Department for
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& Industrial Strategy

FUTURE CAPACITIES AND CAPABILITIES OF THE UK STEEL INDUSTRY

BEIS Research Paper Number 26

Summary Report

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This study was conducted by a Grant Thornton UK LLP-led consortium including Hatch Consulting and the Materials Processing Institute. The consortium received support from a steering board containing representatives from the UK steel sector, including: British Steel, Celsa Steel UK, Liberty Steel, Tata Steel UK and UK Steel (the trade association for the UK steel industry). The views expressed in this report are those of the organisations interviewed as part of this research and the Grant Thornton UK LLP-led consortium; they are not necessarily the views of BEIS.

We would like to thank the UK steel producers and the many people and organisations who contributed to this study. Their invaluable participation and feedback throughout the project helped ensure that this was a comprehensive undertaking and provides a robust assessment of the future capacities and capabilities of the UK steel industry.

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Introduction

The dynamics of the global steel industry have changed significantly in recent years and through a range of different market forces this has placed significant pressure on the steel industry within the UK. In response to this pressure, the UK Steel Council – comprising UK government, devolved administrations, industry, unions and trade associations – identified the need to understand the future capacities and capabilities of the UK steel industry.

In order to do this, the Department for Business, Energy and Industrial Strategy (BEIS) commissioned a consortium led by Grant Thornton UK LLP and comprising Hatch Consulting and the Materials Processing Institute to:

- comprehensively map the current capability of the UK steel sector;
- identify the future opportunities for steel products in new and existing sectors and markets; and
- examine how to overcome potential challenges or barriers preventing industry from meeting this demand.

Methodological approach

In order to undertake this analysis, data and evidence were drawn from a combination of publicly available data sources, extensive desktop research and semi-structured interviews with over 100 stakeholders including UK-based steel producers, industry bodies and steel consuming organisations in seven sectors.

This qualitative and quantitative data was then analysed using a range of different tools and techniques. This included comprehensive data analysis and modelling, the synthesis of qualitative data and a range of different analytical tools (e.g. process flow methodologies, intervention matrices and transformation maps) to draw out the key findings.

Structure of this report

This summary report provides an overview of the key findings under three headings:

- **The future demand opportunity for the UK steel industry** – this section looks at current levels of finished steel demand in the UK, before forecasting how this demand is likely to change up to 2030. It also includes an analysis of true steel demand.
- **Realising the finished steel future opportunity: Barriers to be addressed** – this section provides an overview of the six key barriers identified that are limiting the UK steel industry's ability to maximise the future opportunity for the industry. It also provides an overview of a number of globally recognised technology trends that have far-reaching implications for the steel industry and its supply chains.
- **Realising the finished steel future opportunity: Cross-cutting enablers** – This section of the report identifies those enablers that will best enable the UK steel

industry to address the barriers identified in the previous section and access the future opportunity for growth that this study identifies.

Alongside this summary report there is a detailed suite of technical appendices that provide in-depth analysis of the findings on both a product and sector basis, as well a shorter executive summary.

The future demand opportunity for the UK steel industry

Finished steel demand

The finished steel demand in the UK is currently 9.4 Mt. This comprises 3.4 Mt of long products, 5.6 Mt of flat products and 0.4 Mt of other products. At a macro level, finished steel demand in the UK presents a picture of sharp decline over the past 20 years. Demand for longs and flats has contracted by 31% and 34% respectively. However, for stainless steel and seamless tubes, demand contraction has been more profound, wherein the total contraction has been more than two-thirds. Much of the demand fall was already in progress prior to the financial crisis in 2008, but the crisis exacerbated the situation.

There are numerous reasons for the demand contraction, including:

- **Fixed Assets Investments (FAI)**: Steel demand is driven by investments in infrastructure, machinery, construction, shipbuilding, automotive etc. FAI as a percentage of GDP in the UK has declined from 20% in 1996 to 15% in 2009. Although it has started to recover, it was still 17.3% in 2015, considerably lower than 1996.
- **Manufacturing Migration**: The UK, like many developed countries, has seen large steel-intensive manufacturing sectors decline and migrate out of the UK. Examples are shipbuilding, capital equipment, home appliances, wire drawing etc. As a consequence, steel demand has been negatively impacted.
- **Supply Chain Consolidation**: In sectors such as automotive, supply chains have become more efficient and regionally consolidated to strip out costs. More components and systems can be produced from the same facilities and can be shipped to the point of demand more efficiently and timely, thereby reducing the need for having manufacturing spread out in the EU and UK. The UK does not appear to be a beneficiary of this consolidation.
- **Downgauging of steel**: In the past two decades, there have been enormous improvements in product developments and the introduction of new grades and types of steel. Higher-strength steel grades result in better strength-to-weight ratio in steel, and consequently demand volumes decline. Such trends have been seen in steel usage in home appliances, pipes for oil and gas, offshore platforms, automotive, construction and packaging. These trends have influenced steel demand globally and trends in the UK are a reflection of that.
- **Substitution**: In some applications, like automotive and packaging, alternative materials such as aluminium, paper, glass and plastics have replaced steel. In premium cars, pressures of lightweighting have resulted in aluminium replacing steel in body-in-white parts. In beverage cans, aluminium has largely replaced tinplate cans and as a consequence can weights have reduced by more than half in the last 20 years.

Since 2008, demand has been on a slow recovery path but has not managed to reach anywhere near the pre-crisis levels. It must be highlighted that since 2011, demand for all finished steel is showing signs of some stabilisation. Between 2012 and 2015, long

products demand has expanded by 9.0%. This signals the arresting of further long-term decline in demand for the first time in the past 20 years.

Over this same 20-year time period the market share of UK producers in the UK steel sector has declined from 70% to 47%. However, market share does vary between product. For example:

- Domestic production of rebars has almost mirrored the UK steel industry as a whole, changing from a 74% share in 1996 to a 48% share in 2015;
- For medium and heavy sections, the UK market share has fallen from around two-thirds to a third;
- While for flat products, UK-produced Cold Rolled Coils (CRC) have declined from a 65% market share to 45%.

From the historical trends of demand for individual products, there are two clear groups emerging:

- Group 1 (Rebars, Sections, Rails, Wire Rods [mesh], HRC, Coated): These are products that are dependent on construction and infrastructure spend and have better survived and managed to recover some lost ground in demand.
- Group 2 (Merchant Bars, Wire Rods [drawing], Engineering Steel, Stainless Steel, Seamless Tubes, Plates, CRC, Tinplate): These are products that are dependent on manufacturing and have seen their demand eroded away.

Within these Groups, rails, wire rods (drawing quality) and engineering steels have performed and survived better in the export markets, primarily to the EU. These products are specialised for specific applications in automotive, engineering and infrastructure. They are not products which sell on volumes but are more value-added and less sensitive to the price competition seen in other steel products. The capabilities of UK's steel industry in these products is well positioned to service export markets.

Whilst some other European steel producers have experienced similar trends, in the UK this decline in market share has largely been driven by changes in material requirements, a relative loss of competitiveness, the deterioration of capabilities from UK producers and a lack of capacity. These factors have been further compounded by global overcapacity which has exerted greater pressure on the UK market. These factors are discussed in more detail below.

Throughout this period there has also been a unique and unparalleled level of ownership change and a shift to private ownership from large conglomerates. However, within this overall picture of decline it is important not to lose sight of those products that have retained and indeed seen growth in market share. This includes:

- An increase in local deliveries of Light sections, particularly in recent years, to about 75% of UK demand;
- Local deliveries have been supplying up to 95% of rail demand – a consistent pattern since 1996;
- While local deliveries account for about 65–70% of the demand for Hot Rolled Coils (HRC).

