Jobs and Energy:
The effect of high energy costs on the UK jobs market

By Rian Chad Whitton
Foreword by Matthew Elliott

The Jobs Foundation is a registered charity (1202928) which champions the role of business as a force for good, particularly the crucial role companies play giving people a step up in life by providing jobs and training opportunities.

We want to have a practical impact on the ground, by helping business leaders do even more for their local communities, by providing them with the tools, knowledge, and best practice on employing and training people from less privileged backgrounds.

In parallel, we want to have a policy impact by creating a business environment which allows companies to thrive. We hope our advocacy programme will bring about a real change in the way policy makers view business and the crucial social and economic value businesses contribute to society.

To achieve this, we are building a coalition of business leaders and entrepreneurs from across the country to join our Business Council, to act as the driving force and delivery engine for our ambitions.

This report is the first in a series of longer research notes where we will examine the core components influencing job creation and loss in the UK, looking at factors such as the UK's regulatory and fiscal environment, skills and training provisions, and AI.

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Over the coming year, the Jobs Foundation will examine the core factors influencing job creation and employment across the UK. Our first study will examine the impact of energy prices on job creation and loss in the UK. We will follow this report with studies of other core factors, such as the UK's regulatory environment, fiscal environment, skills and training provision, and immigration.

In this report, we try to answer three questions related to the interplay between our energy market and our labour market:

- Firstly, how do the UK's energy costs compare with other advanced economies?
- Secondly, which sectors have been impacted by the UK's high cost of energy?
- Finally, which locations in the UK have been most affected by the country's high energy costs and may be most affected in the coming years?

In the late 1980s, the government of Margaret Thatcher moved away from the previous model for funding Britain's coal industry, where high state subsidies kept the sector afloat. Privatisation and the industrial changes that were brought with it had many merits, but often the process was managed in a way that had a damaging impact on the communities involved. The handling of the transition for the coal industry, for example, has been a source of regret for the architects of those changes. In 2009, Thatcher's Employment Secretary, Norman Tebbit, stated that:

> *"Those mining communities had good, working class values and a sense of family values... many of these communities were completely devastated... the scale of closures went too far. The damage done to those communities was enormous."*

Today, we find ourselves at a similar moment of change, with focus and attention moving towards the perceived opportunities of net zero and clean energy. The impact of this transition on communities that have long relied on traditional fossil fuels – like Aberdeen in Scotland or Pembrokeshire in Wales – will be significant. Industry figures already state that "a Scunthorpe is happening every day when it comes to job losses in the North Sea energy sector". Although many argue that jobs lost in traditional sectors, like drilling and refining, will be replaced by jobs in clean energy, there remains a lack of evidence that this will be the case in a timeframe to avoid losing skilled jobs in the UK. We risk putting these communities through the same damaging, costly transitions that the 1980s Thatcher government came to regret.

More broadly, the UK's energy costs have significantly impacted the viability of sectors like manufacturing and chemicals. These sectors provide high-quality, high-paid jobs, and give communities a purpose and identity. Similarly, energy costs will play a huge role in determining whether the UK will become a leader in future industries like AI and data.

The UK currently stands at a crossroads on energy policy. We must carefully manage the UK's obligations on climate change and net zero, and the impact that policy measures will have on the UK's competitive position in the world and the associated impact that this will have on communities and jobs. The failure of the steelworks at Scunthorpe shone a spotlight on how the UK's high energy prices are making it simply unfeasible for heavy industry to remain viable against international competition, and a renewed focus on industrial strategy from the Government will be meaningless without significant interventions to reduce the cost of energy.

Indeed, policymakers appear to be increasingly aware of this balance, with Kemi Badenoch recently stating that net zero cannot be achieved by 2050 "without a serious drop in our living standards or by bankrupting us", as well as constant rumbling about the tension between the economic priorities of Rachel Reeves in the Treasury and Ed Miliband's pursuit of net zero in the energy department.

To make sure that we avoid the mistakes of the 1980s and simultaneously position the UK at the forefront of up-and-coming sectors so that we can benefit from the economic value that they create, we must understand which jobs are currently under threat; why and where this is; and help the government think about where they need to attract new jobs. That is what this report does.

