

Briefing

Decarbonisation and deindustrialisation: risks to foundation sectors



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Summary

The crisis around job losses experienced at the Port Talbot steelworks has helped to create an expectation, in parts of the media and the public, that decarbonising the economy will automatically lead to the loss of manufacturing capacity and jobs, particularly in traditional energy hungry industrial sectors. But the Port Talbot story is complicated and unusual, with other sectors unlikely to see the same level of job losses as they decarbonise.

That doesn't mean that futureproofing UK industry will be plain sailing. The risk is that uncertainty and limited support in the UK will lead to international companies – many of which have set challenging net zero targets – investing in plants in other countries and perhaps even shifting their operations entirely to more favourable policy regimes.

To avoid this, the government should create a cohesive, stable and enticing policy framework for investors, including providing vital infrastructure, acting on electricity prices to support industrial heat pumps and other forms of electrification, and creating a market for greener products. It should also identify those sectors likely to be at risk and give workers a greater voice in the transition to modern processes.

The foundation sectors underpin our economy

The UK was the birthplace of the industrial revolution. Manufacturing is etched into the fabric of many towns and cities, forming local landscapes and regional identities, from steelmaking in South Wales and ceramics in Staffordshire to shipbuilding around Glasgow.

Manufacturing may have declined as a share of UK output but it is still responsible for nine per cent of UK gross value added (GVA) and seven per cent of UK employment.¹ Other estimates that bring in wider impacts put the figure at nearly a quarter of UK GDP.² Wages in manufacturing are 13 per cent higher than the national average and the jobs are concentrated outside London and the south east.³

The government's overriding priority is growth and it has committed to an industrial strategy to address underinvestment in UK businesses, identifying advanced manufacturing and clean energy as among its targeted growth areas.

The industrial strategy green paper also acknowledges the importance of foundational manufacturing sectors, like cement, chemicals and steel, that make many of our basic materials. Together, sectors in this category (see the table below) are responsible for only around a fifth of manufacturing's GVA but they are critical to resource security and underpin higher value industries like the automotive sector, providing key materials and related skills and expertise. The Covid pandemic, Russian invasion of Ukraine and greater moves towards protectionism in some economies have all highlighted the importance of resilient supply chains. However, the steel sector reported a drop in the percentage of UK demand met by UK made steel in 2024 and the country lost its remaining capacity to make ammonia for fertilisers in 2023.⁴

The challenge, but also the opportunity, for policy makers looking to futureproof these sectors is that they are responsible for around half of UK industry's total greenhouse gas emissions. Cutting their climate impact will be essential to their long term survival and rejuvenation.

Decarbonisation is essential to futureproof foundation sectors

In our nearest market, the EU, the carbon border adjustment mechanism (CBAM) is driving buyers towards clean materials. And, beyond governments, companies representing around 40 per cent of the global economy have set science based targets, the vast majority of which include supply chain emission reduction ('scope 3') goals. This means buyers are increasingly demanding lower carbon products.⁵ The UK's rapidly decarbonising electricity supply means it is well positioned to deliver these.

Industry was traditionally seen as hard to decarbonise but the tools and technologies to do it are increasingly available, including electrification options like industrial heat pumps, and 'green' and 'blue' hydrogen options (created with either renewable energy or from gas with carbon capture and storage (CCS)). Industrial sites have the advantage of being large point sources of emissions that can be tackled in one go, with little direct impact on the wider public.

That does not mean decarbonising foundation sectors will be straightforward. Industrial plants in sectors like steel are upgraded only every few decades and at considerable cost. They operate on relatively small margins and often compete in global markets. Potentially risky or more

expensive solutions are unlikely to be adopted without government support, even if they make sense in the longer term.

Other governments recognise this and are making substantial investments in futureproofing their domestic industries, such as the €850 million offered to steelmaker ArcelorMittal in France and €1.3 billion offered to the same company in Germany.^{6,7}

The recommendations we make here are based on our interviews with representatives from the foundation sectors.

Another group of industries and industrial jobs are also at risk as we move to a lower carbon future: those that make products closely involved in fossil fuel extraction, processing or consumption. This includes businesses in the oil and gas sector and its suppliers but also the supply chain for internal combustion engine cars. Although we are not looking at these in depth, they would benefit from the same actions we recommend around identifying sectors at risk and establishing transition plans with local communities and workers.

How typical was Port Talbot?

The way that Tata Steel and the government are replacing the ageing blast furnace steelworks at Port Talbot with a lower carbon electric arc furnace (EAF) has been problematic. Planning for this kind of transition should have begun years ago and workers should have been involved in the conversation from the start.^{8,9}

However, looking at other big emitters, Tata's situation has some specific characteristics, many of which won't be seen elsewhere.