Therefore, looking at the latest year for which data is available (2015), these macro changes over the past 20 years have meant that the steel industry in the UK produces 7.9 Mt of finished steel, of which it exports 3.5 Mt. This means that the local deliveries of the industry to meet the demand in UK was 4.4 Mt. As a result, in order to meet demand requirements for finished steel the UK imported 5.0 Mt.

There can be no doubt based on the evidence gathered that the UK steel industry is facing greater competition from imports in the domestic market than ever before. To better compete with the 5.0 Mt of steel imports in 2015, there are steps the industry can consider to ensure that domestic plants are well prepared to address the capacity and capability needs of the future. These factors are discussed in more detail below.

Finished steel demand forecast

Assuming domestic content in UK supply chains remains unchanged and based on the forecasts prepared specifically for this study, finished steel demand is forecast to grow from 9.4 Mt in 2015 to 11.0 Mt in 2030 (see Figures 1 and 2 below for how this growth in demand plays out across different sectors and products). The biggest driver of this growth in demand comes from increasing investments in infrastructure construction.

This demand growth and the subsequent recovery that it will drive is likely to be slow and gradual. The demand growth will require the steel industry to respond to numerous evolving changes in customer demands which are likely to continue for the foreseeable future.

However, the size of the opportunity is significant for the UK steel industry. Based on the current levels of domestic supply achieved by the UK steel industry, this represents a £3.8bn p.a. opportunity in revenue terms in 2030. With further growth in UK content in domestic supply chains, the opportunity is even greater.

The nature of this future opportunity does, however, vary significantly by finished steel product and consuming sector.

As can be seen from Figure 1 below, the main future opportunities in products are in:

- Coated products and organically coated steels (OCS) (£958m) – Demand for coated products is forecast to grow at 0.6% p.a. to 2,261 kt from 2,054 kt between 2015 and 2030. OCS is forecast to grow at 0.9% p.a. to 315 kt from 274 kt during the same period. The lower growth rates are not an indication of lack of growth but a cumulative effect of a shift to higher-value, high-strength and lower-gauge steels in response to the evolving needs of the automotive and construction sectors. The overall changes in technical specifications will be in construction applications where there will be downgauging and shifts to lower thickness; and automotive applications where perceptible, sharp increases in advanced high-strength steels

(AHS) and ultra-high-strength steels (UHS) will be required to meet the 2030 emissions target.

- Stainless steel (£573m) – Demand is forecast to grow by 1.1% p.a. to 249 kt from 211 kt between 2015 and 2030. This works out as an additional demand of +38 kt (+18%). Demand depends more on the manufacturing sector, such as home appliances, catering equipment and process equipment.

- HRC (£440m) – Demand is forecast to grow to 1,993 kt from 1,754 kt between 2015 and 2030 at a rate of 0.9% p.a. The total increase in the demand during the forecast period is +239 kt (+14%). The overall changes in technical requirements for hot rolled coils are likely to be: pipeline grades – particularly increases in the use of X80 grades; shifts in general structural grades to high-strength normalised grades in hollow sections; and increasing use of thinner-gauge HRC tending towards 1.3–1.5mm.

- Rebar (£315m) – Demand is forecast to grow by 2.6% p.a. to 1,234 kt from 843 kt between 2015 and 2030. This translates to an additional demand of +391 kt (+46%) over 2015 levels. We could expect an increasing demand for rebar in coils and its share could increase from 13% currently to 15%, but on a much larger demand base. In 2020, rebar demand could breach the 1 Mt mark which was the highest demand levels achieved in the past 20 years.

- Heavy sections (£279m) – Demand is expected to grow at 1.3% p.a. to 922 kt from 762 kt between 2015 and 2030. This would result in additional demand of 160 kt (+21%) over the forecast period. Within this, further shifts to higher strength – S355 and S420/S460 – can be expected. Currently, Eurocode 3 (steel structure design) norms limit the use of strengths up to S460. However, changes in Eurocode norms in the future could allow use of steel strengths up to S700.

These five sets of steel products account for about two-thirds of the total future opportunity. Each product faces a different set of challenges to access this opportunity as well as varying levels of import penetration in 2015.

The demand recovery presents an excellent opportunity for the UK steel industry. However, the industry has to address numerous capability issues and it has to break out of the cycle it finds itself in and make the leap forward to position itself competitively. The demands of the customers cannot be accommodated by incremental improvements or capability enhancements.

Figure 1: Current UK demand, current UK sales, forecast UK demand and future UK opportunity by product for finished steel

	← Tonnage →				← Value →				
Product	**2015 Current demand (Kt)**	**2030 Forecast demand (Kt)**	**2015 Current UK sales (Kt)**	**2030 Future opportunity (Kt)[1]**	**2015 Current demand (£m)**	**2030 Forecast demand (£m)**	**2015 Value of current UK sales (£m)**	**2030 Future opportunity (£m)[2] and breakdown (%)**	
Coated Products/OCS	2,328	2,576	896	1,680	856	1,471	332	958	**25.3**
Stainless Steel	211	249	0	249	342	573	0	573	**15.1**
HRC	1,754	1,993	1,040	953	528	921	313	440	**11.6**
Rebar	843	1,234	402	832	248	468	118	315	**8.3**
Heavy Sections	762	922	328	594	348	433	150	279	**7.4**
Plates	511	615	155	460	194	338	59	253	**6.7**
CRC	676	719	286	433	234	370	99	223	**5.9**
Medium Sections	348	421	116	305	129	181	43	131	**3.5**
Seamless Tubes	171	155	0	155	136	128	0	128	**3.4**
Engineering Steels	318	351	115	236	139	189	50	127	**3.4**
Wire Rods	612	743	436	307	184	305	131	126	**3.3**
Tinplate	364	364	207	157	182	264	104	114	**3.0**
Merchant Bars	227	285	166	119	83	118	61	49	**1.3**
ODF	38	46	20	26	52	66	27	37	**1.0**
Light Sections	101	123	74	49	37	51	27	20	**0.5**
Rails	166	182	159	23	84	94	81	12	**0.3**
Total	**9,430**	**10,977**	**4,400**	**6,577**	**3,775**	**5,969**	**1,594**	**3,785**	**100**

Source: Hatch

[1]2030 forecast demand minus 2015 current UK sales

[2]2030 forecast demand minus 2015 current UK sales, valued using 2030 prices

From the sector perspective, the key sector opportunity is in the construction sector (£2.2bn), which accounts for a 57% share of the total £3.8bn. Steel demand in the construction sector is forecast to grow by 1.4% p.a. to 6.9 Mt in 2030 from 5.6 Mt in 2015. The total change in demand is expected to be +1.3 Mt (+24%). Within construction, rebars, heavy sections, HRC and coated products could account for 71% of the growth. The construction sector is likely to dominate the share of total demand (Mt) across sectors, increasing its share to 63% in 2030 from 59% in 2015. While this presents a positive outlook for demand, it also implies that the steel industry could become even more

susceptible and vulnerable to cyclicality and volatility, which may not be beneficial to the long-term health of the industry.

The automotive sector (£0.3bn) is also an important contributor with significant opportunities to boost finished steel demand through growing domestic supply-chain content. The total demand for finished steel from the automotive sector is forecast to change to 645 kt in 2030 from 711 kt in 2015. At a high level, this is a reduction in demand volume. However, it is critical to highlight that demand is shifting from volumes to value because of a higher use of more value-added AHS and UHS. It is also important to note that the forecast is based on the current local content of 35% in UK production. Therefore, there is significant potential to improve this if the local content could be increased by re-shoring automotive supply chains.

