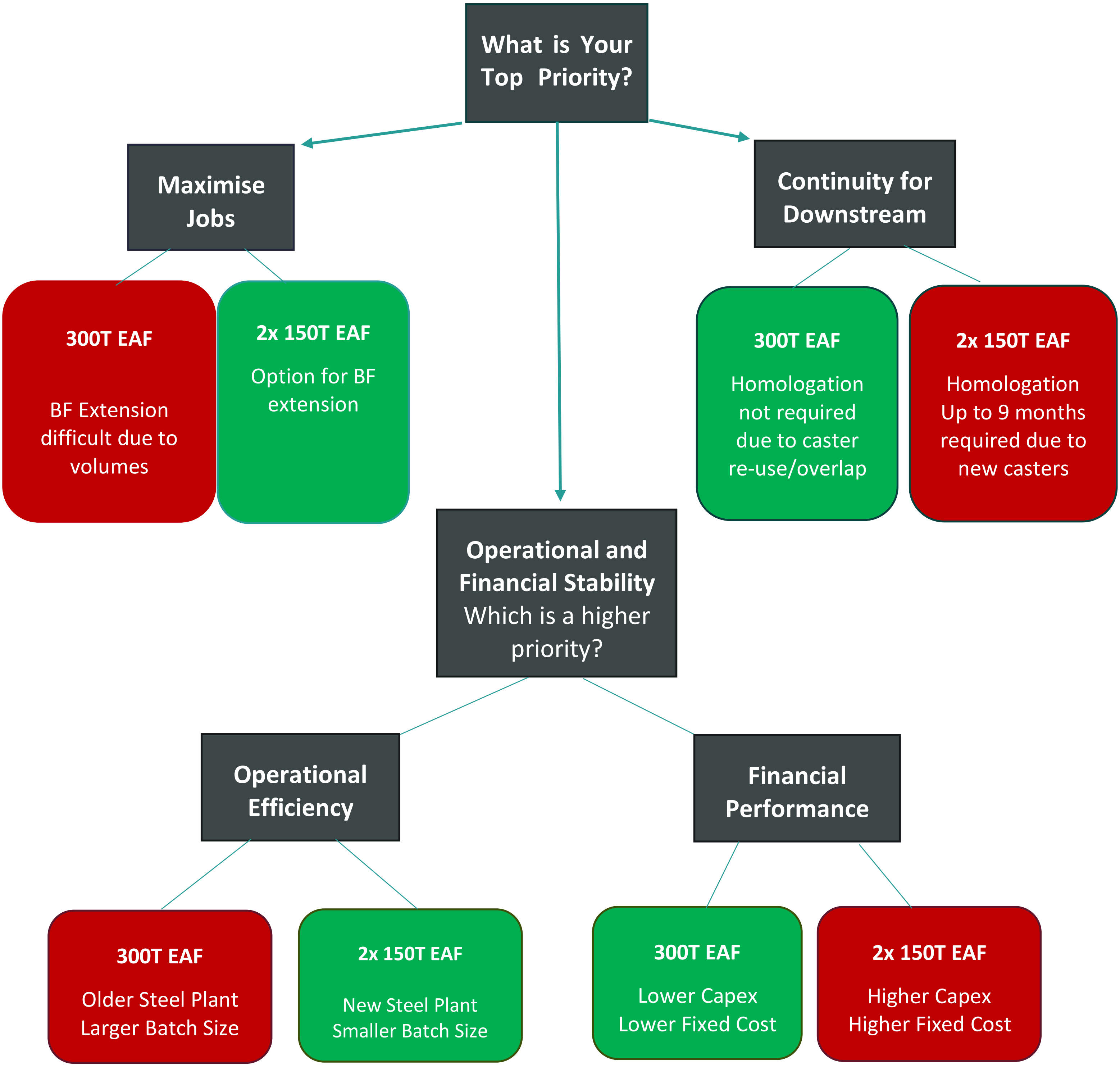
	Rationale	Syndex View
Option A **2 x 130T EAF, Scunthorpe, refurbish steel plant**	Evaluated as a lower-cost, faster transition solution. By utilizing existing infrastructure, it minimizes initial investment.	Suboptimal
Option B **1 x 300T EAF, Scunthorpe, refurbish steel plant**	Emerged as the most cost-effective scenario in terms of capex. The single large EAF, though financially efficient, is unconventional and lacks reference plants for operational benchmarking. Additionally, this scenario requires up to three years of reliance on external semi-finished steel as blast furnace operations would need to be stopped to carry out the refurbishment, this would expose the company to potential supply chain risks and impacting customer relationships.	There are references of 300t EAFs. The lack of references concerns mainly >300t EAFs. It is true that most of the jumbo EAF are not used for long products and with high level of HBI. Nevertheless, the level of HBI required by British Steel would be compatible with a 300t EAF. A 300t EAF is nevertheless more exposed to grid weakness as minimum load is >50% of 2 small EAFs. This solution would shorten the process of homologation as the casters would remain the same for billets and could transition without interruption for the slab caster (the new slab caster could be built close to the current slab caster). The main issue with a 300t EAF is its lower flexibility in case of weak demand and more complex management of the portfolio given the bigger batches and additional complexity with hot heels. Initial discussions have confirmed that the targeted portfolio would be manageable with adequate sequencing. This could be more of a challenge if market dynamics requires a sudden change in steelmaking planning. To avoid this British Steel might have to increase semi inventories when compared to operating 2 smaller EAFs. Despite a significant capex and opex advantage compared to 2x smaller EAFs, a 300t EAF makes only sense if installed in the refurbished steel plant.