Lord Elliott of Mickle Fell
President

Executive summary

This report investigates one of the most pressing but underexplored challenges facing the UK economy: the impact of high energy costs on industrial competitiveness, regional employment, and the country's capacity to seize the opportunities of future technologies.

For too long, Britain has treated energy as an environmental or household issue, rather than a foundational input for economic growth. But as manufacturing stagnates, energy intensive industries collapse, and regions dependent on industrial employment fall further behind, it has become clear that energy pricing is now a determining factor in Britain's economic future. This report makes the case that unless the cost of energy is urgently addressed, the UK risks losing not only hundreds of thousands of high-value jobs but also its ability to lead in emerging sectors like artificial intelligence, electric vehicles, and clean technology.

Many involved in the economic transition of the 1980s reflect on the lasting damage that this inflicted on coal communities at the time, and today's transition to net zero risks repeating those mistakes. The UK is at a crossroads where balancing climate goals with economic competitiveness is crucial to avoiding the long-term hollowing out of productive communities.

Some of the report's key conclusions state, as follows:

1. The UK has among the highest industrial energy prices in the developed world

The UK's electricity prices for industrial users are among the highest in the OECD - 46% above the average of 24 developed economies and over 100% higher than those paid by similar EU users. Large-scale British manufacturers face electricity costs that are more than double those of their European counterparts, and up to four times higher than in the U.S. or China. This is not simply due to fuel costs: a complex system of levies, network charges, and subsidies has pushed industrial power bills to unsustainable levels. In 2023, global energy costs rose to consume 17% of GDP, the highest level since the 1980s oil crises, with the UK among the worst affected of advanced economies.

2. Energy intensive industries are shrinking or closing

The UK's industrial core is rapidly eroding. Sectors with high energy demands - chemicals, steel, glass, cement, aluminium, paper, and fertilisers - are contracting sharply. Between 2021 and 2024, chemical output fell by 40%. British steel production has collapsed from 12 million tonnes in 2013 to just 4 million in 2024. Aluminium and paper mills have shut, and fertiliser plants have scaled back or closed entirely. These are not fringe sectors: they provide high-wage, high-productivity employment and underpin vital supply chains. Their decline translates directly into job losses, skills erosion, and diminished national self-sufficiency.

3. Policy has compounded the problem

Rather than mitigating global energy volatility, UK policy has amplified it. A web of levies - Climate Change Levy, Contracts for Difference, Renewable Obligation Certificates, and the Capacity Market - has inflated costs for producers and consumers alike. In some cases, these levies account for over 25% of an energy bill. These policies often hit the poorest hardest, acting as a form of regressive taxation with little industrial upside.

4. Regional disparities are deepening

High energy costs are not evenly felt. They are intensifying regional inequality by accelerating industrial decline in places already struggling. The 25 parliamentary constituencies most reliant on energy-intensive industries include Scunthorpe, Alloa and Grangemouth, Port Talbot, and Aberafan Maesteg. These communities have suffered recent closures and job losses, with few alternative employment options. Many are in politically sensitive "red wall" areas. Their economic fragility makes them especially vulnerable to policy missteps, and any further decline could have both economic and electoral consequences.

5. Future industries are also at risk

The energy crisis is not only a threat to legacy industries. It imperils the UK's prospects in emerging sectors. Electric vehicle manufacturing, battery production, and AI data centres all rely on large-scale, affordable electricity. Without competitive energy pricing, Britain risks missing out on investment in next-generation technologies. While other countries are attracting gigafactories and supercomputing clusters, the UK has fallen behind. High energy prices are effectively vetoing growth in the very sectors most vital to long-term prosperity.

Introduction

For 20 years, tangible British economic growth has stagnated at the level of industrial turnover and household consumption. Of particular concern is industry and productive capacity. Accounting for inflation, British manufacturing turnover in 2023 was lower than in 2006. The picture is even worse when factoring in other production sectors like mining and quarrying. The result is a significant reduction in jobs, many of them high-paying and located in otherwise distressed areas.

