green alliance...

A brighter future for UK steel

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Summary

> **“The UK market for steel has potential to grow by up to 26 per cent by 2030, mostly from meeting net zero needs.”**

This report is one of a series in which Green Alliance is looking in depth at important sectors to determine how the UK can take a lead in the global transition to net zero and improve the country’s economic resilience and sustainability in a rapidly decarbonising world.

The UK steel industry is going through a critical transition. It is seeking government support to help reduce its substantial carbon emissions and improve its competitiveness in a global market.

There are clear advantages to be gained from keeping steelmaking capacity in the UK which has much lower production capacity than other countries of similar wealth, leaving it more vulnerable to supply chain shocks. Domestic steelmaking underpins other industries and provides good quality jobs.[1]

Other countries are offering their steel industries sizeable subsidies to invest in modern production plants but UK action on industrial decarbonisation so far has progressed slowly.

This work follows our report *Building the future* in 2022 which made the case for a transition for the industry centred around better use of the UK’s extensive supply of scrap steel, combined with a small volume of low carbon hydrogen-based ironmaking to maximise future flexibility.[2]

> “Buyers around the world want more clean steel and to maximise material efficiency.”

Here, we show that the UK market for steel, has potential to grow by up to 26 per cent by 2030, mostly from meeting net zero needs like electric vehicle charging points and wind turbines.

To effectively meet the net zero goal and not just shift emissions elsewhere, it is important that the UK manages demand by using its steel more efficiently.

We show that domestic production capacity could supply the vast majority of what the UK will need, particularly in scenarios involving greater material efficiency. And recycled steel could meet nearly 80 per cent of future UK demand.

Better use of steel in the UK and elsewhere could reduce embedded carbon by 14 per cent and cut emissions from the domestic steel industry by an estimated six per cent in 2030, on top of the savings made from running modern lower carbon steel plants.

Buyers around the world, in some cases driven by government regulation, want more clean steel and to maximise material efficiency. The UK industry needs to get ahead and find ways to extract greater value from less product.

We offer several examples of how this might be achieved, including through closer integration with customers to offer higher value products in markets like construction. We also recommend securing supplies of high quality scrap for a future competitive market.

Moving away from an approach focused on maximising production volume might appear daunting for an industry which has been built around that aim. But a transition now would lead to better connections with the domestic market and potentially improved profitability.

> “Ensuring a healthy market for UK steel needs wider government commitment.”

None of this can happen, though, if the steel industry struggles to compete internationally. Ensuring a healthy market for UK steel and better synergy with a revitalised supply base needs wider government commitment to supporting UK steel manufacturing, ensuring, for instance, that components for the net zero transition are made in the UK rather than imported.

We recommend a strategy, to be agreed by the government and the steel industry, centred around the UK’s future steel needs.

Our analysis shows that the following actions would improve the industry’s prospects and could be implemented quickly with a co-ordinated approach.

Recommendations for the steel Industry

- Shift steel production to electric arc furnaces (EAFs).
- Minimise steel waste during processing and improve scrap recovery.
- Invest in processing capacity for scrap steel and for high value products.
- Investigate other new business models for the industry, such as leasing, buy back schemes or circular stockholding.

Recommendations for the government

- Create a more favourable investment environment.
- Offer match funded capital support, including for a hydrogen direct reduction facility supplying low carbon iron to UK industry.

- Have dedicated strategies for reshoring manufacturing industries using steel and growing sectors like renewables.
- Drive faster uptake of low carbon steel and resource efficiency in the industry, eg through mandatory scope 3 (upstream and downstream) emissions reporting and product standards, and by extending public procurement, carbon footprint and circularity requirements across the UK.

Introduction

> “There is a strong argument for continuing to produce steel in the UK but with electrified steelmaking.”

In a global market that has an oversupply of steel and high energy prices, UK steel producers are struggling to compete and face an uncertain future. In addition, to keep up with growing demand for cleaner steel and align with the country’s net zero goal, the two largest steel producing sites in the UK will require fundamental transformation by 2035, to move away from high carbon blast furnaces.

As our 2022 report *Building the future* set out, there is a strong argument for continuing to produce steel in the UK but with electrified steelmaking. This could predominantly recycle the UK’s ready supply of scrap steel, with a small additional input of virgin iron for steel made using low carbon hydrogen.[3] While there are some electric arc furnaces (EAFs) in the UK using scrap steel, it is at low volumes currently.

The UK has limited steel production capacity for an economy of its size, which threatens its resilience. The industry provides well paid jobs in several economically disadvantaged areas and helps to underpin the wider manufacturing sector.[4]

However, the transition to low carbon steel making is unlikely to happen without more government action to improve operating conditions and investment, including by ensuring cheap green power for the sector.

Since 2022, operating conditions have continued to be challenging, prompting negotiations around what support the government can offer in exchange for retaining and decarbonising the country’s two largest steel plants. In contrast, other governments around the world are offering significant capital funding to help their steel industries to decarbonise.[5,6]

Climate change means using steel differently

What is happening to the industry in the UK is only part of the picture. Steel is globally traded and its demand is increasing across the world. While it could meet a lot of the UK's needs, recycling steel cannot meet all requirements internationally.[7] To minimise the environmental impact of the industry and not just shift emissions elsewhere, the UK and steel buyers should aim to reduce the amount of steel used and ensure that each tonne produced delivers as much value as possible.