Option C **2 x 130T EAF, new steel plant**	Balances moderate investment with high operational efficiency due to a new, purpose-built facility. This scenario aligns with the long-term decarbonization goals while offering a reliable reference plant model. The structure also allows for small batch sizes, enabling agile responses to market demands, and reduces overall stock levels, which benefits working capital management. Given its cost-efficiency and flexibility, Option C offers a sustainable approach to transitioning the plant over time.	This option is undeniably the easiest and safest solution from an operational point of view. It results nevertheless in additional [£..] Capex without any major additional capability and a lower output. The OPEX per tonne of liquid steel will be higher than in the case of a 300t EAF. It will require a re-homologation for all homologated products. It will add further ramping up to stabilise not only the EAF but also the casters.
Option D **2 x 130T EAF, dual-site at Scunthorpe and Teesside**	Involves the highest capital investment due to the construction of two new facilities across separate sites. This option provides the most extensive operational reach, potentially meeting demand across broader markets. However, the dual-site complexity introduces logistical challenges and elevates operational costs, making it the least financially viable in the short term.	This is not a retained option

	Rationale	Risk/Challenges
Option E **2 x BF + 2x150t EAF** **Scunthorpe, New steel plant**	Operation of two blast furnaces (BFs) during the transition period from 2025 up to EAF commission. This strategy offers several strategic and financial advantages that address some of the core limitations identified in alternative EAF scenarios. The detailed scenario analysis and financial modelling indicate that the EAF transition aligns with long-term decarbonization goals.	**Option E (Option C+2BF)** emerge as the most balanced choice among the scenarios. Operating two BFs alongside the gradual introduction of EAFs presents a practical alternative that minimizes financial losses, preserves the highest number of jobs, ensures market stability, and positions British Steel to capitalize on emerging opportunities. This dual approach, maintaining BF operations while phasing in EAFs, provides a strategic blend of environmental commitment and operational continuity, allowing British Steel to achieve a more resilient and community-focused transition.
Option F **2 x BF + 1 300t EAF** **Scunthorpe, refurbish steel plant**	Same	**Option F (Option B+ 2BF)** emerge as the safest option in terms of continuity and comes with the lowest CAPEX. Nevertheless, once the EAF will reach full capacity, the two blast furnaces would have to close. In order to maintain a blast furnace post EAF British Steel would have to invest in further rolling capacity to value above 1Mt of steel. The 300t EAF could also be fed with hot metal from the BF to replace the need for HBI.

