Recycling Today for a Greener Tomorrow:
A Roadmap to Net Zero for the UK Metals Recycling Industry

British Metals Recycling Association

Foreword

As President of the British Metals Recycling Association (BMRA), I am proud to present this landmark *Recycling Today for a Greener Tomorrow: A Roadmap to Net Zero for the UK Metals Recycling Industry* (Roadmap) – a document that reflects not only the environmental credentials of metals recycling but the determination and ingenuity of the people who power it. Metals recycling has always been at the forefront of circularity, conserving resources and preventing vast quantities of emissions. Yet as the UK seeks to attain net zero, the role of its domestic metal recyclers has never been more vital.

This Roadmap reinforces the environmental credentials of the metals recycling industry, with its direct operations contributing just 0.07% of the UK's territorial emissions while enabling huge carbon savings in the UK and worldwide. But it also shows that we can go further. With the right policy environment, collaboration across the value chain, and investment in cleaner technologies, our industry can become the first in the world to produce truly net zero recycled metal.

Reaching net zero will not be easy. It will require courage, curiosity, and shared commitment from recyclers, manufacturers, policymakers and partners. Yet I firmly believe that our industry has the resilience and vision to rise to this challenge. We have never shied away from innovation. And we have never been more aware of the legacy we must leave for future generations.

Susie Burrage OBE
BMRA President

Executive Summary

UK metals recycling is already a major contributor to reducing global emissions because it avoids the need for emissions-intensive primary metal production.

This is why, when domestic steelmaking transitions to Electric Arc Furnace (EAF) technology supplied with recycled metal, there will be a reduction of over 4,000,000 tonnes of CO_2 equivalent (t CO_2e) each year.

The BMRA, the voice of the UK metals recycling industry, in collaboration with Tunley Environmental, has completed the first comprehensive Carbon Footprint Assessment (Assessment) of the UK metals recycling industry.

This Roadmap, based on the Assessment's findings, shows how – with Government support and collaboration across the value chain – the UK metals recycling industry can progress towards producing a net zero recycled metal, capable of serving both domestic and international markets.

This Roadmap will also highlight five policy asks from the metals recycling industry to the UK Government. These are:

1. To ensure that metals recycling businesses are eligible for the British Industrial Competitiveness Scheme.
2. To expand the uptake of biofuels by introducing a 10p per litre reduction in fuel duty for biofuels like Hydrotreated Vegetable Oil (HVO), with an annual review to ensure competitiveness.
3. To provide affordable financing, allowing operators to secure Government-backed low-interest rate loans for power and grid connection infrastructure upgrades.
4. To incorporate fee modulation – based on recyclability and recycled content criteria – into upcoming reforms of the Batteries, End-of-Life Vehicle, and Waste Electrical and Electronic Equipment Regulations.
5. To adopt science-based standards such as the Steel Climate Standard formulated by the Global Steel Climate Council which do not penalise recycled content.

Further information on the asks can be found from page 9 onwards.

The industry

The UK metals recycling industry contributes £9 billion in gross value added to the UK economy. It is made up of over 2,000 businesses and directly employs over 15,000 people.

The industry trades and processes over 11.5 million tonnes of ferrous and non-ferrous metals every year, including steel, aluminium and copper. This includes a wide range of related products, such as end-of-life vehicles, packaging, batteries, domestic appliances, building materials and electronic goods.

The UK metals recycling industry is an important global player, exporting 70 - 80% of its production annually. By 2030, when every UK steelmaker is expected to operate an EAF, domestic material retention will increase significantly, and the emissions associated with UK steelmaking will fall sharply. But it can go further. This practicable Roadmap provides a plan for UK metal recyclers to work towards becoming the first in the world to supply net zero recycled steel.

The Assessment shows that the industry's Scope 1 and Scope 2 operational emissions, which include fuel use and electricity consumption, represent **2.6% (284,640 t CO_2e)** of its overall footprint and **0.07% of the UK's total territorial emissions**.