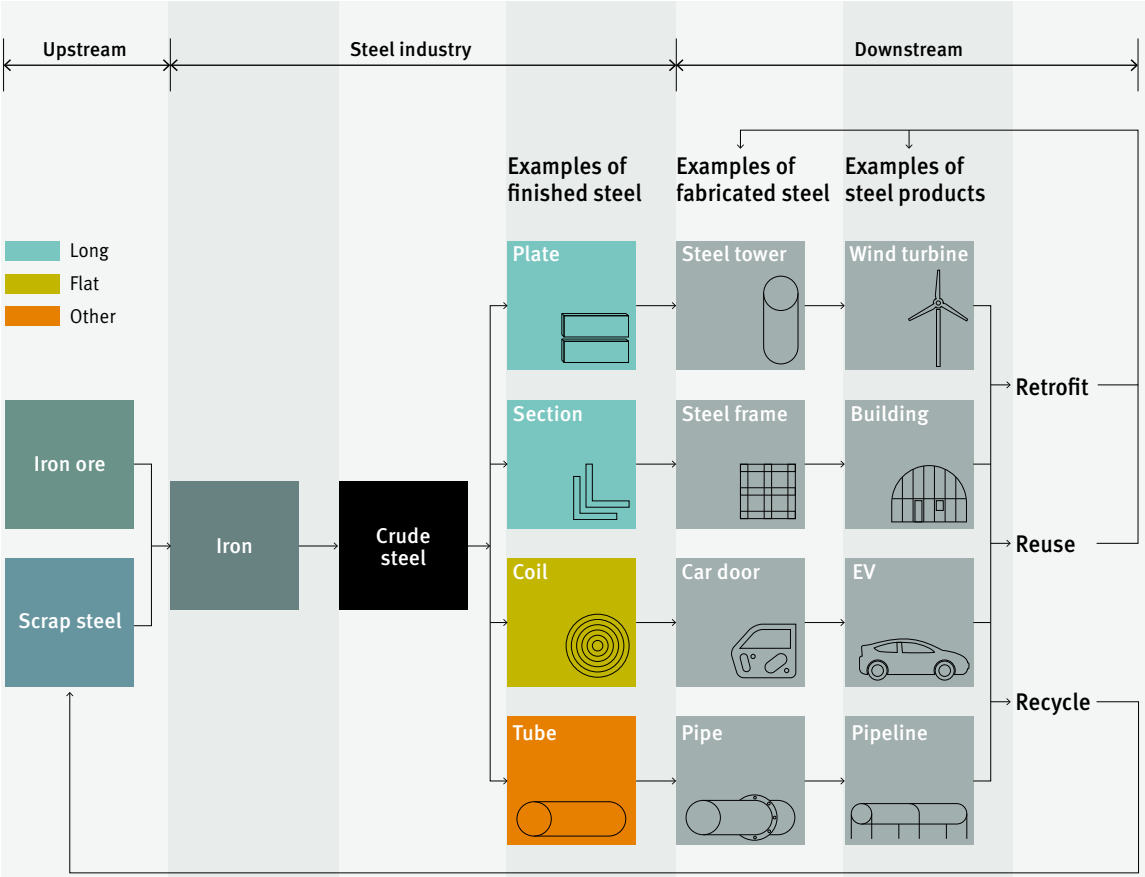
> "Only about 55 per cent of the steel purchased by car manufacturers makes it into cars."

Current practices are wasteful. For example, only about 55 per cent of the steel purchased by car manufacturers makes it into cars.[8] In the construction sector, steel beams are often designed to use 30 per cent more steel than required and steel framed buildings are being built with twice the steel necessary to meet safety standards.[9]

This waste is often perversely cost effective for businesses because it saves on more expensive labour costs. There is little incentive for an industry which values volume of throughput, as is the case with blast furnace production, to produce higher value, more highly engineered alternatives using less material.

However, EAFs are more flexible to demand than blast furnaces and the market is shifting to favour this.

Strategy for change in the UK steel industry[10]



What should happen at each stage

Mining and scrap retrieval	Ironmaking	Steel making	Processing	Fabrication	In use	End of life
Better scrap processing would create more high quality scrap for electric arc furnaces	A shift away from coal to hydrogen direct reduction is needed as this stage is the source of most of the sector's carbon emissions	A move to electric arc furnaces would enable greater use of scrap and hydrogen reduced iron	Investing in processing capacity would allow the UK to produce all types of steel to meet its future demand	Steel producers could add value to their business by expanding into fabrication (vertical integration)	There are huge opportunities for greater resource efficiency in use	Building retrofits and steel reuse should be prioritised before recycling, to maintain highest material value and increase efficiency of use

The industry is already changing

> **“Thirty six large companies have pledged to meet half of their demand with green steel by 2030.”**

Growing demand for greener products persuades manufacturers to shift towards lower carbon forms of production, and this is also true for steel.[11,12] Replacing equipment is very capital intensive and lower carbon hydrogen steel making is expected to incur a cost premium of around 30 per cent that will be passed on to buyers.[13]