In 1999, the British industrial base was the fourth largest in the world, with over four million workers. Today, it is the eleventh largest, with two-and-a-half million workers. This decline is not due to economic efficiency or moving up the value chain. Manufacturing contributes more value than its share of employment. Some sectors, such as chemicals, are among the most productive industries in the country. Moreover, these types of jobs often give a sense of purpose and pride to local communities, which lasts through generations.

Manufacturers across the Western world are under pressure from a heavily subsidised and polluting Chinese industrial base. Planning regulations stall investment. The workforce is ageing. But the longstanding rise in British energy prices, from their low point in 2003, has dramatically reduced the competitiveness of our manufacturers. Energy-intensive industries, including steel, chemicals, cement, paper and glass, have seen the most significant casualties. Between 2021 and 2024, chemical output declined by 40% (Ratcliffe, 2025).

The sidelining of energy-intensive manufacturing has a profound impact on British jobs. The average weekly pay of a worker in the chemicals sector is nearly three times that of someone in hospitality, twice that of someone in retail, 130% of someone in education, 120% of someone in construction, and comparable to that of a scientific and research professional (ONS, 2024). This industry, providing good jobs to remote areas, supports hundreds of thousands more throughout the country. We cannot cling to the hope that declines in energy-intensive sectors will lead to specialisation further down the supply chain. Since 2008, the value of motor vehicles, aircraft, electrical equipment, and mechanical equipment manufacturing has declined in real terms.

High energy prices are not just throttling our existing economy. It is an effective veto on our ability to reap the spoils of new technological frontiers and the jobs of the future that come alongside this. Despite having a mandate to end internal combustion engine vehicle sales by 2030, Britain has almost no capacity to build batteries for electric vehicles (Business and Trade Committee, 2023). As it currently stands, we are planning to outlaw fossil fuel cars and internal combustion engines, which are our first and second largest export, with no existing electric vehicle exports to replace them (ONS, 2024). Jobs in factories such as these are often the lynchpins of local economies. We risk sleepwalking into seeing communities across the country decimated, with workers losing their livelihoods and identities through no fault of their own.