By way of comparison, the UK steel industry as a whole accounts for **2.4%** of the UK's total territorial emissions.

With the addition of the industry's Scope 3 emissions (all other indirect emissions such as transport and smelting by third parties), the Assessment found that the industry's total estimated overall carbon footprint is **10.95 million t CO_2e**.

Almost all of these emissions – **97.4%** – come from activities outside the direct control of recyclers, generated by third parties, including the smelting and refining of metals by both domestic and international smelters.

Further information on emissions can be found from page 6.

Critical to net zero

Under the Climate Change Act (2008), the UK created a legally binding framework to reduce emissions. Now every industry – regardless of its existing environmental benefit – must play a role in achieving net zero by 2050.

Metals recycling is critical to achieving net zero, reducing the need for mining and processing raw materials, which are highly energy-intensive and environmentally damaging. **By recycling metals, we conserve natural resources, reduce waste, and avoid emissions associated with primary production.**

The Assessment provides a clear picture of the UK metals recycling industry's carbon footprint. It explains where

emissions occur and the practical steps which can be taken to reduce them. It explores a policy environment that can enable the first net zero metals recycling industry in the world.

The UK metals recycling industry is one of the most important players globally and is a true example of a British success story. Not only does it stand ready to be the first metals recycling industry in the world to reach net zero but, as will be clear, it also has a practicable Roadmap to progress towards it.

Metals recycling's operational footprint

The assessment has shown that the UK metals recycling industry's operational footprint is modest, contributing to just **0.07% of the UK's total territorial emissions**. Whilst the emissions within its value chain are considerably higher, **these will be lowered substantially when domestic manufacturers use recycled metal as their main feedstock**, rather than supplementing imported iron ore.

The Bureau of International Recycling, the federation representing the global recycling industry, found in its Environmental Benefits of Recycling (2016) study:

- Recycling aluminium avoids **63 million tonnes of CO_2e globally**, equivalent to removing 14 million petrol cars from the road.
- Recycling steel saves **504 million tonnes of CO_2e**, equal to eliminating 155 million return flights between Paris and Beijing.

When – given recent Government announcements – domestic steelmaking transitions to EAF technology supplied with recycled metal, the metals recycling industry's emission footprint will reduce by 38% (4,160,028.6 t CO_2e).

The following pages will explain in more detail how this will be achieved.

An industry emissions overview

Calculations:

To calculate emissions, Tunley Environmental assessed the industry in accordance with BS EN ISO 14064-1, a methodology similar to the **Greenhouse Gas (GHG) Protocol**, which divides emissions into three categories:

- **Scope 1** covers direct emissions, including fuel used in machinery and vehicles.
- **Scope 2** includes indirect emissions from purchased electricity.
- **Scope 3** accounts for all other indirect emissions, such as transport and processing by third parties.

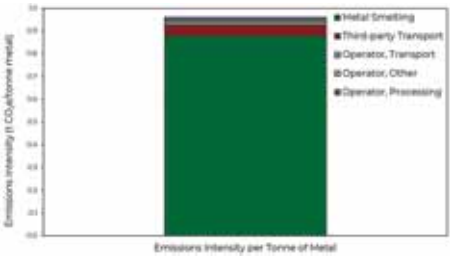
Data were collected from a sample of BMRA members and then scaled up using various databases. This included national tonnage data from several UK environmental agencies, including the Environment Agency, the Northern Ireland Environment Agency, Natural Resources Wales and the Scottish Environment Protection Agency.

Emissions:

The UK metals recycling industry emitted an estimated **10.96 million t CO_2e** in 2023. Of this total:

- **Scope 1 emissions** (fuel use in operations) accounted for 233,371 t CO_2e.
- **Scope 2 emissions** (electricity consumed) contributed 51,268.8 t CO_2e.

Figure 1: Stacked emissions intensity profile for the average production of one tonne of recycled metal by a UK metals recycling operator.



- **Scope 3 emissions** (upstream and downstream emissions) accounted for 10,674,256 t CO_2e.