Buyers of steel are beginning to seek lower carbon products, which is raising concerns for manufacturers running traditional blast furnaces. Under the SteelZero initiative, for example, 38 large companies have pledged to meet half of their demand with green steel by 2030.[14] Globally, the automotive sector leads the way, responsible for 44 per cent of the 48 green steel procurement contracts made up to May 2023.[15] Demand is also being driven by government action abroad, including green public procurement initiatives and the emergence of carbon border adjustments, which price the carbon in imported goods.[16,17]

The focus is not just on the carbon intensity of steel production. Some of these initiatives, including buyers subject to voluntary or mandatory requirements to report their scope 3 emissions (ie their upstream and downstream supply chain emissions), are also driving resource efficiency. In some cases, mandatory targets that will drive both are appearing. For instance, France has targets for the embedded emissions of all new buildings.[18]

Although the UK does not have a national equivalent, London’s requirements for embedded carbon and circularity assessments of large developments are encouraging interest in reusing existing buildings and their components. This includes the reuse of steel beams, as well as the use of low carbon and recycled materials (see page 20).

Other options for resource efficiency involve cutting the number of new steel products required. These include car sharing services like Zipcar, which can take 24 private vehicles off the road per shared car, and replacing steel with other materials such as timber for some uses in construction.[19]

Although these trends may seem threatening to the industry, by adapting its practices to changing demand it could benefit. For example, UK steel producers receive only a third of the final value of fabricated steel they sell into construction, as well as missing out on opportunities for material savings, as they only supply the steel and not the finished construction products it is turned into.[20]

Net zero will keep steel demand high

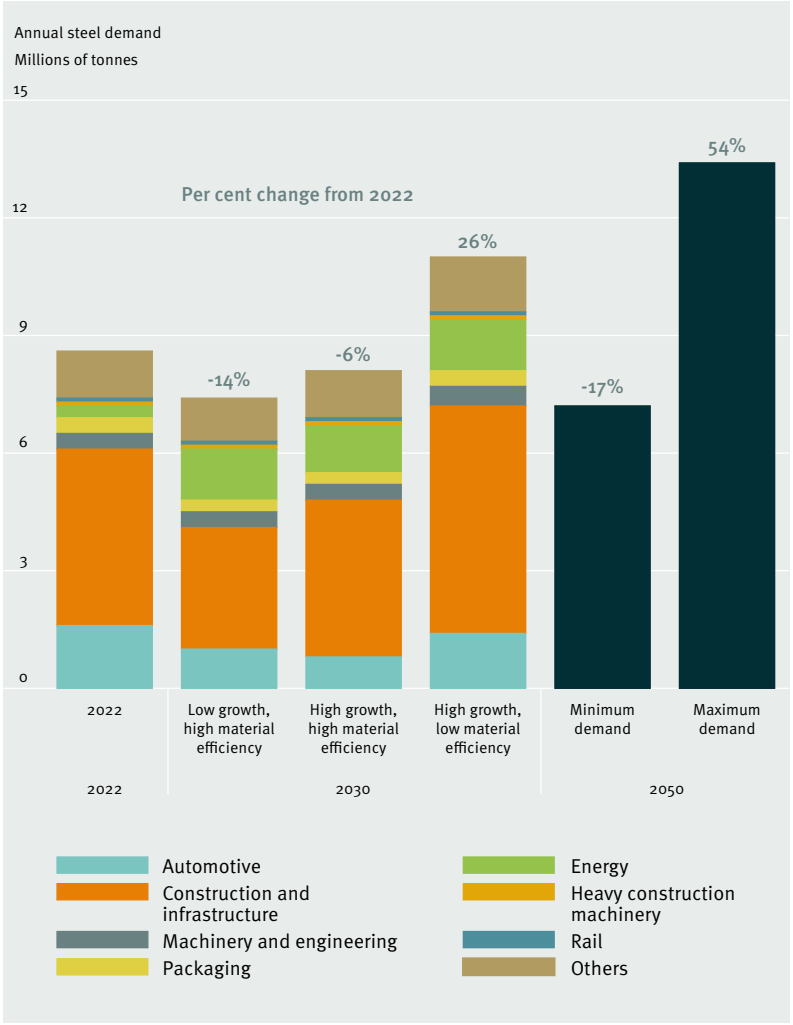
> “There will be a significant domestic market for the UK steel industry into the future.”

The UK will continue to need steel. Our forecasts for UK demand in 2030, which update a 2017 government assessment, show the UK could be using 26 per cent more steel by 2030 under a maximum growth scenario, assuming a business as usual approach to consumption.[21] Over 68 per cent of this increase is linked to needs for net zero machinery and infrastructure, such as uses for wind turbines and electric vehicle charging points.

Beyond 2030, some sectors are likely to see more growth than others, but it is fair to assume a rise in demand for steel of up to 54 per cent by 2050, with business as usual and the one per cent a year growth the government has predicted from 2015 to 2030. The market could be considerably smaller if economic growth is lower than this or if steel is used more efficiently. More efficient use of steel could cut 2022 demand by up to six per cent a year by 2030 even in a high growth scenario.

Even assuming steady levels of progress on material efficiency and continued slow economic growth, seven million tonnes of steel could still be needed in the UK each year to 2050.[22] Although this might not all come from UK production, it indicates that there will be a significant domestic market for the UK steel industry into the future.