For a start, the technology available in this case is much simpler, with fewer components. A single EAF will replace coke ovens, a sintering plant, blast furnaces and a basic oxygen furnace. This, and the fact that the UK has the raw material (scrap steel) in abundance, has advantages from a productivity and resource security perspective. Unfortunately, the new process requires fewer workers. The transition to EAFs should have been phased in, rather than based on the closure of old plant before the new one was built. It should also have included plans for additional downstream steel processing to create steel plate for the wind industry. It should also, ideally, have included production of at least a small quantify of clean iron. Both of these processes would have generated more jobs and broadened the UK sector's capabilities, while further futureproofing the Port Talbot plant.

In other sectors, plant modernisations might lead to greater automation and job losses, but the decarbonisation technologies involved will not have as radical an impact on jobs.

In many manufacturing processes, heat and steam will simply be produced using electricity or hydrogen instead of natural gas. Changes will mainly be needed around the operation of boilers and heating equipment. A few sectors, like cement, are likely to need CCS but that will involve additional equipment, rather than the replacement of large parts of the plant, as is happening with steel. Using CCS will also create jobs downstream in the transport and storage of CO₂.

Decarbonisation options in foundational sectors

Manufacturing sector	Contribution to 2022 UK manufacturing's GDP (revenues) ¹⁰	Emissions in 2022 (MtCO ₂ e) ¹¹	Domestic production as proportion of UK consumption in 2022 ¹²	Main decarbonisation option(s) being considered or implemented
Cement and lime	1.8%	9.3	85%	Carbon capture for the majority of emissions, alongside some fuel switching
Ceramic and brick	0.2%	3.8 (combined with glass)	38%	Fuel switching to a combination of electricity and hydrogen
Chemicals (excluding pharmaceuticals)	12.2%	12.1	78%	Carbon capture for most UK steam crackers, fuel switching to electricity or hydrogen for remainder of sector
Glass making	1.0%	3.8 (combined with ceramics)	77%	Fuel switching to a combination of electricity and hydrogen
Paper and pulp making	2.5%	2.3	68%	Fuel switching, most likely electrification
Steel and iron making	0.4%	10.5	46%	Move away from primary steelmaking using iron ore to EAFs. Potentially some hydrogen ironmaking in future but location uncertain

Real industrial decarbonisation risks

Although the picture shown for other sectors in the table above differs from that for steel, there are still barriers to be overcome to position all UK manufacturing industries well for a low carbon future. Many of the industries struggle with competitiveness in the international market because of factors like high input and labour costs.

Increasing digitalisation may favour more developed economies like the UK with more skilled workforces and concerns about resource security are driving policy makers to put greater emphasis on domestic resources. But our interviews with representatives from different sectors suggest that high UK electricity prices are particularly problematic. These affect a plant's stability but also a company's ability to invest. Some sites will face physical difficulties in making changes because of, for instance, poor access to electricity and CCS infrastructure and supply chain bottlenecks.

We heard repeatedly from industrial stakeholders that international companies with plants in the UK and ambitious corporate climate targets were weighing up which countries to invest in to meet their goals.

The UK is a candidate but needs an improved and more predictable policy framework. With European neighbours and the US Inflation Reduction Act providing significant financial incentives to encourage private investment in domestic industries, the UK's potential failure to attract the money needed to modernise plants and prepare them for a lower carbon future is the biggest risk.

Challenges to decarbonisation (based on our conversations with industry)

	Existing competitiveness	Physical ability to decarbonise	Financial ability to decarbonise
Challenges	High energy and carbon prices are not faced by overseas competitors. In some cases, there is an inability to meet demand for clean products.	Half of industrial emissions are outside industrial clusters, making access to hydrogen and CCS harder. ¹³ Delays are reported in accessing grid connections. Some technologies, such as high temperature heat	High capital cost of site transformation. Insufficient 'green premium' for low carbon products, savings made on the carbon price after decarbonisation might not counterbalance capital and other ongoing operational costs, eg the high

		<p>pumps, are less mature and suppliers are limited.</p> <p>Site transformation may pause production.</p>	<p>electricity price for electrified processes.</p> <p>Multinationals cannot invest simultaneously around the world and will prioritise upgrades based on local conditions.</p>
Consequences	<p>Reduced competitiveness, profitability and the ability to invest</p>	<p>Sites become stuck in high carbon production, reducing access to some markets and keeping the cost of carbon market compliance high.</p>	<p>Sites become stuck in high carbon production, reducing access to some markets and keeping the cost of carbon market compliance high.</p>
Sectors particularly exposed	<p>Steel, cement, refining, fertilisers and some types of chemicals production have been previously assessed by the European Commission to be at most risk from the combined impact of high carbon prices and international competition although all the foundation sectors we list are deemed to be at some risk. ^{14,15}</p> <p>The chemicals sector is heavily affected by higher UK gas costs, as gas is a raw material input.</p>	<p>Cement and ceramic sectors exist largely outside industrial clusters.</p> <p>Steel and chemicals may need more bespoke solutions than some sectors, and lengthy interruptions in output are likely.</p> <p>Aversion to technology risk is common across sectors.</p>	<p>Sectors requiring major structural changes are most likely to struggle with capital costs.</p> <p>Solutions to capital costs are in place for steel but are more limited for other sectors considering electrification (a CCS business model includes a capital expenditure loan).</p> <p>Plants considering electrification are more at risk from ongoing high operational costs than those that use CCS or hydrogen and will benefit from dedicated business models for those solutions.</p>

A cohesive, futureproof framework

Spring 2025 will be a critical point. The industrial strategy green paper has provided welcome recognition of the value that foundation sectors bring to the UK economy and more detailed plans will follow in the early months of 2025.