Figure 2: Current UK demand, current UK sales, forecast UK demand and future UK opportunity by sector for finished steel

	← Tonnage →				← Value →				
Sector	**2015 Current demand (Kt)**	**2030 Forecast demand (Kt)**	**2015 Current UK sales (Kt)**	**2030 Future opportunity (Kt)[1]**	**2015 Current demand (£m)**	**2030 Forecast demand (£m)**	**2015 Value of current UK sales (£m)**	**2030 Future opportunity (£m)[2] and breakdown (%)**	
Construction	5,554	6,879	2,539	4,340	2,003	3,352	880	2,170	**57.3**
Others	1,510	1,760	756	1,004	654	1,122	232	770	**20.4**
Automotive	711	645	285	360	348	471	120	293	**7.7**
Machinery & Engineering	538	611	304	307	226	349	116	194	**5.1**
Packaging	456	462	259	202	213	314	122	136	**3.6**
Oil & Gas	353	253	57	196	191	163	27	129	**3.4**
Yellow Goods	142	186	43	143	58	104	17	80	**2.1**
Rails	166	182	158	24	84	94	80	12	**0.3**
Total	**9,430**	**10,977**	**4,400**	**6,577**	**3,775**	**5,969**	**1,594**	**3,785**	**100**

Source: Hatch

[1]2030 forecast demand minus 2015 current UK sales

[2]2030 forecast demand minus 2015 current UK sales, valued using 2030 prices

Alternative scenarios

The demand forecast presented above works on a conservative basis of local content in automotive production and presence of supply chains in the UK. A key factor, which will significantly influence the prospects of acceleration of demand recovery, is the uncertainty surrounding the EU exit. This uncertainty is cascading across multiple sectors. In light of

this, and in addition to the base forecasts presented above, two alternative demand scenarios were developed. The key assumptions for the scenarios were as follows:

High Case	Low Case
• EU exit process, trade agreements uncertainty resolved quicker • Better support for manufacturing in the UK and pick up in re-shoring of supply chains • Improved localisation of automotive production – +10% increase • Positive spillover effects on industrial and commercial construction • Funding constraints for infrastructure projects less constrained	• Hard landing from EU exit • Further hollowing of supply chains • Manufacturing activity remains weak due to tariffs • Auto localisation drops by 10%

Source: Hatch

Figure 3 below translates these assumptions into alternative demand scenarios.[1] These scenarios imply that the upside for demand is quite significant: ~6.5% of the base demand at 11.6 Mt in 2030. The future opportunity is £3.8bn in the base case, but could be as low as £3.6bn or as high as £4.2bn under the different scenarios. The key to fruition of the upside opportunity is to advance the EU exit negotiation process and trade agreements which would help remove the uncertainty surrounding the planned investments in many sectors. In addition, if this is combined with a positive, inclusive industrial strategy, it could support further expansion of steel demand in the UK.

Figure 3: Alternative demand forecast scenarios (Mt and £b)

	Demand 2030 (Mt)				Growth (p.a.)		
	2015	Base	High	Low	Base	High	Low
Finished Steel	9.4	11.0	11.8	10.5	1.0%	1.5%	0.7%
Long Products	3.4	4.3	4.5	4.1	1.6%	2.0%	1.4%
Flat Products	5.6	6.3	6.8	6.0	0.7%	1.3%	0.4%
Other Products	0.42	0.45	0.46	0.45	0.4%	0.6%	0.4%
	Demand 2030 (£b)				**Growth (p.a.)**		
	2015	**Base**	**High**	**Low**	**Base**	**High**	**Low**
Finished Steel	3.8	6.0	6.4	5.7	3.1%	3.6%	2.8%

[1] The sensitivity analysis uses different scenarios for UK steel demand in tonnes but a single set of forecasts for global steel prices.

Long Products	1.3	1.8	2.0	1.8	2.6%	3.0%	2.4%
Flat Products	2.0	3.4	3.7	3.2	3.6%	4.1%	3.2%
Other Products	0.5	0.8	0.8	0.8	2.5%	2.7%	2.4%

Source: Hatch

True steel demand

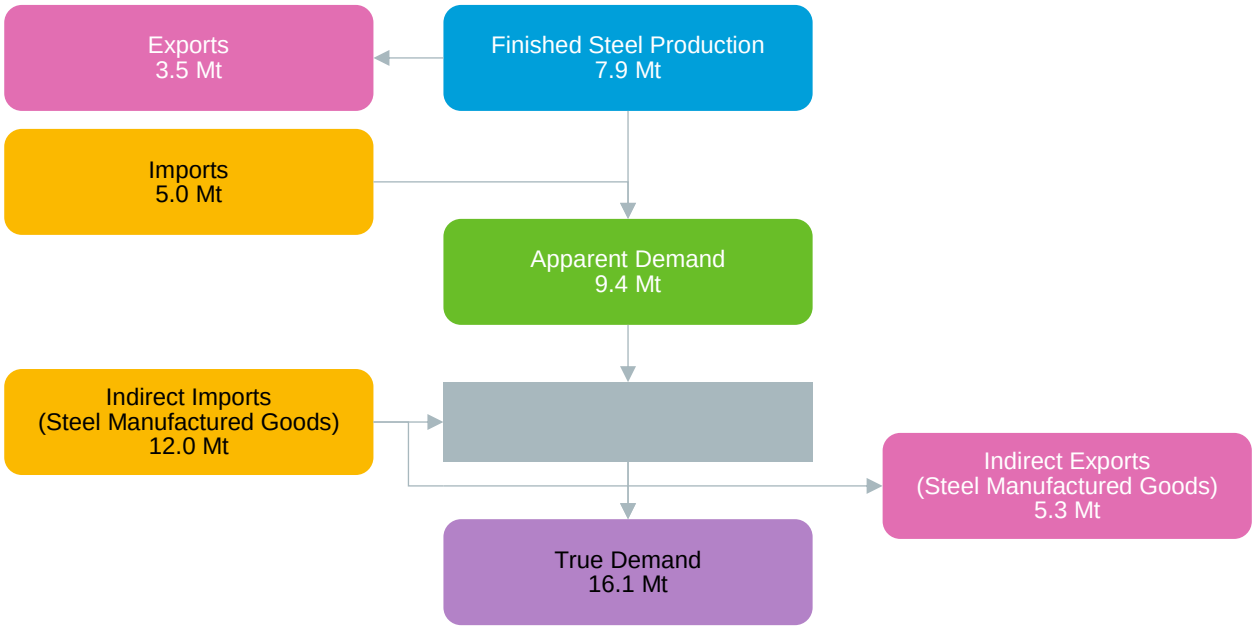
In addition to the opportunity arising from the demand in finished steel, there is a wider opportunity for the UK steel industry related to true steel demand (which includes steel contained in imported goods). True steel demand is therefore the aggregation of the apparent or direct demand for steel, which is transformed into manufactured and fabricated products in country, and the demand for steel contained products such as appliances, light and commercial vehicles, machinery, ships, rolling stock, process equipment, internal combustion engines. As a result, the true steel demand is a better indicator of the total steel consumed in the UK.

Universally, it is not possible for the full extent of true steel demand to be transformed in a country. In a globalised world of free trade underpinned by comparative advantage, steel contained products will be imported. In the UK context, it is important to study this distinction between apparent and true demand as it displays very divergent trends and points to a structural issue for the UK steel industry.