UK future demand for steel in 2030 and 2050, relative to 2022[23]



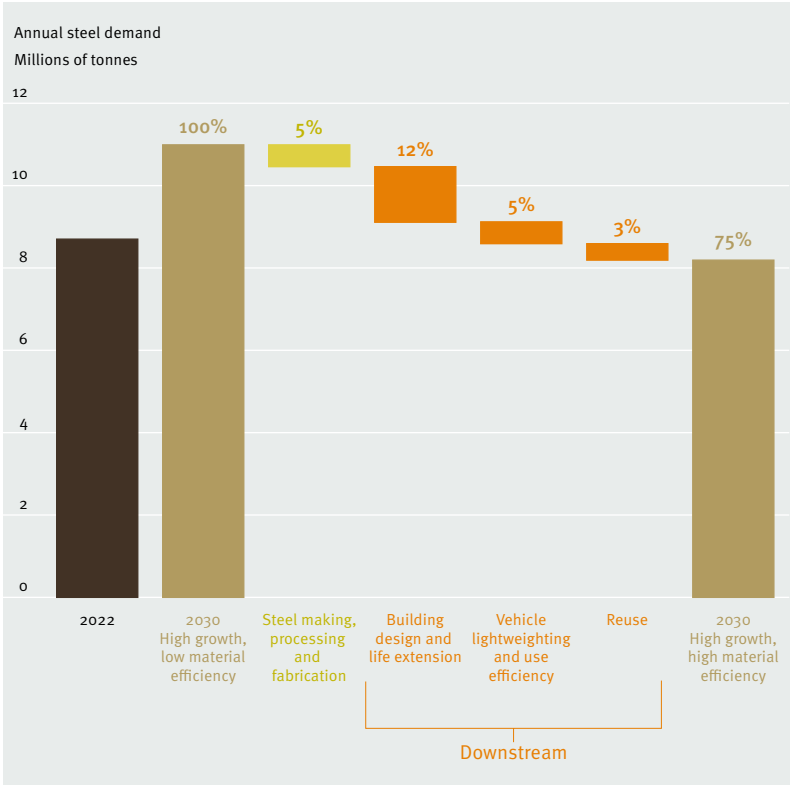
The forecast shown in the graph above only considers 'finished steel' ie intermediate steel products either produced in UK or imported to be used by UK manufacturers and not the steel contained in imported and assembled end products, such as cars. We also assume that the net zero demand contribution to is solely from UK manufacturers, so this is a maximum of what the UK could demand. Historically, imported products containing steel have contributed about as much to total UK steel demand as finished steel.

> “Material efficiency measures could reduce domestic demand for steel by a quarter by 2030.”

Efficiency potential is greatest for cars and construction

Material efficiency measures could reduce domestic demand for steel by a quarter by 2030. As our graph below shows, around a fifth of the possible efficiency gains arise from steel production itself, due to waste reduction during each manufacturing stage up to the fabrication stage.[24] The rest could be driven by demand for more efficiency from steel buyers, with all steel manufacturers having to adapt. The largest possible potential savings are in the construction and automotive sectors. As the graph shows, the most significant drivers of steel use efficiency are improved building designs and extending the life of buildings through retrofit.

Potential for steel material efficiency in 2030[25]



A future market for UK-made clean steel

> **“UK industry is well placed to meet domestic steel demand.”**

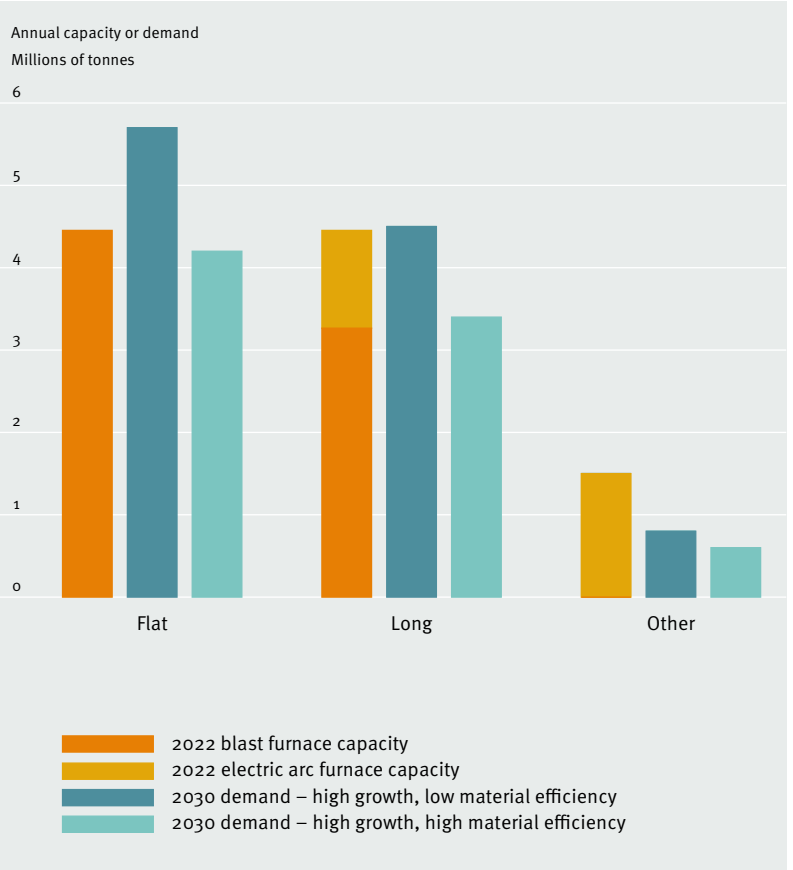
Different uses of steel require different processes and final shapes. In terms of finished steel, these can be loosely categorised as either flat, long or ‘other’. Flat steel includes the cold rolled coated steel used for car doors, tin plate used for steel cans and galvanised steel for roofing and cladding in construction. Long steel includes rebar for construction, sections for construction and rail, and plate for construction and renewable energy infrastructure. The ‘other’ category includes stainless steel, engineering steels, open die forging and seamless steel tubes.