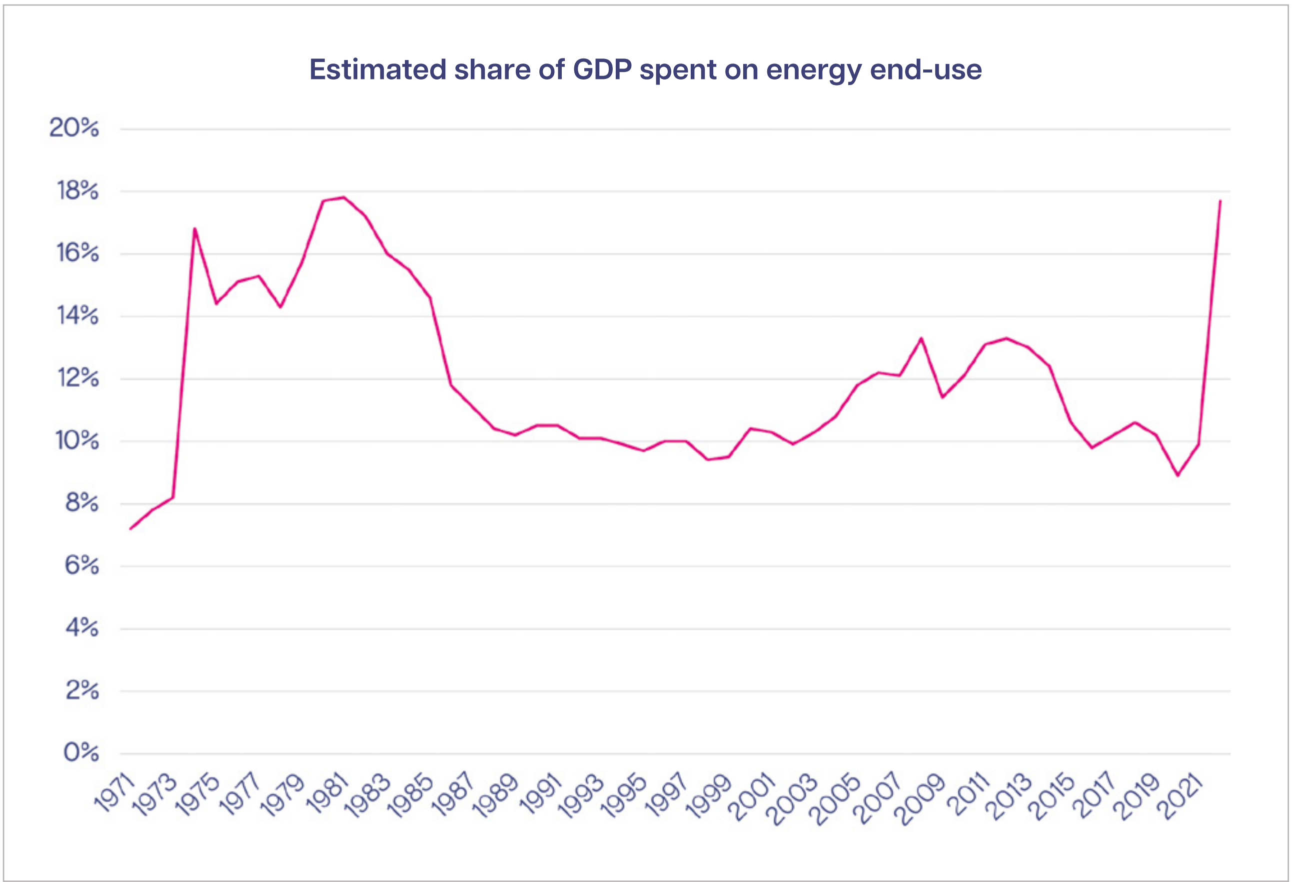
Significantly, data centres, the key infrastructure for future artificial intelligence development, depend on cheap, abundant energy. If the current state of affairs persists, we risk the loss of further jobs in our industrial base and we guarantee missing out on the most productive and prestigious jobs of the future.

1. The role of energy in the wider economy

Energy is a fundamental input of modern industrial economies, comparable to capital and labour, even though most economic models do not directly include it as a significant factor of production (Stern & Kander, 2011). The relative ubiquity of available energy in recent decades has seen economists focus more on inputs like labour augmenting technology or education. Throughout the modern economic period, except for the oil crises of the late 20th century and the more recent 2022 Ukraine crisis, energy access has been perceived by most as abundant.

Since energy, in gross terms, is a relatively small component of most businesses' overall costs, it has been overlooked as a key input, despite the fact it has been essential to growth for well over two hundred years. Abundant energy is a prerequisite for all other inputs to drive economic growth for both production and services (Stern & Kander, 2011).

Figure 1. Energy as a share of global GDP between 1971 and 2022



Source: OECD, 2022

Energy inputs quickly lose relevance to decision-makers during times of abundance. Between 1900 and 1973, energy costs represented between 1.5% and 3% of global GDP every year (OECD, 2022). Energy, particularly coal and oil, was produced mainly by the U.S., Soviet Union, and European countries, all with significant industrial demand and an incentive to keep prices low (Our World in Data, n.d.). In 1974, following the OPEC-led oil embargo on Western countries, energy costs rose to 8% of global GDP, reaching 17% in 1980 (OECD Ecoscope, 2023). Since then, energy as a percentage of economic activity has significantly fluctuated depending on oil and natural gas prices. In 2022, it reached 17% again (OECD Ecoscope, 2023). Much of this movement is down to the fluctuating prices of oil and natural gas, but in 2022, the share of global GDP related to electricity doubled from under 3% to nearly 6% (OECD Ecoscope, 2023). High energy inputs are associated with recession and economic turbulence, and, at the global level, tend to benefit major energy exporters or largely self-sufficient economies like the U.S., while severely hurting energy importers.