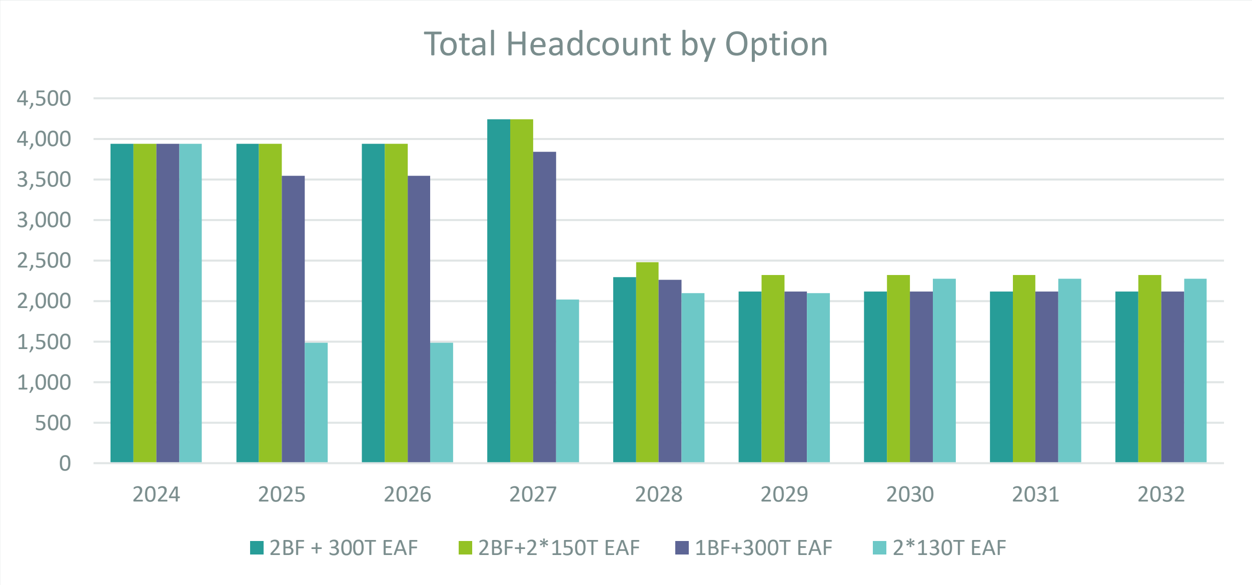
2. KEY CONSIDERATION OF THE STRATEGY

DECISION FRAMEWORK FOR EAF TRANSITION



2.1. EMPLOYEE IMPACT AND JOB SECURITY

One of the most pressing challenges associated with the transition to EAF technology is its impact on the workforce and the surrounding community. While the adoption of EAFs offers significant environmental benefits, it reduces the labour-intensive nature of steel production. Integrated steelmaking with blast furnaces requires considerably more manpower compared to EAF operations, which are highly automated and streamlined. As a result, the shift to EAFs presents a considerable risk of job losses, particularly in areas where alternative employment opportunities are limited, and a significant portion of the community relies on the plant for stable income. Large-scale job reductions could have severe socio-economic consequences for the region.



Source: Syndex

The anticipated workforce reduction is notable, with current staffing levels of approximately 4,000 expected to decline significantly depending on the chosen scenario. This decline will impact job security and employee morale. Strategies that secure downstream roles, such as ensuring minimal disruptions to these positions during the transition, would enhance job security.

The workforce age distribution at the plant also presents an opportunity to mitigate reductions through early retirement schemes. A delay of three years in workforce reductions could result in a more gradual transition, reducing the impact of redundancies.