At the moment, the UK exports almost half of the finished steel it makes and imports nearly twice the amount of finished steel it exports. However, our analysis suggests UK industry is well placed to meet domestic steel demand, either as its main market or as an alternative to exports.

For crude steel, the UK has sufficient production capacity to meet domestic demand for finished steels in all three categories, assuming high levels of resource efficiency, and as much as 89 per cent of demand, even if steel use is not managed so efficiently (see the graph opposite). And not all the production capacity is used, highlighting the potential for UK producers to increase their share of the domestic market. Currently, the UK meets around 40 per cent of the country’s demand for finished steel.

> “With resource efficiency savings, the UK could, in theory, meet 94 per cent of its demand for finished steel.”

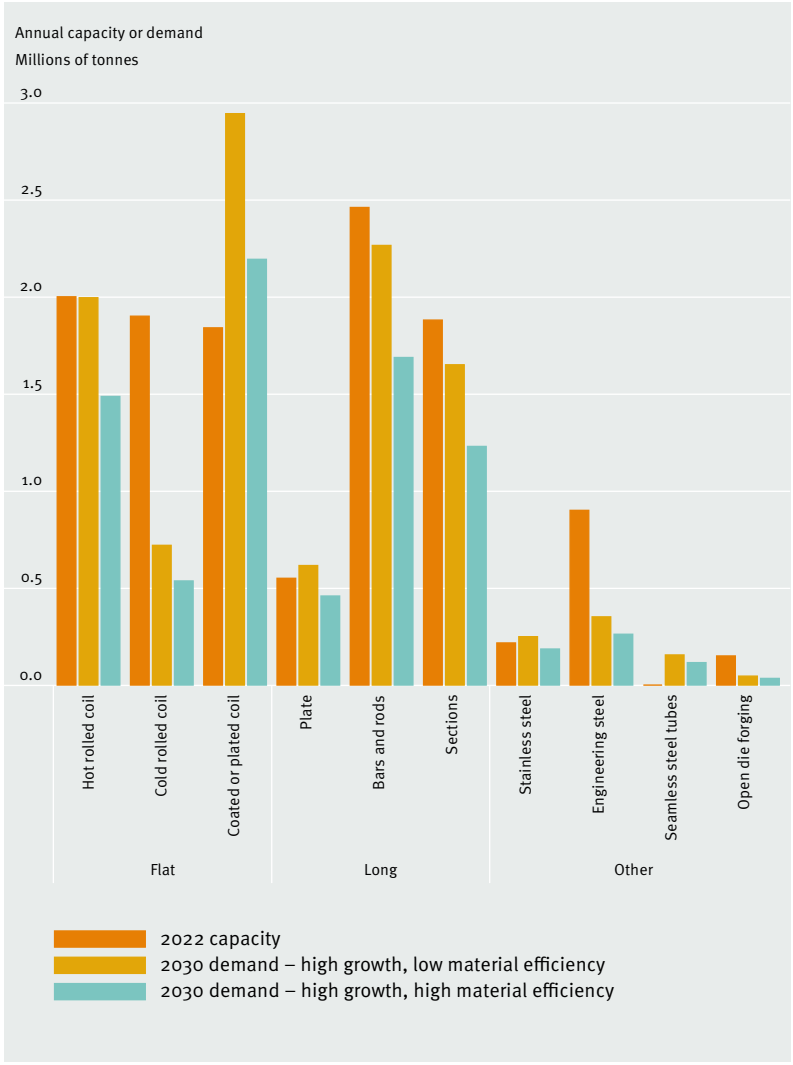
UK crude steel production capacity now vs demand in 2030[26]



When it comes to steel processing capacity, the UK could meet 88 per cent of its total demand for different finished steel types, even in the highest demand scenario for 2030 (see page 16). Potential shortages include coated coil for electric vehicle manufacturing and steel plate for wind turbines. UK plate mills are also limited by the size of plate they can produce.[27]

With resource efficiency savings, the UK could, in theory, meet 94 per cent of its demand for finished steel, leaving significant opportunities for export in some areas due to excess capacity. Alternatively, the UK could focus on using this excess capacity to partially replace imported steel contained in end products by manufacturing them domestically instead.