In the period between 1996 and 2015, while apparent demand contracted by 30%, true demand has increased by 4.4%. This finding highlights the continuing UK dependence on steel usage to meet its manufacturing, automotive, capital goods and consumer goods needs. Since the global financial crisis of 2008, true demand for steel has actually grown by 7% p.a., while in comparison apparent demand has only seen growth of 4.7% p.a. This implies that while true demand for steel has recovered and is on a growth trajectory, the full benefits of this growth have not accrued to the steel industry in the UK. Alongside this – and across all steel contained good and products – imports have increased while exports have decreased. As a consequence, this has been a two-fold setback for the UK steel industry.

To understand the distinction between true steel and apparent steel demand, and the implication of the future opportunity to the steel industry, a review and analysis for the year 2015 has been provided (see Figures 4 and 5 below).

Figure 4: Schematic of finished steel flow to true demand in UK – 2015



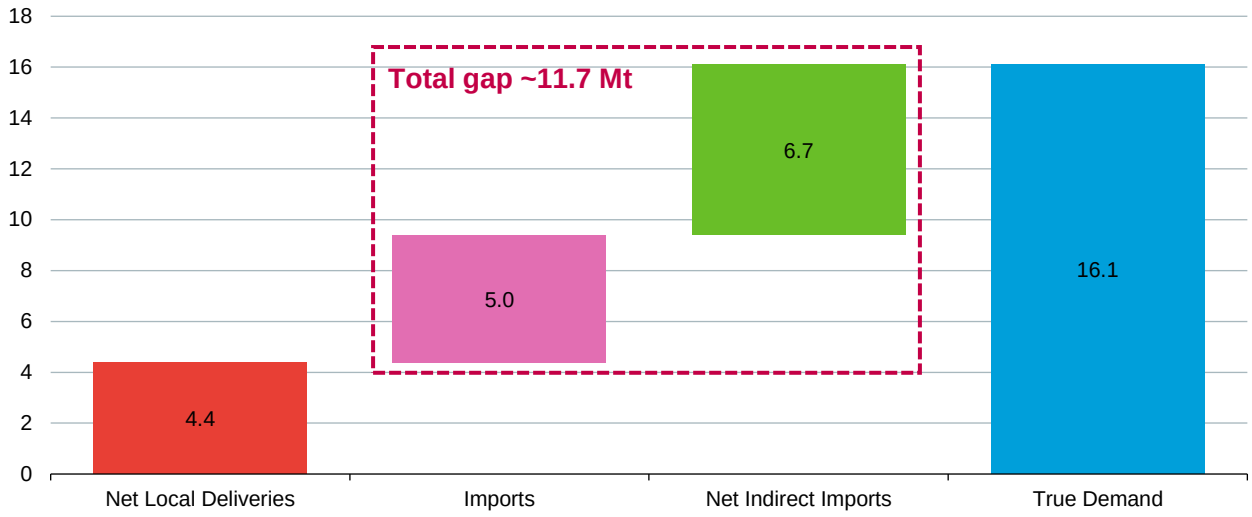
Source: ISSB, Hatch

As already noted, the industry in the UK produced 7.9 Mt of finished steel. The local deliveries of the industry to meet the demand in the UK was 4.4 Mt and 3.5 Mt was exported. In addition, the UK imported 5.0 Mt of finished steel.

Over and above this, in steel contained manufactured goods, the UK imported 12.0 Mt while it exported 5.3 Mt. On a net trade basis, the UK was therefore a net importer of 6.7 Mt of steel in contained manufactured goods.

After factoring in finished steel imports and net indirect imports, the gap between true demand (16.1 Mt) and what UK steel producers supplied to the domestic market (4.4 Mt) is 11.7 Mt. This represents a good opportunity for UK producers. However, with 43% of the gap met by steel imports and 57% met by imported goods containing steel, there are two separate challenges to narrowing it. The main driver of this trend is the migration of manufacturing and supply chains from the UK, creating a greater reliance on imported goods.

Figure 5: Gaps between UK net local deliveries and true demand (Mt) – 2015



Source: ISSB, Hatch

However, for the steel industry to access the full opportunity of 11.7 Mt, the UK will require wider cross-sector collaboration and longer-term strategies to grow domestic content in supply chains and re-shore manufacturing (particularly in automotive). This challenge extends beyond the UK steel industry and cuts across a number of manufacturing sectors and as such an effective solution requires a longer-term multi-sector response.

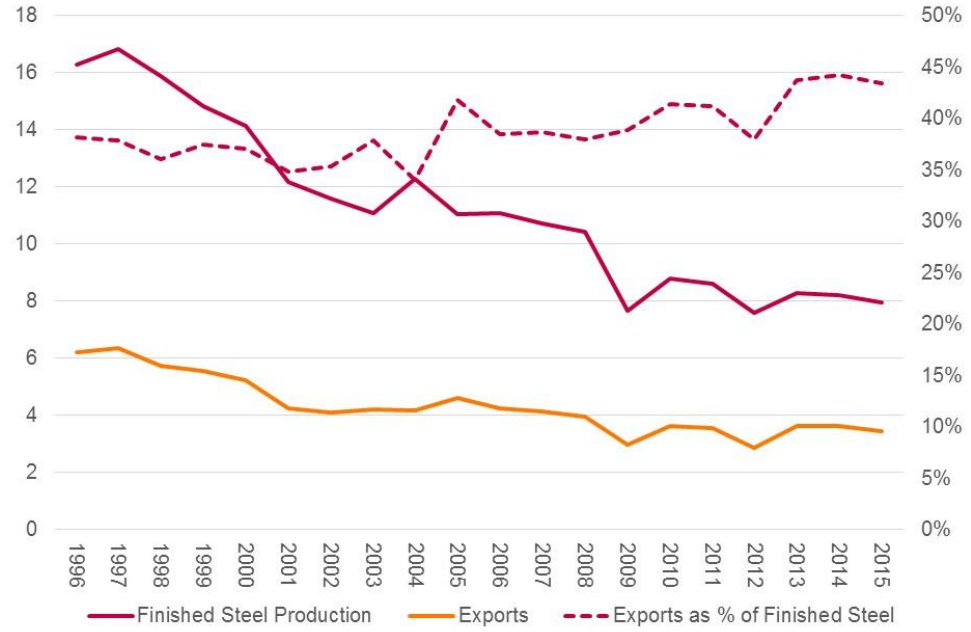
Export markets

While an in-depth review of potential export markets was outside the scope of this study, we are able to draw some insights from the analysis conducted.

Exports of finished steel are an important part of the production mix for UK producers. In volume terms, exports have tracked the trends of finished steel production. Both finished steel and exports have contracted by nearly half between 1996 and 2015.

The UK currently exports 43% of its production of finished steel. This share has increased in recent years, particularly after the financial crisis in 2008. Prior to 2008, the share was between 35% and 39%.