Employees who experienced the liquidation of the former entity and subsequent re-employment have already undergone redundancy processes. These employees received statutory redundancy pay for their previous service, with their current employment tenure reset to the acquisition date of March 2020. As a result, redundancy compensation for affected employees may be lower than anticipated.,

On a positive note, between 1,000 and 1,500 construction jobs are expected to be created during the development of the EAF facilities, offering short-term economic benefits to the local community. However, a comprehensive workforce transition plan will be essential to support the long-term viability of the plant and the surrounding region

2.2. REDUCED PRODUCTION VOLUMES AND FINANCIAL STRAIN

The transition to EAF technology presents significant financial challenges The need to balance production continuity with financial sustainability during the transition adds complexity.

The need for substantial stakeholder funding and careful management of operational costs will be critical to maintaining the viability of the business during this period.

The successful implementation of EAF technology hinges on stable energy costs and grid readiness. These factors remain uncertain and could potentially inflate operational expenses, further affecting profitability. Strategic planning and contingency measures will be essential to addressing these uncertainties and ensuring financial stability throughout the transition. Ensuring a consistent supply of semi-finished products will be critical to meeting customer demands in strategic markets such as rail and construction. While global overcapacity in the steel market provides sourcing opportunities, it also presents risks, including price volatility and geopolitical considerations. Such challenges could impact operational continuity and margins if not carefully managed.

2.3. FUTURE RAW MATERIAL SUPPLY CHALLENGES

HOT BRIQUETTED IRON (HBI)

Hot Briquetted Iron (HBI) is a processed form of Direct Reduced Iron (DRI) that offers improved stability and can be shipped over longer distances. Unlike standard DRI, which is volatile and incurs significant additional costs for transport, HBI serves as a practical replacement for pig iron in EAF operations.

Availability: The future market for HBI is anticipated to be extremely tight. Demand is expected to rise significantly as steelmakers transition to decarbonized operations, with many relying on EAF technology but lacking the capacity to produce DRI in-house. Consequently, a substantial portion of the industry will need to source HBI externally. However, global HBI supply remains modest, with production estimated at approximately 10 million tonnes in 2023. Planned investments in new production capabilities are limited and have been further constrained by geopolitical developments, including the conflict in Ukraine. Historically, both Russia and Ukraine were key locations for HBI production. Emerging projects, such as those announced by Vale in the Middle East, aim to leverage favourable gas prices and maritime logistics, but these efforts are unlikely to create a significantly competitive market in the near term.

Price and Cost: The combination of rising demand and constrained supply is expected to result in high HBI premiums and prices. This would increase the cost base for steelmakers relying on HBI compared to alternative raw materials, such as on-site DRI production.

Future HBI Trends: The availability of prime-grade iron ore suitable for DRI and HBI production is projected to decline, with prime iron reserves estimated at only 3% of global reserves. A significant portion of these reserves is already allocated to existing operations. As demand grows and availability decreases, the quality of HBI is expected to diminish, leading to lower metallization levels and reduced productivity for EAFs. Metallization rates for future HBI are projected to fall to approximately 87%, which could impact efficiency and performance in steelmaking operations.

FERROUS SCRAP

Ferrous scrap is a critical raw material for EAF steel production, alongside Hot Briquetted Iron (HBI). British Steel is projected to require over 2 million tonnes of purchased scrap annually for its operations. While the UK generates approximately 10.5 million tonnes of scrap and exports 8 to 9 million tonnes, challenges persist related to scrap quality, supplier concentration, and future demand.

The product mix for British Steel necessitates scrap with low residual content, particularly minimal copper levels, as high residual content can adversely impact fracture toughness and formability of the final product. There is a currently a lack of consistent composition testing within the UK, and high residual levels have been frequently detected.

A key challenge lies in the supply of high-grade shredded scrap, with the UK largely focussed on export markets the volume of shred is relatively low. In scenarios where HBI is unavailable, the demand for scrap with high Fe content could increase to approximately 2 million tonnes, approaching the UK's supply limits.

While British Steel maintains strong commercial relationships with suppliers, these relationships currently cover comparatively low purchase volumes Dependence on a few major players highlights the importance of diversifying supply sources to mitigate risks. Additionally, high export margins may disincentivize suppliers from adapting scrap handling and residual testing processes to meet British Steel's requirements.