UK finished steel capacity now vs 2030 demand[28]



Domestic supply can be low carbon

Some very thin flat steels, particularly those used in car panels and tins, cannot be made from 100 per cent recycled steel due to the presence of contaminants, such as copper, that reduce their quality.[29] These uses ('coated or plated coil' in the illustration opposite) are around half of the potential maximum demand for flat steel in 2030. But the rest of the steel needed in 2030 under the maximum demand scenario – ie around three quarters – could be produced using recycled steel. EAFs are less carbon intensive than blast furnaces and even less if powered by renewable energy.

> "Electric arc furnaces are less carbon intensive than blast furnaces and even less if powered by renewable energy."

It is possible to reduce the use of virgin steel further if all flat steels are made with, on average, 60 per cent scrap and 40 per cent virgin iron, as is produced by electric arc furnaces in the US.[30] The same approach in the UK would mean only around 21 per cent of maximum domestic steel demand in 2030 would need to be met with virgin material. The rest, nearly 80 per cent, could come from scrap steel.[31]

If Tata's plant in Port Talbot were to replace one of its blast furnaces with an EAF before 2030, it could meet projected demand for virgin steel with its remaining blast furnace.

The pathway for the industry we set out in our 2022 report *Building the future* would see all UK blast furnaces replaced by 2035 with low emission iron from hydrogen ironmaking available domestically.[32] Even if this trajectory is not followed, imported iron could supplement scrap steel to make some of the thin flat steel products in the automotive and packaging sectors.

Efficiency measures would bring down emissions

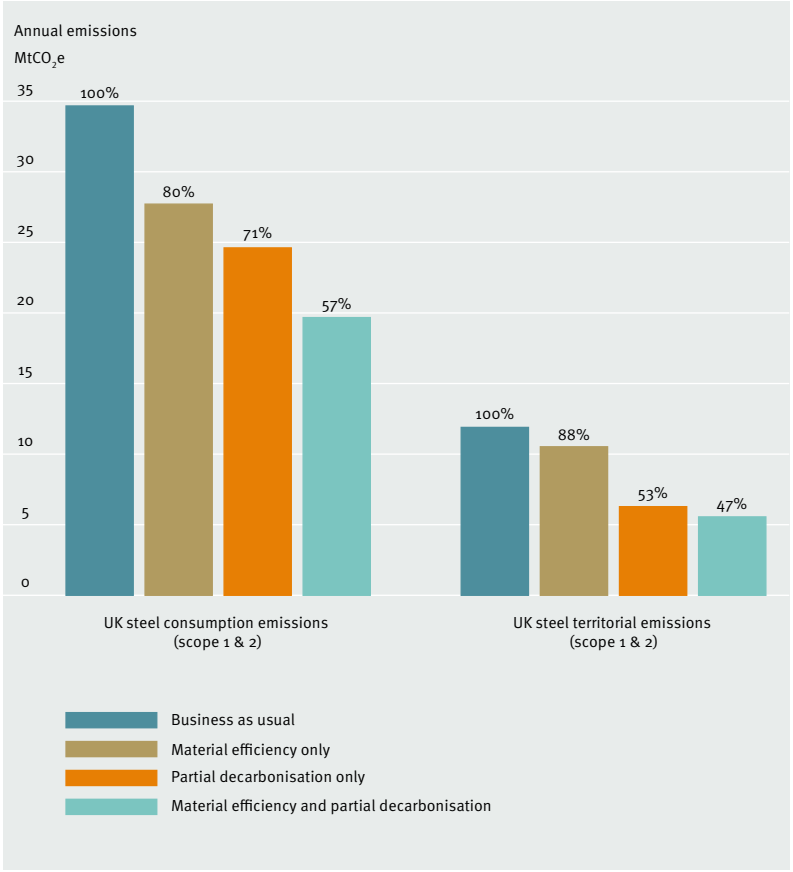
> **“Material efficiency measures could reduce carbon embedded in the steel in UK products by an additional 14 per cent.”**

Material efficiency would also play a valuable role in bringing down carbon emissions, particularly in the early stages of the industry’s transition, before the carbon intensity of the steel making process is reduced.

We estimate that, in 2030, material efficiency measures could reduce carbon embedded in the steel in UK products by an additional 14 per cent, compared to only pursuing partial decarbonisation of production processes in the UK and globally. The steel industry is not expected to be fully decarbonised by 2030.[33]

The impact on UK domestic emissions is harder to assess because it could be that lower domestic demand from efficiencies may not reduce production, as products could be exported instead. However, our conservative estimate is that material efficiency could reduce domestic UK steel sector emissions by another six per cent, compared to just pursuing decarbonisation. This assumes there will be global steps to reduce steel use that will also affect UK producers.

The emissions reduction potential of greater material efficiency[34]



> “Selling less steel does not have to mean making less money.”

Selling less steel does not have to mean making less money. There are a variety of business models that would enable the steel industry to capitalise on changes in demand and extract more value per tonne of product. Lessons from some commercial sectors can be found in Green Alliance’s recent report on circular models.[35] Often the driver for new business models is commercial and not explicitly intending to achieve material efficiency, such as providing a more consistent source of income or a closer relationship with customers.