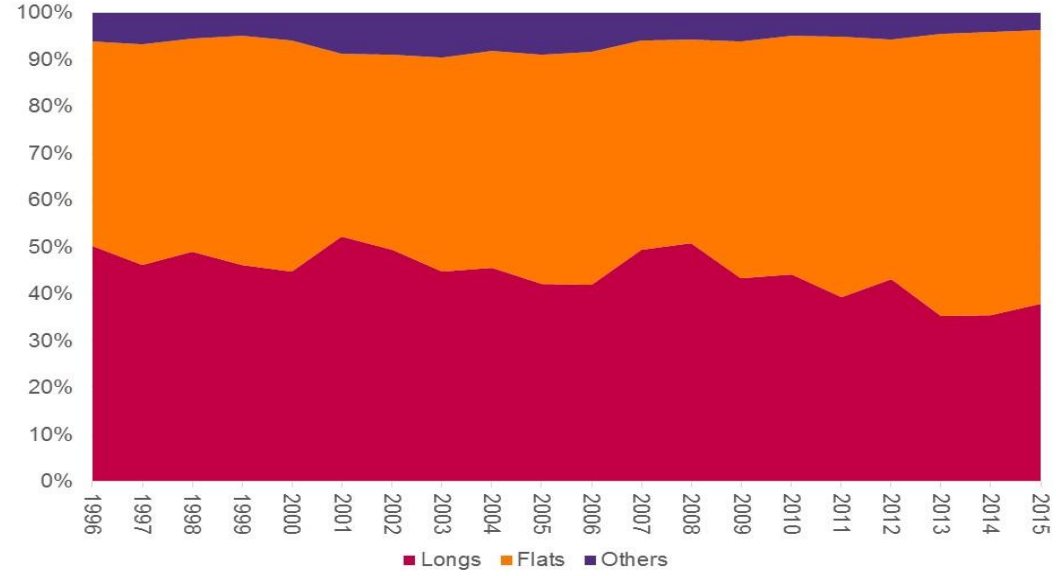
Figure 6: Finished steel production and exports in UK (kt)



Source: ISSB, Hatch

Of the total exports, the share of flats has increased from approximately 32% to 44% between 1996 and 2015, while the share of longs has decreased from approximately 50% to 38%. In some finished steel such as wire rods and engineering steels, exports are more important to the production mix and the capabilities are better suited to markets overseas as compared with the UK. In the case of other finished steel, exports are pursued to achieve production volumes and spread the fixed costs.

Figure 7: Share of longs, flats and other finished steel in exports



Compared with other EU countries, UK exports (43%) are lower than Germany (57%), Italy (58%) and Spain (62%). Although there is likely to be a geographic component to this, there are also disadvantages from lack of cost competitiveness and gaps in capabilities in the industry.

The past trends indicate that exports will in all likelihood continue to play an important part in steel production, and producers in the UK will rely on leveraging the linkages with the markets and customers to support its business.

Realising the finished steel future opportunity: Barriers to be addressed

Given the need for an industry-wide response in relation to true steel demand, the focus of the remainder of this report is therefore on finished steel demand, where the demand recovery presents an excellent opportunity for the UK steel industry. There are, however, a number of challenges to the industry accessing the full future opportunity. Appendix 5 in the Technical Appendices provides an overview of these barriers by product and provides specific interventions that could help to address these challenges.

These challenges can be grouped together under the following themes: capacity, capability, competitiveness, customer service, unlocking supply chains and aligning to market trends. The remainder of this section looks in turn at the different issues emerging within each of these themes and discusses a number of wider technology trends that will also impact on the steel industry.

Capacity

While it is not realistic to expect the UK to be 100% self-sufficient, if the UK steel industry is to realise the growth potential then it needs to increase its capacity. This increase in capacity is required across both high-volume products such as rebar and high-value products such as coated steels. For example, in terms of rebar the UK's current mill capacity of 890 kt is clearly not large enough to meet the forecast future demand of 1,230 kt in 2030. There may be opportunities to address this gap through capacity enhancements and restarting of mothballed rebar mills – something that could also help to address and diversify supply risk issues that were highlighted by some consumers. Or, looking at coated products, it would appear that there is a capacity gap of 1.5 Mt in relation to the potential opportunity size up to 2030.

In addition, there are capacity gaps for other products such as mesh-quality wire rods, although the gap is not at a scale that would justify additional investment in capacity. There are also other products, such as seamless tubes and stainless steel, where the UK currently has no capacity. However, given the UK's current market position there is no incentive to intervene in these products. For example, in stainless steel because the UK does not have downstream processing there is not a market case for investment or intervention; a conclusion that is given further weight by the fact that the product is sub-scale and marginal to UK steel from an investment standpoint. It is a similar conclusion for seamless tubes, although this position may need to be revisited if the shale gas market develops.

It is important when considering capacity to not lose sight of the 40% of UK finished steel production that is exported. Not least because much of this production helps producers achieve a cost-effective volume, for example in wire rods, tinplate, merchant bar and engineering steels. However, the uncertainty surrounding the EU exit negotiations and outcomes in relation to trade deals could pose a significant risk for the UK steel industry's capacity if exports reduce dramatically.

Capability

To date, the capabilities of the UK steel industry have not kept pace with the market. Therefore, if production capability continues at current levels, the UK's ability to achieve the maximum value of the future opportunity in 2030 is limited. Without action, the UK steel industry's position is also likely to worsen over the longer term (post-2020) as the effect of lightweighting and grade shifting impacts on key sectors such as automotive, construction and packaging. This issue is particularly apparent in the automotive sector, where the CO_2 emission target implies that vehicle mass reduction is a critical component to achieve the emissions target alongside other options such as increasing power train efficiency and rolling resistance. This change would see an increasing share of AHS and UHS in vehicles. Given that the UK does not produce any of these value-added grades, this underlines a very significant lack of capability. Automotive grades is a huge strategic area that needs investments in modifications and capability enhancements.

There are also significant capability gaps currently across a range of products including HRC where the UK is unable to roll thinner gauge below 1.8mm, while many European competitors have had this capability for more than a decade. While in pipeline grades, the UK is unable to produce X70 grades and all grades for applications in low-temperature environments as well as wear-resistant grades and high-strength and advanced high-strength automotive grades. This is a result of limited mill-rolling and slab-casting capability for a consistent sustainable market offering.

It is a similar story in sections where a major European competitor is operating a lower-cost steel-making route utilising scrap, beam blank casting and hot connect facilities. This process configuration provides a greater degree of operating flexibility, higher yield, lower thermal losses and greater labour productivity. Therefore, in addition to cost limitations, the UK's competitiveness (see below) is also limited by capability gaps, with the UK unable to meet the full demand and some grade requirements, particularly across medium and heavy sections (e.g. thermomechanically rolled grades).

Similarly, with plates the incumbent plate mills do not have steel-making facilities for certain pipeline grades (X52, X60, X65, X70), pressure vessel grades, ultra-high strength, wear resistance and shipbuilding, and therefore depend on purchased slabs. While purchasing slabs for general applications is straightforward, it can be more difficult to source slabs for more demanding applications as the quality of slabs required for high-quality, high-value plate production is not readily available. This means that UK producers are unable to service the complete requirements of the UK market, which limits the industry's ability to move up the value chain. Given that consumers sometimes have a preference to source from fully integrated producers, the UK steel industry needs to convince these consumers that they can construct effective supply chains using partners. It should also be noted that these capability gaps are partly a result of mill capability (particularly in relation to mill widths) and partly of continuous casting machine capability.

Or, from a sector perspective automotive steel is huge strategic area in which the UK has approximately a third of the market. It has not made the investments in aligning its capabilities with the demands of the industry. The roots of these issues can in part be

traced back to the industry struggling to make margins and invest the surpluses to develop the capabilities. The result is an economic response with some capabilities migrating out of the UK.

If the UK steel industry wishes to access these opportunities it will require investment to meet the new capability either from completely new mills, upgrades to existing facilities or R&D in products and services. For example, alloy development for product innovation to meet changing customer needs, with a particular emphasis on the development of higher-strength steels for lightweighting, is required if demand is not to be lost due to product migration and to allow the UK to utilise its significant latent capacity in this product.

Alongside gaps in capability, there is also evidence of producers taking commercial decisions that have resulted in capabilities being shifted out of the UK to elsewhere in the EU. For example, when many car manufacturers moved away from galvanneal to galvanised products, it left small uneconomical volumes of galvanneal at different production plants with the result that rational commercial decisions were made to consolidate production in a single European facility. Alongside this, while there is some anecdotal evidence that investments have been made in strip product research and development, there is a lack of evidence that these products have been commercialised in the UK.