To address these challenges, maintaining blast furnace operations during the transition period is advisable. This approach will help ensure consistent production and uphold product quality while the UK scrap market adapts to increased demand from the EAF transition. This strategy provides stability and mitigates potential disruptions, facilitating a smoother shift to more sustainable steel production methods.

3. FINANCIAL ANALYSIS OF BRITISH STEEL[1]

Any proposed alternative must ensure a robust and sustainable financial outlook.

Analysis suggests that all options under consideration will face losses in 2025, and these losses are worsened by carbon costs. The one blast furnace option does not appear to be financially viable, even when excluding the impact of carbon costs, as the fixed costs involved cannot be covered. Maintaining the two blast furnaces in operation allows to minimise the losses. With an additional support of c. £200m provided by UK Government for the cost of additional CO2 emissions this solution is the most competitive amongst all scenario's analysed.

4. COMMERCIAL ANALYSIS OF BRITISH STEEL

BRITISH STEEL IN THE UK MARKET

British Steel operates across four main sectors: Rail, Construction, Special Profiles, and Rods, each presenting unique opportunities and challenges influenced by competitive dynamics, customer needs, and market trends.

4.1. RAIL

British Steel is a key supplier in the UK rail market, where it fulfils a critical rolelsl in supporting domestic infrastructure. This position is bolstered by strong local demand, logistical advantages, and alignment with government decarbonization goals, which could secure long-term contracts. However, global overcapacity in rail steel creates price pressure risks, and British Steel's reliance on key contracts (e.g., with Network Rail) makes it vulnerable to policy or demand changes. As the company transitions to EAF technology, managing production consistency will be essential to maintaining trust and stability in the rail sector.

4.2. CONSTRUCTION

In the **UK construction market**, **British Steel is the only UK producer of heavy sections for Construction** supported by its rapid fulfilment capabilities and compliance with UK-specific standards like BS4, which differentiates it from European competitors. The construction steel market faces global overcapacity (60% worldwide and 46% in the EU), increasing competition and putting downward pressure on prices.

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[1] For confidentiality reason this document does not present the details of the financial model. Syndex's analysis has been shared and discussed in detail with BSL.

4.3. SPECIAL PROFILES

Special Profiles represent a niche but valuable segment for British Steel, with diverse applications in industries ranging from automotive to heavy machinery. The company's broad product range, bespoke shaping capabilities, and customer-focused service offerings provide **a competitive edge**. To maintain its edge, British Steel will need to focus on customization and premium service, while managing competitive pressures in this fragmented market.

4.4. RODS

Rods are mainly a export driven products. In the rods market, British Steel holds strong customer relationships and a reputation for quality in high-strength and high-carbon products, particularly for automotive uses. The EU market remains challenging due to price competition from cost-focused players and advanced capabilities from leaders like Saar Stahl and Voestalpine. British Steel will need to leverage its quality focus and strategic partnerships to mitigate cost pressures and capitalize on high-end market demand.

4.5. OPPORTUNITIES IN THE MARKET

A major challenge with the 300t EAF+BF model is the high volume of steel production, which exceeds the company's current rolling capacity. This may force British Steel to sell a significant volume of semis at low margins. While some hot metal could supply the EAF, the business case for this transitional solution requires thorough analysis. Increasing rolling capacity to convert semis into more profitable products presents a viable solution. Additionally, this increased capacity could enhance British Steel's future profitability in various scenarios, even after the closure of the blast furnaces.

The capacity gap in the UK steel industry in 2024 highlights four products that are potentially addressable by British Steel semis:

- Rebar
- Sheet piles
- Plate
- Merchant bar

British Steel could consider adding additional downstream rolling capacity, either through acquisition investment in new assets, or even partnerships.