Analysis for the construction sector suggests such circular models could improve profitability by up to 26 per cent.[36] And, for the steel industry, an added incentive would be ensuring it can access plenty of high quality scrap. This will become an increasing concern as plants in Europe build EAFs that use recycled steel combined with hydrogen ironmaking.[37]

Below, we discuss some alternative business models for types of steel, assuming the market conditions are favourable to innovate. EAF steel making is a batch process and, therefore, more flexible to different levels and types of demand. The annex on page 26 summarises the pros and cons of a wider range of models, how they could work and the products they might work best for.

Reusing steel in construction

Reuse of steel beams in construction is a growing trend, driven by efforts to cut embedded carbon.[38,39] Steel beams are ideally suited for reuse because they do not degrade and there are a limited number of standard designs.

The embedded carbon of a reused beam, at about 47kgCO_2e per tonne, is around a tenth of a similar one made from recycled steel.[40] For example, the construction of Brent

> “Steel producers could enter the reuse market and become a one stop shop for construction’s steel needs.”

Cross substation in London was built with up to 43 per cent reused steel beams, leading to 40 per cent carbon savings on the steelwork, compared to using new beams.[41]

For companies that want to create a building with a story, there is also an attraction in knowing where different components came from. Around a third of the steel in the Holbein Gardens office redevelopment in central London is reused, with some sourced from the demolition of the former US Embassy in London.[42]

Demand for reusable steel beams is such that it now far outstrips supply, despite there being an estimated 500 million tonnes of steel embedded in the UK built environment, with close to a million tonnes is taken down every year.[43,44] Current incentives favour recycling instead of reusing beams when a building is demolished. The high demand means they can be sold at a premium. However, reprocessing and testing costs would come down if more beams were reused instead of recycled. But, if developers are unable to access what they need, interest may decline. As well the need for improved logistics for the storage and distribution of reused steel, demolition companies need an incentive to retain beams, rather than chopping them up for rapid removal. For example, the Greater London Authority’s circularity statements could include specific targets for reusing the materials in existing buildings, rather than having an overall target for both reuse and recycling, which tends to encourage the latter.

Steel producers could enter the reuse market by expanding their core business into sourcing, stockholding and reprocessing and become a one stop shop for construction’s steel needs. This model already exists: Celsa, which makes steel for construction in Cardiff, has its own stockholding and fabrication business called Celsa Steel Service UK, which makes and sells steel grids.[45] Companies could sell a variety of steel products to meet individual customer requirements, bypassing traditional stockholders to create direct relationships with end users.

Allying with the renewables industry

The infrastructure needed to decarbonise the UK’s power system and expand grid capacity for greater electrification

> “Renewables developers could offer cheap electricity directly to steel producers through a favourably priced power purchase agreement.”

will require significant amounts of steel. For example, the steel used in offshore wind turbines is up to 90 per cent of their weight, mostly in the tower and the foundations.[46,47]

We estimate that renewables infrastructure alone needed to meet government offshore wind and solar targets requires roughly seven million tonnes of steel between now and 2030, which means an additional 0.9 million tonnes a year on current demand.

Zero Waste Scotland’s proposal for an EAF to recycle scrap steel from decommissioning the domestic oil and gas industry, to supply wind turbine manufacturers, highlights the potential for greater integration between the renewables and steel sectors.[48]

Much of the steel used in renewable energy developments comes from overseas because it is imported in readymade components. Domestic supply of steel for the renewables supply chain is also hampered by the restricted availability of certain products, and the scale and competitiveness of UK production facilities.[49]

A barrier to competitiveness is the high price of electricity in the UK, relative to other countries. Realigning the industry to meet the needs of the renewables sector would help to solve this.[50] In an ‘energy for steel’ model, renewables developers could offer cheap electricity directly to steel producers through a favourably priced power purchase agreement. This would help the offshore wind industry meet commitments in its 2019 sector deal with government to source more domestic content by 2030.[51]

The steel industry could offer lower price steel to wind developers helping them to reduce their costs (building the tower and foundations is 25 per cent of their capital expenditure).[52] To make the most of this opportunity, steel production should be situated close to renewables generation and fabrication, such as the planned wind turbine manufacturing site at Port of Nigg in Scotland.[53]

Steel producers could also lease out steel for wind turbines or have an option to buy it back at the end of life (typically turbines have a life span of 25 years), guaranteeing them a future flow of high quality scrap steel input.

> “Greater vertical integration along the steel and automotive supply chains would help to cut waste.”

Vertical integration in the car industry

If the UK can successfully maintain its car industry by switching to electric vehicles, it will provide an important market for steel producers. The low cost of steel relative to the final price of an electric vehicle, and car industry concerns about embedded carbon, make a compelling case for manufacturers to pay a premium for clean steel, although lighter materials like aluminium might be considered in some cases.

Greater vertical integration along the steel and automotive supply chains, eg if a steel company not only produced coils but also formed them into the shapes needed for cars, would help to cut waste and provide a source of high quality scrap directly from offcuts. Steel producers in the US are signing closed loop scrap agreements with automotive companies along these lines for this reason.[54] It would be a distinct advantage for car makers to receive ready to use components with greener credentials. This type of arrangement could lead to long term offtake agreements, helping to sustain both industries.[55]

A circular system for rail production

Providing steel sections for railways has been a steady source of business for British Steel in Scunthorpe, which supplies 95 per cent of the rails used in the UK and is the only domestic manufacturer. Demand will be higher by 2030 due to major projects like HS2.