If the industry's emissions are anchored to a tangible business activity such as metal recycled, then:

The metals recycling industry's Scope 1 and 2 intensity ratio is 0.025 t CO_2e/ tonne metal recycled.

The metals recycling industry's overall intensity ratio (including Scope 3 emissions) is 0.96 t CO_2e/tonne metal recycled.

The sources of emissions

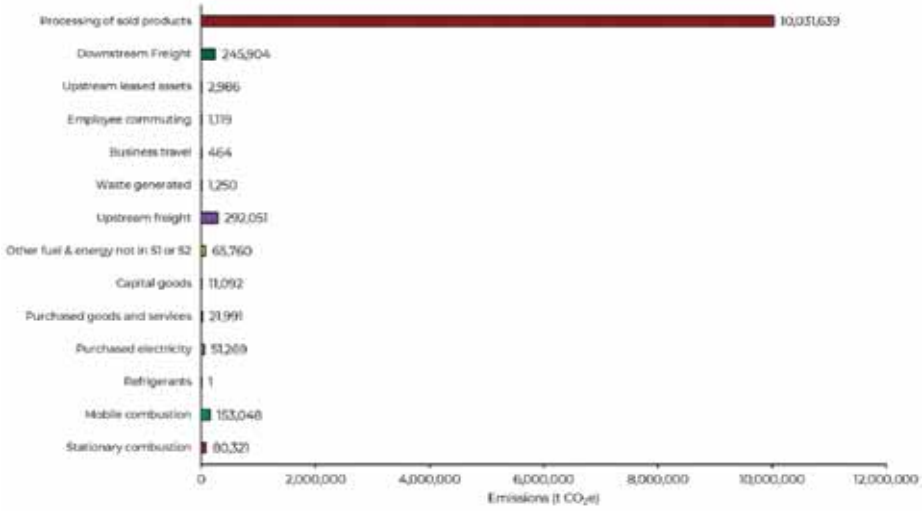
The largest source of emissions is the processing of sold products, which includes smelting and refining by steelmakers and other third parties. This happens domestically and abroad. This category alone accounts for **91.5% of total emissions**.

The transport of materials by third parties, both upstream and downstream, represent the second and third largest contributors and collectively account for **4.9% of total emissions**.

Direct operational emissions, such as mobile and stationary combustion and electricity consumed, make up a relatively small share, contributing **2.57% of total emissions**.

0.6% of total emissions are attributed to the upstream 'well-to-tank' emissions associated with fuel use. **The remaining 0.43%** of total emissions relate to a combination of employee commuting, business travel, purchased goods and services, waste generated, upstream leased assets, refrigerants and capital goods (asset and machinery purchases).

Figure 2: Graphical representation for the quantified emission categories (GHG Protocol) for the metals recycling industry.



A Roadmap to net zero for the metals recycling industry

The Assessment concluded that the industry can significantly reduce its carbon footprint by adopting practical measures:

- Switch to renewable electricity.
- Electrify machinery and lighter vehicles.
- Procure low-carbon fuels like HVO.
- Collaborate with domestic steelworks to maximise recycled steel consumption.
- Work with suppliers and customers to optimise transport.
- Prioritise customers that are actively working towards producing green metals.

If these steps, as well as some incremental initiatives, are implemented:

- Scope 1 and 2 emissions are expected to fall by **93% by 2050**.
- Scope 1, 2 and 3 emissions could drop by **70% by 2050**.

For precise graphical representations of the UK metals recycling industry's Roadmap to operational carbon neutrality and net zero by 2050, please see the appendix on page 12.

However, in order for the metals recycling industry to invest significantly in decarbonisation projects and progress with pace to net zero, several barriers must be overcome.

An electric baler.
Image courtesy of Lefort.

- The cost of electricity
- Grid connection costs
- Regional grid constraints
- The cost disparity between diesel and biodiesel
- The limited domestic demand for recycled products
- The inadequate appetite to produce green metals both domestically and internationally.

With the right policy environment many of the hurdles to the metals recycling industry achieving net zero can be addressed.