5. STRATEGIC RECOMMENDATIONS

1. **Implement a 2x150t EAF Model in a New Steel Plant**
   The recommended configuration for EAF technology is two 150-ton EAFs installed in a purpose-built steel plant. This model strikes the optimal balance between capacity, operational flexibility, and risk management:
   - **Capacity and Flexibility:** Compared to alternatives of 2x130t EAF model, the 2x150t configuration ensures sufficient production volume to meet future market demand. It also provides operational resilience by allowing staggered production if one unit is offline.
   - **Necessity of a New Plant:** Retrofitting the existing steel plant for two EAFs is not recommended due to layout inefficiencies, construction complexities, and integration challenges with current infrastructure. Building a new plant provides a streamlined and future-ready solution.
   - **Location Recommendation:** The decommissioned plate mill area is an ideal site for the new steel plant, offering logistical and operational advantages. A location near the Nitrogen plant, while considered, would necessitate the immediate closure of the blast furnaces, disrupting the transition.

2. **Maintain Two Blast Furnaces During the Transition**
   Operating both blast furnaces throughout the transition is critical to ensuring production stability, customer retention, and financial viability:
   - **Supply Continuity:** Maintaining blast furnace operations during the EAF construction phase will ensure stable production volumes, allowing British Steel to meet customer needs

3. **Ensure Continuity with Current Casters Until Full Homologation of New Casters**
   Homologation of new casters is a complex process that could take 6-12 months for certain high-margin products, such as those in the automotive sector. Premature reliance on new casters risks significant disruptions to supply and customer relationships. Continuing operations with existing casters until full homologation is achieved ensures uninterrupted production and market stability.

4. **Explore Downstream Market Opportunities to Enhance Profitability**
   To maximize the value of British Steel's production capacity, downstream market opportunities must be pursued:
   - **Increased Rolling Capacity:** Expanding rolling capacity to convert semi-finished steel into finished products will reduce reliance on low-margin semis and bolster profitability.

5. **Engage the Government to Mitigate CO_2 Costs During Transition**
   Operating blast furnaces during the transition incurs significant carbon costs, adding financial strain. Government support in the form of CO_2 cost relief or subsidies is essential to maintain competitiveness and allow the blast furnaces to remain open to ensure a successful transition.

Key Considerations

- **Headcount Implications and Workforce Strategy**
  Transitioning to EAF technology will significantly impact British Steel's workforce,

  - **2x150t EAF Scenario + 2 BF until 2028 (Recommended):**
    - Maintaining two blast furnaces during the transition delays major workforce reductions, providing a smoother adjustment period for employees.
    - Once the EAFs are operational, headcount stabilizes albeit at reduced levels
    - The gradual transition provides additional time to prepare and upskill employees for new roles associated with EAF operations.
    - In the case of two small EAFs, the timeline of the closure of the second blast furnace could be postponed if the market demand and raw material cost allow to deliver sufficient profitability.

Profitability: The 2x150t EAF solution, while requiring higher initial capex than a single 300t EAF, offers better alignment with long-term profitability goals. The model allows for higher production volumes, operational flexibility, and smoother integration with downstream operations, positioning British Steel to capitalize on high-margin market opportunities. Analysis suggests that all options under consideration will face losses in 2025, and these losses are worsened by carbon costs. The one blast furnace option does not appear to be financially viable, even when excluding the impact of carbon costs, as the fixed costs involved cannot be covered. Maintaining the two blast furnaces in operation allows to reduce the losses. With an additional support of c. £200m provided by UK Government for the cost of additional CO_2 emissions this solution is the most competitive amongst all scenario's analysed.

- **Capex Investment:** Although a new steel plant increases capital expenditure compared to retrofitting the existing plant, the long-term operational and risk management benefits justify this approach.

- **Grid Connection Risks:** The single 300t EAF configuration might poses challenges related to grid capacity and resilience. The 2x150t EAF model reduces these risks by distributing the load more effectively

- **Customer Retention:** Maintaining production continuity with the two-blast furnace model and existing casters is essential to avoid losing customers in critical sectors, such as automotive and rail, during the transition.