In this context, it is important not to lose sight of those products where the UK steel industry has kept pace with the global market and those particular products where demand is not only largely satisfied by local deliveries but also contributes to UK exports. This includes:

- Rails – compared with any other product, rails represent a success story for UK steel. Of the 166 kt procured in the UK in 2015, local deliveries account for over 95%. Exports have also increased significantly in 2014 and 2015, particularly when compared with the past 15 years.

- Wire rods – where the UK industry is fundamentally capable to service the downstream mesh and wire-drawing industry, with the UK also a large exporter of wire rod, including high-value tyre cord wire rods.

- Coated products – where Tata's Colorcoat was seen to be the 'best on the market' for its quality as well as customer service (it comes with a 40-year guarantee). Colorcoat is a particularly good example because both the research and the commercialisation of the product were driven from the UK.

Competitiveness

While parts of the UK steel industry and associated supply chains suggested that the UK steel industry was competitive in some products, the majority suggested that UK mills faced a competitive disadvantage compared with EU competitors. Although this study did

not involve a full comparison of the cost competitiveness of sites and the drivers of this, a number of the producers and consumers consulted did highlight a range of factors that are limiting the UK steel industry's competitiveness. These included:

- The UK's higher energy prices, something that particularly affected Electric Arc Furnaces (EAFs);
- Higher business rates; and
- Higher logistics costs in terms of UK transport and the structural cost disadvantage because of a lack of single-site facilities, which means there is a need to move products between plants.

These factors mean that the UK struggles to be cost competitive, particularly when compared with countries such as Turkey, China, Ukraine as well as other parts of Europe. Given that elements such as energy prices and business rates are outside of the control of UK producers, there is a need to work closely with government to address this.

Alongside these cost disadvantages, another factor that has limited the UK's competitiveness is a lack of investment in new capital equipment to close supply chain gaps and enhance capability, as well as create a step change in flexibility, productivity, and cost competitiveness (see next section for more detail). As well as limiting UK capability, for multinationals this incentivises the leakage of future investment and R&D from UK plants to other competing plants in the EU that already have higher capabilities.

If the UK steel industry is to begin to address these factors, it will require more capital investment and spend on process R&D alongside policy changes on factors such as energy costs and business rates to secure long-term sustainability. For example:

- The competitiveness of rebar production in the UK could be enhanced through investment and innovation in scrap pre-processing and efficiency in the EAF.
- For plate, there is a need for two parallel interventions, firstly a modern plate mill utilising technologies such as thermomechanical rolling and accelerated cooling could supply the higher-quality end of the market. Secondly, steelmaking and slab-casting facilities capable of supplying suitable semi-finished products to enable the mill to fulfil its full product range potential.
- For coated products, there is a need for research into new coatings and wear-resistant steels, and ultra-high-strength low-alloy steels. Importantly for the UK steel industry, this R&D activity would need to be commercialised in the UK, which would involve a strategic decision backed up by investment.

The third limitation on competitiveness is that for some products the UK only has a single producer. This was seen as an issue by a number of consumers who noted a preference to procure their steel from multiple producers and as such maintain a diverse supplier base in order to manage their supply risk. This factor has therefore further driven the increase in imports as consumers either source direct from overseas mills or through UK-based stockholders who import foreign products. It is a factor that is further complicated for some products within the UK because of downstream ownership of the supply chain, which means that certain UK suppliers are not used because they are part of the same parent group of companies that are considered competitors. This is a factor that could be addressed by new entrants to the market that would not only provide further competition but in turn could allow downstream buyers to buy UK-produced steel.

Customer service

The range of consumers consulted as part of this study reported a mixed experience in relation to customer service. Some interviewees praised UK producers for their level of engagement and adaptability in meeting customer needs. Many consumers would welcome opportunity for more engagement with producers. In particular, respondents in construction believe it could give producers a better understanding of industry needs which could have positive implications for innovation.

Others raised challenges for the industry, including:

- The long lead times that were required. This was seen as particularly problematic for those consumers with contracts that come through ‘last minute’. The result is that many consumers are restricted to using stockholders.

- A lack of willingness to deal with small order sizes, with the result being that the processing time is greatly increased or not taken, a fact that again pushes consumers towards using stockholders (see below).

- The timeliness of delivery, with examples given of producers rendering delivery on time when it was four weeks late (something, it was noted, that was not the case in Europe).

For many of the consumers consulted, there was a stated desire to buy from British producers and many would also welcome closer engagement throughout the supply chain (see below) to ensure that designers, engineers and fabricators are fully aware of UK products and services.

Given that many original equipment manufacturers (OEMs) are multinational companies that specify the source of steel procurement to the supply chain, this is an opportunity to influence and change the model. Producers could also consider how they might enhance

supply-chain agility (particularly short delivery times) and meet smaller order volumes, both of which are issues that push consumers to go to stockists.

Unlocking supply chains

For those sectors such as automotive and construction, where the scale of the future demand opportunity is large, there is a clear need for the UK steel industry to engage in a deeper and more responsive way.

Looking first at the automotive sector, it is clear that UK-based OEMs operate sophisticated, globally integrated supply chains and, given foreign ownership, many sourcing decisions are made outside the UK. This context has a number of significant inter-related implications for UK producers. Principally, it means that they source from producers that they have established relationships with, who are capable of meeting their needs cost-effectively across a number of locations not just the UK. Therefore, UK producers often need to be capable of matching the competition to supply key OEMs not just in the UK. To meet this need, it means that steel producers will often seek to supply from the most cost-effective plant – which in many cases is not in the UK. This has a knock-on effect in relation to investments, as the parent company of the producer will often choose to invest in plants that are capable of producing higher-value grades.

A further challenge in the automotive sector is how producers engage effectively with the supply chain below the OEM. This is a challenge for the producers as the automotive supply chain is invariably made up of a large number of smaller suppliers. Therefore, while engagement with the OEM may be strong there is much less engagement at Tier 1 and below. Given the amount of money tied up in the complex automotive supply chain and the high levels of wastage, there is a clear opportunity for the automotive and steel industries to innovate and facilitate a clearer, simpler supply-chain solution.

For the construction sector, it is the fragmented nature of the supply chain that has created the greatest barrier, as it has made it difficult for producers to engage throughout the supply chain. The biggest implication for the UK steel industry of this limited engagement relates to the steel industry's ability to influence the construction sector in terms of helping shape design decisions and ensuring that there is a comprehensive understanding of how steel can be used. This will also help to mitigate any risks to UK steel in relation to material substitution and an increased use of wood.

Another implication of a highly fragmented supply chain is its complexity, with a number of fabricators and consumers noting that there is a need to invest in technology to support the functioning and efficiency of the supply chain.

For both these sectors the supply chain was also impacted by the UK steel industry's limited capability and capacity, which meant that alternative sources had to be found. This was particularly the case in terms of capability as there are certain specifications, particularly high-strength steel, that UK producers cannot make. Therefore, if the UK steel

industry is to compete against the global steel market, the industry must collaborate and innovate through the supply chain to improve the offer. Greater vertical integration might allow producers to capture greater value but may have unintended consequences if competing downstream fabricators switched supply to imports.

In addition to the construction and automotive sectors, producer engagement with the supply chain across the whole manufacturing sector is further complicated by UK industry going through structural change and hollowing out of supply chains. This has resulted in a decline in domestic steel demand as activities have been offshored.