In doing so, Government will accelerate the UK metals recycling industry's journey to net zero, reinforcing a proud history of climate leadership.

The BMRA has developed five policy asks that will make net zero an attainable target for the entire metals recycling industry.

Policy one: Ensure metal recyclers are eligible for the British Industrial Competitiveness Scheme

UK electricity prices currently act as a deterrent to electrification by increasing operational costs and putting UK recyclers at a competitive disadvantage compared to their European counterparts.

For UK steel manufacturers, the British Industry Supercharger, alongside other Government support, has made the business case for transitioning to EAF technology viable. The success of this transition is inextricably linked to the success of UK metal recyclers who will supply critical feedstock. Energy costs – which have doubled in the past decade – are placing extreme financial pressure on metal recyclers.

The BMRA is therefore calling on Government to ensure that metal recycling businesses can meet the eligibility criteria for the British Industrial Competitiveness Scheme. This scheme would reduce a qualifying operator's electricity bills by up to £40/MWh. This is a saving which could be passed on to domestic steelmakers, incentivise electrification and make the entire UK metal value chain more competitive on the international stage.

Policy two: A 10p reduction in Fuel Duty for low-carbon fuels

HVO represents one of the most practical and impactful solutions for reducing emissions today. As a drop-in fuel, HVO can be used in existing equipment and vehicles without costly modifications – delivering instant emission savings for hard-to-electrify, heavy-duty fleets.

At present HM Treasury classifies biodiesels like HVO as a 'heavy oil' under the Hydrocarbon Oil Duties Act (1979), placing it in the same category as diesel for duty purposes.

As a result, HVO fuel is typically 10% more expensive than traditional diesel. Before the industry lost its entitlement to red diesel, this added cost may have been absorbed by many metal recyclers. Since 2022, however, losing the red diesel entitlement has increased fuel costs by £200,000 per annum on average.

To expand the uptake of biofuels in heavy duty vehicle fleets and/or plant machinery, the BMRA calls for an initial 10p per litre reduction in fuel duty for biofuels like HVO, with an annual review to ensure competitiveness. This would create price parity between biofuels and diesel, making HVO a very attractive proposition for immediate emission reduction.

Policy three: Provide affordable financing for energy infrastructure upgrades

To comply with local planning laws, reduce environmental impact, and attain community acceptance, metals recycling sites, through no fault of their own, often operate on the outskirts of towns or are more rurally located.

As a result, a significant minority of metals recycling sites do not have a connection to the National Grid, while many others were never designed to incorporate the future electrification of heavy industrial processes like baling, shearing and shredding. This constraint is a major barrier to electrification – the single most effective way to cut operational emissions.

Several operators have been proactive, contacting their distribution network operator to build a business case for electrification. Yet the high – and in some cases exorbitant – upfront costs associated with connecting to the grid or upgrading a site's power supply, as a result of their remote location, are inhibiting site electrification.

To mitigate capex risks and accelerate infrastructure upgrades, the BMRA is asking Government to consider affordable financing, allowing operators to secure Government-backed low-interest rate loans for power and grid connection infrastructure.

Policy four: Introduce modulated fees for other waste streams

The introduction of modulated fees, through the UK's Extended Producer Responsibility (EPR) for packaging, is a landmark moment for the emissions associated with the waste and recycling sector.

It creates a powerful financial incentive for eco-design as producers pay a lower fee if their product is easier to recycle or contains recycled content. Producers of hard-to-recycle products, on the other hand, pay more, reflecting the environmental and additional processing costs.

By rewarding products based on recyclability, the volume of processing required to recycle the product is reduced, thereby lowering emissions.

The BMRA is therefore calling on Government to incorporate 'fee modulation' based on recyclability and recycled content criteria into upcoming reforms of the Batteries, End-of-Life Vehicle, and Waste Electrical and Electronic Equipment Regulations.

Policy five: Adopt a science-based standard for defining green steel

As the global steel sector comes under increasing pressure to decarbonise, governments across the globe are defining and labelling 'green steel' in order to support and strengthen their domestic industries.