An industrial decarbonisation strategy is also promised for 2025, as well as a deep dive into the steel sector, via a steel strategy, as well as trade and circular economy strategies and an updated carbon budget delivery plan. These will all have to intersect with the forthcoming three year spending review.

Together, these offer an opportunity for a new approach. Below, we set out logic that should be followed, from integrating cross government policy development to improving the investment environment and, finally, providing subsidies where necessary. Support for industrial electrification, which has been consistently overlooked and lacks the lobbying weight of other solutions, must be at the heart of this process.

- 1. Integrate and adequately fund strategies** through the three year spending review, with headroom allowed where detailed plans are still in development.
- 2. In policy development and when tasking bodies like the National Wealth Fund, recognise the social value of foundation sectors**, beyond financial returns. The long term goal should be for UK industries to meet a growing proportion of domestic needs, and with low carbon goods.
- 3. Identify sectors at risk earlier and involve communities and workers in managing transitions and establishing alternative sources of jobs where needed** in manufacturing and beyond. Lessons from the closure of coal mines in Germany's Ruhr valley and the move to clean steel in Sweden show the value of acting early.¹⁶
- 4. Give investors certainty and the underpinning architecture for investment.** Greater certainty requires clear goals, a clearer trajectory for the carbon price and spatial infrastructure plans for the UK. Other needs include access to skilled staff, competitive power prices and fast connections to power grids, hydrogen or CCS networks. The UK carbon border adjustment mechanism (CBAM), due to come into force in 2027, will also avoid UK producers being undermined by high carbon imports.
- 5. Drive domestic markets for clean products.** The UK government is a major consumer of materials, buying millions of pounds worth each year but figures for steel show that a third of this is being imported.¹⁷ The

government should also set more stretching standards covering private sector purchasing in sectors like construction.

- 6. Match financial support for electrification with that given to hydrogen and CCS.** Subsidies should be a last resort, following the measures set out above, but they are essential if the UK is to compete for investment in a global market where other governments are providing generous support. Any subsidies must be conditional on the provision of good quality jobs.

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Endnotes

¹ House of Commons Library, 2024, *Industries in the UK*

² Oxford Economics, April 2024, *The true impact of UK manufacturing*

³ Ibid

⁴ UK Steel, 2024, *Public procurement of steel: time for new thinking for a thriving industry*

⁵ SBTi, July 2024, *Aligning corporate value chains to global climate goals*

⁶ European Commission, press release, July 2023, 'State aid: Commission approves €850 million French measure'

⁷ European Commission, press release, February 2024, 'Commission approves €1.3 billion German State aid measure funded under Recovery and Resilience Facility to support ArcelorMittal decarbonise its steel production'

⁸ Green Alliance, Inside Track blog, 20 September 2023, 'What the government should have done about steel', <https://greenallianceblog.org.uk/2023/09/20/what-the-government-should-have-done-about-steel/>

⁹ Green Alliance, October 2024, *Ensuring fairness in the net zero transition*

¹⁰ Green Alliance analysis of: ONS, 2024, 'UK manufacturers' sales by product'

¹¹ Green Alliance analysis of: ONS, 17 October 2024, 'Atmospheric emissions: greenhouse gas by industry and gas' (final data for 2022)

¹² This is a simplified metric to demonstrate differences between sectors. For those with greater diversity of products, such as chemicals, this will be a crude assessment. Production values were taken in £m from the Office for National Statistics (ONS), released 19 September 2024, '[UK manufacturers' sales by product](#)'. Consumption values were estimated as [production-exports+imports] in £m, with export and import values taken from the ONS, released 15 November 2024, '[UK trade in goods by classification of product by activity time series](#)'. For import and export data, current price values (not adjusted for inflation) were used.

¹³ UKRI, 2023, *Enabling net zero: a plan for UK industrial cluster decarbonisation*

¹⁴ Inclusion on the carbon leakage list in UK and EU emissions trading systems is based on leakage risk, which is primarily assessed based on a combination of trade intensity and carbon intensity. Not all parts of each sector qualify for the leakage list

¹⁵ Underlying European Commission assessments can be found here:

https://climate.ec.europa.eu/document/download/de7b6d7e-a152-4796-901d-133e5bdaeafc_en?filename=6_cil-ei-ti_results_en.pdf

¹⁶ Green Alliance, October 2024, op cit

¹⁷ UK Steel, 2024, op cit