UK steel for rails is made in a blast furnace with mostly primary iron. Although there are concerns that recycled steel might not be suitable, it is being used for this purpose in other countries like France.[56] Increasing the circularity of production, so scrap rails are consistently recycled to produce more rails rather than auctioned off for other uses, would ensure consistency of inputs and potentially reduce costs.

British Steel’s decarbonisation plans involve shifting at least half of its production to using recycled input.[57] If rails can be produced at scale by this method, it would significantly reduce the need for virgin steel. The difficulty of transporting long pieces of rail means British Steel already has a captive market in the UK and is well placed to lead on a new approach.

A new strategy for steel

“The government and industry should work together on a strategy to improve competitiveness.”

There is growing demand not just for steel with a lower carbon content but also for the more efficient use of steel.

As we have shown the UK steel industry could have a bright future, meeting growing net zero needs, if it adapts by shifting towards EAF steel making and better integrating with end markets.

To enable this transition and futureproof the sector, the government and industry should work together on a strategy to improve competitiveness.

This should include:

Recommendations for the steel Industry

- Shift steel production to EAFs which can be more responsive to demand and fed with both primary iron and scrap steel, depending on need.
- Work with suppliers and customers to minimise steel waste during processing and improve high quality scrap recovery.
- Develop and invest in processing capacity for scrap steel and for high value products, particularly for net zero applications, such as steel plate for wind turbines.
- Investigate other new business models for the industry, such as leasing, buy back schemes or circular stockholding (see annex on page 26).

Recommendations for the government

- Create a more favourable investment environment for steelmakers and processors by adopting the recommendations in our earlier report *Building the future*, including offering a ‘green power pool’ to reduce electricity prices, in return for decarbonisation commitments, putting in place carbon border

adjustments and improving scrap quality through tax incentives and regulation.[58]

- Offer match funded capital support to transform steel production methods, reflecting investments made by other governments around the world. This should include funding a hydrogen direct reduction facility supplying low carbon iron to UK industry.[59]
- Support the reshoring of manufacturing industries that consume steel and supply growing sectors like renewables with dedicated strategies. Measures could include, for instance, requirements around sourcing components locally under contracts for difference and, where appropriate, support on electricity prices.
- Drive the faster uptake of low carbon steel and resource efficiency in the industry through a range of measures:
  - require mandatory scope 3 emissions reporting (ie upstream and downstream supply chain emissions) for all large companies;
  - strengthen public procurement requirements to include scope 3 emissions and resource efficiency metrics;
  - replicate the carbon footprint and circularity statement requirements used in London for large construction projects across the rest of the country;
  - encourage the salvaging of reusable components during demolition by introducing specific targets for reuse;
  - set mandatory product standards for buildings and cars later in the 2020s, allowing suppliers time to prepare.

Annex
Alternative steel business models compared

Business model	Description	Most relevant industry and products	Benefits	Drawbacks	Feasibility	Material efficiency impact
Electrified steel making with scrap	Move from blast furnace to EAF steelmaking	All applications	Lower emissions Enables other circular business models More demand responsive production	Does not reduce overall demand for steel High capital costs for new plant Requires high quality scrap and competitive electricity prices Quality issues to be overcome for some flat products	High	Low
Buy back scheme	Buy back requirements in return for a discount for the steel customer	Automotive: sheet steel Construction: steel beams	Access to high quality scrap for flat steels Encourages domestic use of steel	No incentive for greater material efficiency	High	Low
Circular stockholder	Steel company deals in new and reusable steel	Construction: steel beams	Uses existing supply chains to make steel reuse mainstream Can charge a premium for reused steel	Requires vertical integration or investment in stockholding capability Reused steel could compete with existing business	Medium	Medium

Business model	Description	Most relevant industry and products	Benefits	Drawbacks	Feasibility	Material efficiency impact
Steel for energy	A two way arrangement between steel and renewables companies, trading renewable power for steel.	Power: steel plate for wind turbines, coated steel for solar farms	Competitive electricity for electrified steel production	Cheap energy could encourage greater production Need to ensure value for renewables companies	High	Low
Steel leasing	Leasing instead of selling steel to customers, maintaining ownership until it is returned at end of life	Power: steel plate for wind turbines	Ensures access to scrap steel Continuous income over the long term, not dependent on production Encourages the domestic use of steel	Lower income in the short term Better suited for end use products Challenging for products with long lifetimes	Medium	Medium
Downstream: producer and consumer integration	Steelmakers integrate more closely with fabricators to produce components optimised for end use	Automotive: car panels from sheet steel Construction: fabricated steel frames from steel beams	Greater revenue for steelmakers Facilitates the reclaim of scrap steel from fabrication offcuts	Requires investment into fabrication Could put the steel industry in competition with its customers	Low	Medium
Upstream: scrap market and producer integration	Steel producer moves into scrap market	Scrap steel	Guarantees supply of scrap steel for EAFs Provides an incentive for higher quality scrap production	Does not necessarily reduce demand for steel or increase material efficiency	High	Low

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