These definitions of green steel will shape international trade, investment, and climate outcomes. For the UK, how green steel is defined globally and domestically will directly impact the emissions profile and circularity of UK recycled steel.

Two types of approach have emerged:

- Sliding-scale standards that penalise recycled content – a counterproductive measure that undermines circularity
- Science-based standards grounded in robust life-cycle assessments and technology-neutral frameworks

The definition of green steel must be based on actual emissions, not the type of technology used to achieve decarbonisation.

The BMRA urges Government to adopt science-based standards such as the Global Steel Climate Council's Steel Climate Standard and use its climate leadership to champion its adoption on the world stage.

Conclusion

For over a century, the UK metals recycling industry has contributed positively to both the UK and global supply chains through the manufacture of recycled materials. With increasing levels of innovation and expertise, the industry is now pushing the boundaries of value recovery and circularity across an increasingly diverse portfolio of end-of-life products.

With UK steelmaking expected to fully transition to EAF technology as early as 2030, domestic material retention will increase substantially. This shift will reduce territorial emissions while also creating additional co-benefits, including improved material quality and enhanced safety standards.

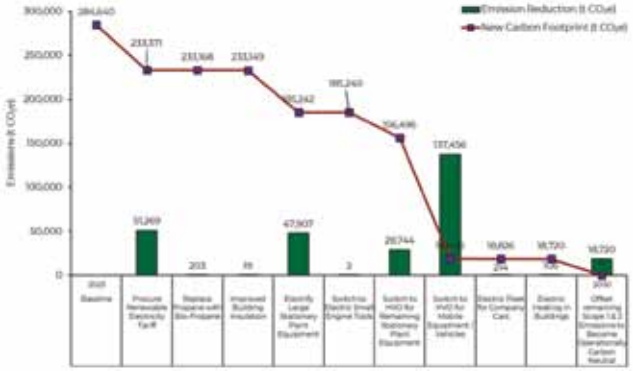
The UK metals recycling industry, however, can go even further. With the right policy environment to support decarbonisation, UK metal recyclers can reduce their operational emissions by more than 90% and cut their overall carbon footprint by 70%, positioning the UK metals manufacturing value chain as one of the greenest in the world.

Appendix:

The two figures below provide a precise graphical representation of the UK metals recycling industry's emissions Roadmap. Figure 3 presents the Roadmap towards operational carbon neutrality, while Figure 4 sets out the Roadmap towards net zero.

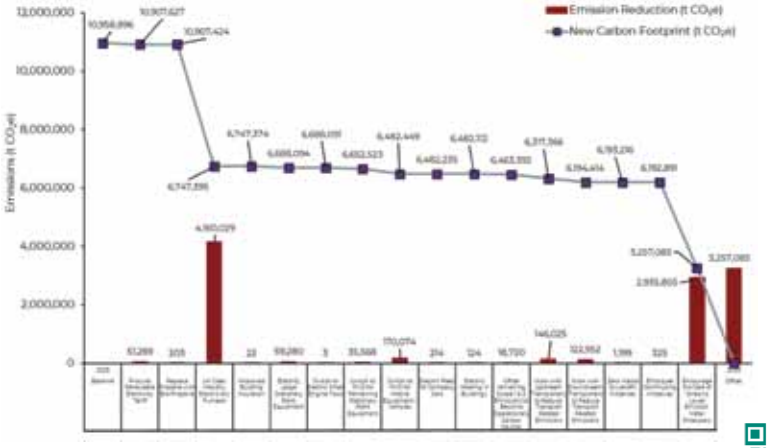
Scope 1 and 2 emission Roadmap

Figure 3: Roadmap towards operational carbon neutrality only for Scope 1, 2 emissions by 2050.



Scope 1, 2 and 3 emission Roadmap

Figure 4: Roadmap towards net zero in Scope 1, 2 & 3 emissions by 2050.



To read the full Carbon Footprint Assessment visit:
www.recyclemetals.org/roadmap-to-net-zero

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