Across all sectors, stockholders are also playing an increasingly important role within the supply chain, whether that be in providing grades that are not produced in the UK, providing more timely and agile delivery or servicing small volume orders. This has potentially significant implications for the UK steel industry as stockholders become the key target customers of importing mills who require that channel to be able to serve sophisticated or small customers in the UK. This growth in the UK stockholding segment has also exacerbated the disconnect between producer and consumer and can inhibit continuous improvement and new product development. Finally, in order to manage supply risks, stockholders will import steel, which in turn increases competition and reduces demand – particularly with a number of stockholders noting that international producers had more capability, better quality and lower prices.

The UK steel industry therefore has a clear opportunity to grow its influence with end users by addressing short-term service requirements and strategic development objectives. In response to this, harmonisation of digital procurement systems was suggested as another aspect where the UK steel industry lagged behind competitors and provided an opportunity to improve supply-chain linkages.

Aligning to market trends

In the medium term, several sectors will undergo transformative changes and it is important that the UK steel industry is aligned and responsive to these market trends, particularly those such as construction and automotive where the scale of opportunity is greatest.

In the construction sector one of the strongest trends identified through the consultations was the move to higher grades of steel. This echoes the findings in the historical data analysis and reinforces the expectation in the demand forecast that there will be further shifts to higher strength – S355 and S420/S460. However, some respondents did feel that the current cost of these grades makes them prohibitive. This is particularly important in the context of a range of different materials (concrete, glass-reinforced plastic and timber) that were seen to provide viable alternatives to steel in the construction process.

Alongside this, another trend identified was the standardisation of design and a greater opportunity for modular buildings. This is a real opportunity for the UK steel industry as the

approach requires framing of modules (or elements) which is typically done in steel or some form of metal. For this to really be successful there is, however, a need for the steel industry to work with the housebuilding industry to change perceptions of what modular means. If this can be done it will enable the market to grow at a whole different level.

With major infrastructure projects playing a key role in driving the future demand of UK steel, there would also appear to be an opportunity around procurement within the construction sector to support the UK steel industry by focusing on increased transparency on reporting material sourcing as well as ensuring that public procurement takes into account wider socio-economic impacts of UK sourcing. Some interviewees in this study relayed their own experience, that when foreign companies win contracts they tend to use their own existing supply chains.

In the automotive sector, in terms of the future of steel, there were two big factors that were seen to be influencing steel usage. The first was around vehicle electrification. The second was around the emissions agenda and a desire to reduce vehicle weights, which will impact on the intensity of steel used as OEMs look for efficiency with an increasing move towards the use of lightweight steels, aluminium, composites and plastics. Given that future OEM production is determined by 5–6-year product cycles, there is a need for the UK steel industry to ensure that they are engaging around the key decision points of their major clients and influencing design decisions.

Therefore, for the UK steel industry to remain competitive and maximise the scale of the future opportunity it can realise, there is the need for greater market intelligence and innovation, as this would enable the producers to adapt better to the changing needs of the automotive sector. In this context, the example was given of aluminium producers engaging effectively with the automotive sector around both customer service and innovation.

Alongside this, further investment in R&D would help the UK adapt to such changes and meet new demand. However, it should be noted that the commercialisation of some products is likely to happen outside the UK if production of higher-value steels remains consolidated outside the UK.

Technology trends

A number of globally recognised technology trends have far-reaching implications for the steel industry and its supply chains, of these decarbonisation, digitisation and materials substitution are highlighted below.

Decarbonisation

The challenge for decarbonisation of the steel industry is difficult as carbon is used both as a fuel and as a chemical reductant. It is the chemical aspect of the role of carbon in the process that is difficult to change. There is a technical limit to the level of carbon reduction based on thermodynamics and beyond this point the only option is to switch to a different

processing route. Therefore, any future for steel that aims to be low or zero carbon requires significant investment in process innovation and new process research. This has been recognised at an international level by World Steel, which has been co-ordinating collaborative effort through ULCOS: Ultra-Low Carbon Dioxide Steelmaking.[2]

At a national level the UK steel industry has participated in the development of a 2050 low-carbon roadmap in association with government.[3] Key findings from this roadmap include the need to invest in research, innovation, pilot and demonstration activity at a national level, with the electricity grid decarbonisation identified as a key technology area. This priority has also been identified by the national governments and steel industries in Germany, Austria[4] and Sweden.[5] What these initiatives have in common is a recognition of the need to switch from carbon to an alternative fuel and reductant, such as hydrogen. This is also the focus of the Zero Carbon and Hydrogen Hub at the Materials Processing Institute[6]. Significant investment in process development for decarbonisation of steel is essential to enable the switch to a sustainable low-carbon industry. The UK is well placed to do this having considerable process expertise and pilot facilities already in place, but to be successfully commercialised there needs also to be a willingness from the industry to invest in the commercialisation of these technologies.

Digitisation

Digital technologies and the fourth industrial revolution have the potential for far-reaching transformation throughout the economy. Historically, the steel industry has been a developer and early adopter of process instrumentation and control technologies, including expert systems and adaptive neural networks.[7] The fourth industrial revolution takes this to a different level, incorporating ‘big data’, the ‘internet of things’ and automation technologies to drive process, product and customer service improvements. The steel industry has recognised the opportunity this presents and the first global steel conference on Industry 4.0 was held in Warsaw in 2017.[8] At a UK level the industry is investing in R&D in this area, including using big-data technologies for the transformation of process control. An area of opportunity would be to collaborate closely with the Industrial Digitisation Review reporting in to government.[9]

Materials substitution

Purchasers of materials rarely wish to buy a specific material. Usually they require a set of material properties and then seek the material with the most appropriate and economically

[2] http://ulcos.org/en/index.php
[3] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/416667/Iron_and_Steel_Report.pdf
[4] http://www.voestalpine.com/group/en/media/press-releases/2017-02-07-voestalpine-siemens-and-verbund-are-building-a-pilot-facility-for-green-hydrogen-at-the-linz-location/
[5] http://carbon-pulse.com/17894/
[6] http://www.mpiuk.com/news-details.php?news_id=116
[7] http://industrialdigitalisation.org.uk/wp-content/uploads/2017/07/Interim_Report_Final3_1.pdf
[8] http://www.futuresteelforum.com/
[9] http://industrialdigitalisation.org.uk/wp-content/uploads/2017/07/Interim_Report_Final3_1.pdf

viable matches to those properties. As a consequence, materials are under constant competition in different applications. Historically, steel has proved extremely resilient to material substitution, through continuous process and product innovation. However, there are some new and emerging threats, particularly as viewed from a UK context, where a response from steel producers is required. The forecast data show opportunity for steel in the UK, particularly in the areas of construction and automotive, but in both of these areas there are emerging challengers to steel.

The use of natural materials in construction is gaining in acceptance in the UK. In particular, new technologies have been developed for engineered wood products. For example, the construction of the world's first cross-laminated (CL) hardwood building, for the NHS in Oldham, has recently been reported.[10] CL timber construction is also making wooden high-rise buildings possible with up to 12-storey buildings being constructed in the USA and Scandinavia in the past two years.[11] CL wood claims high-sustainability credentials and is not the only innovation in this material, with engineered wooded tubes currently being developed as a direct competitor to steel in this sector.[12] Market acceptance of this material is perceived to be high, with barriers to entry reducing as a result of new innovations that allowed the construction in 2017 of the first wooden church in London since the Great Fire in 1666.[13] This project was only possible due to the advances in treatment for fire resistance that overcame historic planning restrictions.

To address this challenge, steel companies will need to revisit some of the successful strategies of earlier decades, including engaging at an early stage with architects and designers. New product innovation will be required, as will new process innovation to achieve the desired material properties for stronger and lighter steels as well as functional coatings.

Assessing the impact of current barriers in capacity and capability

A headline finding from the study is that there is a £3.8bn p.a. future opportunity in UK steel demand identified in 2030. This is in revenue terms and is over and above the value of domestic market supply achieved by the UK steel sector in 2015.

It is possible to make an illustrative comparison between the capacity and capabilities of UK steelmaking assets in 2015 and this future demand opportunity. This only takes into account sites operating throughout 2015, assumes that UK sites continue to export at the

[10] http://www.iom3.org/materials-world-magazine/news/2017/aug/01/worlds-first-building-made-hardwood-clt
[11] https://www.dezeen.com/2015/06/08/puukuokka-housing-block-oopeaa-finland-wooden-apartment-building-lakea-oy-clt/
[12] https://www.pollywood-natural.com/#about-us
[13] http://www.catholicherald.co.uk/news/2017/02/02/first-wooden-church-since-the-great-fire-is-built-in-london/

volumes achieved in 2015 and that no investment is made in new or mothballed assets to improve product capacity or capability.[14]

Under this comparison, of the £3.8bn future opportunity in 2030:

- £0.7bn or 18% can be accessed by UK mills operating in 2015 – i.e. this much of the future opportunity could be realised if all spare capacity in UK assets was utilised;
- A further £2.0bn or 52% is outside the capacity of UK mills operating in 2015 – i.e. UK mills make these products, but even if assets were at full capacity, it is estimated that more than half the future opportunity could not be realised (subject to the above assumptions).
- A further £1.1bn or 30% is outside the capability of UK mills operating in 2015 – i.e. UK mills do not currently make these products and could not in the future without new investment in assets.

It is important to note that this is a crude comparison based on a snapshot of the industry in 2015. UK producers may decide to target domestic opportunities over exports if they are more profitable, or invest in restarting mothballed or new steelmaking assets if there are viable commercial opportunities. It is also unrealistic for a country to satisfy its entire steel demand from domestic producers. This comparison highlights some of the choices facing UK steel producers and policymakers in accessing a greater share of the future opportunity, working from the baseline of the position of the industry in 2015.

[14] Sites not taken into account include sites that closed in 2015 (such as SSI's Redcar plant) and sites that were mothballed in at least part of 2015 (such as Newport, Sheerness, Llanwern HRC line). Spare capacity in UK combi mills has been allocated to higher value products first. The comparison assumes the 2015 product mix achieved in UK strip production is unchanged, due to constraints in operating capacity.

Realising the finished steel future opportunity: Cross-cutting enablers

The barriers identified in the previous section present a varied set of challenges to the UK steel industry winning a larger share of the future opportunity in UK steel demand. There is no single solution to each of the issues set out. In all cases, strategies for growing domestic market share will be a commercial decision for individual companies. There are, however, a number of cross-cutting themes. These themes have the potential to better enable the UK industry to access the future opportunity and as such any future strategy for the sector should carefully consider and respond to each of these themes.

Investment capability

There is an urgent need to encourage investment in new capital equipment to close supply-chain gaps and enhance capability as well as create a step change in flexibility, productivity, and cost competitiveness by early adoption of disruptive technologies that have the potential to allow the UK to achieve competitive advantage as a world leader. This will require closer engagement with the customer and end users to better understand market drivers and demand.

A major barrier for the UK steel industry is that the UK production infrastructure is already built and a reluctance to uproot and replace ‘sunk capital’ before its end of life tends to limit advances to incremental development rather than encourage the adoption of the latest technologies being applied to greenfield developments elsewhere. The cycle is perpetual as ‘sunk capital’ does not all reach end of life at the same time.

There is evidence that the business case for investment is challenging, due to the relatively low levels of return on capital employed. This barrier could be addressed by considering different business models, asset configurations and lower capital cost processing technologies in conjunction with attention to some of the cost factors associated with manufacturing in the UK – all of which should also be underpinned by investment in process innovation.[15]

Supply-chain engagement

Greater engagement between producers and the steel supply chain, building on strong relationships already in place, would improve communication and collaboration between producers and end users on product design and material specification. Producers could consider supply-chain initiatives similar to the highly successful engagement with

[15] ‘Steel 2050: How Steel Transformed the World and Now Must Transform Itself’ – Rob Beddows, Devonian Ventures; 978-0993038105.

architects, procurers and fabricators in the construction supply chain that has resulted in an increase in the steel intensity of commercial buildings.[16,17]

The lack of flexibility in, or guarantee of, delivery from producers, and global procurement policies from OEMs, must be overcome if UK market share is to increase. An overcomplicated UK steel supply chain increases the distance between the producers and end users. Collaboration between UK suppliers would help identify opportunities to drive greater value and reduce wastage. This may require process innovation.

Such engagement, coupled with the UK's general business strengths, will also help to improve the attractiveness of the UK offer as a whole, with respect to international competitors, which would increase the likelihood of manufacturing being re-shored back to the UK. Customers have identified the fact that there is a single UK producer of many steel products as a barrier to increasing the overall UK market share, as consumers seek to de-risk their procurement policies. Producers could consider opportunities to increase the range of individual products, which would increase competition within the UK industry, but should also allow the UK industry to compete more effectively with imports.

Research & development

The evidence collected identified concerns about whether the innovation performance from UK producers could keep pace with international competitors in the future. This was more relevant for some products than others.

In the short term, solutions will involve working in collaboration with supply chain and end users on product development, cost-reduction technologies, productivity innovation and transformation planning. While in the medium term, it requires large-scale piloting and upscaling facilities including near net shape, raw material processing and other process compression and efficiency technologies to de-risk and accelerate commercialisation. This will require enhancement of existing R&D facilities through capital investment. The cross-cutting barrier identified above relating to capability investment must be addressed alongside investment in R&D, or the higher value-added steels developed risk being commercialised outside the UK.

Over the longer term, the clear opportunity for a step change in productivity, cost base and value-added product requires sustained investment in technical capability and facilities. In light of this, consideration should be given to whether existing R&D interventions for other sectors (Aerospace Technology Institute/Advanced Propulsion Centre) and other catapult

[16] Market management in Construction, A strategic analysis of CSPIJ's options for channels to market in the Benelux construction steel market, CORUS (Internal Report), 2005.

[17] Start building with finished rooms, Modular Building System, CORUS Living Solutions (Internal Report), 2005.

centres (such as the National Composite Centre) could give similar benefits if it is replicated in the steel sector.

While there is a recurring theme highlighting the need for increased emphasis on capability and product development, this has historically required combined input between businesses that have recently become separated, and in future some framework to address this deficit will be required.

Skills development

A number of producers, fabricators and consumers mentioned skill shortages in key areas such as: metallurgy, with the point made that there are currently no metallurgy degrees offered in the UK; engineering, at professional, chartered and technician levels; technical skills such as those required to work with different grades; and process skills such as production management and risk management.

In addition, a number of consuming sectors talked about skills shortages in their own industries, with the potential to impact on sector growth. Alongside this there is also clearly competition between different sectors with automotive cited as particularly effective at attracting engineers.

Concerns were also identified in terms of the impact of skills as a result of the EU exit.

As a number of interviewees did not raise skills in the context of accessing future opportunities, this report cannot draw specific conclusions around the future skills requirements of the sector, although some skills gaps have been highlighted.

Therefore, in response to all these enablers there is a need to consider the role played by skills, and how upskilling could help to close identified gaps, particularly in technology and risk management capability.

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