Relative energy costs play a clear role in determining commercial competitiveness for a wide range of industries. The enormous expansion of the Chinese industrial base is due to several factors, including unrestrictive labour and environmental laws, government subsidies, and a highly skilled workforce. But it is also attributable to very cheap energy, largely derived from the world's largest fleet of coal power stations. The country's cheapest electricity is located in Western Xinjiang province at 0.4 renminbi per kilowatt-hour (KWh) or £0.04 per KWh. This is cheaper than comparable electricity prices for any developed economy except for the U.S. For context, Britain's industrial electricity prices in 2023 were 25.85 pence per KWh, more than six times as much.

There is a wealth of academic research linking rises in relative energy costs to contractions in production and rises in imported goods from countries with cheaper energy costs. In 2023, the European Central Bank (ECB) confirmed that manufacturing output growth declines relative to import growth when energy costs are high (European Central Bank, 2023). A 2019 paper from the London School of Economics, analysing the role of energy costs in French manufacturing, found that the impact of higher energy prices are larger in the long-term rather than in the short-term, in trade-exposed and energy-intensive sectors, and slightly skill-biased towards technical workers (Marin & Vona, 2019). Any significant increase in prices disproportionately hurts exporting producers and high-value-added jobs.

Britain's primary energy consumption in 2023 was 75% from fossil fuels. After that, 13% came from wind and solar power, 5% from nuclear power, and the rest came from hydroelectric plants and biomass – effectively the burning of wood imported from North America (Our World in Data, n.d.). When just looking at electricity consumption, in January 2025 Britain relied on natural gas for 38% of consumption, followed by wind (27%), nuclear (12%), and imports (12%) via Europe, with much of this coming from French nuclear plants. A further 6% of the generation comes from biomass, meaning burning wood pellets in power stations. Marginal shares of 2% or under came from solar photovoltaics, hydroelectric generation and storage. The trend for the last decade has been declining fossil fuel consumption, a significant expansion in wind-based generation, and increases in electricity imports.

1.1. Britain's energy situation

It is not news that British energy prices, particularly electricity prices for households and industry, have been high relative to their global peers for over two decades. While the Russian invasion of Ukraine in early 2022 exacerbated the problem by sharply increasing natural gas prices, the trend of ever-higher electricity costs for households, services, and production industries, even when accounting for inflation, has been clear since the 2008 financial crisis.

The UK's high cost of energy is due to several factors. Britain's nuclear fleet of sixteen reactors is decrepit and poorly run. From 2021, it had an energy availability of just 68%, versus 93% for the U.S. and a global average of 82% (International Atomic Energy Agency, n.d.). Meanwhile, subsidies and levies to fund the buildout of renewables have increased bills. These include renewable obligation certificates (ROCs), contracts-for-difference (CfDs) and feed-in tariffs (FiTs). Besides this, the expansion of intermittent renewables has increased network costs, and since 2014 has required the funding of a capacity market, whereby natural gas plants are paid to retain capacity in the case of shortages for renewable generation. This is compounded by the significant costs of expanding transmission and distribution networks to connect disparate renewable assets to end users.

Policymakers' costs have been placed on fossil fuels through production levies and taxes on carbon. Combined with Britain's increased exposure to volatile gas markets being made worse through lower domestic production, it is no surprise that such expenses are beginning to weigh on the wider economy.

The most affected areas have been Britain's manufacturing industries, including metal production (steel and non-ferrous metals like aluminium), inorganic and non-metallic materials (cement, ceramics, glass, rubber and plastics), and chemicals. It has also affected discrete manufacturing industries, such as electrical equipment, transport equipment, and machinery. Besides production, high energy prices negatively impact the wider service economy, especially small and medium-sized enterprises, which generally pay higher electricity per kilowatt-hour. Perhaps most alarmingly, high electricity costs prohibit quick infrastructure development for forward-looking industries; an example is the failure to expand data centres to train and process large-scale artificial intelligence models. Despite Britain by some metrics having more data centres than any other country besides the U.S. and Germany, actual energy consumption is far behind that of comparable countries (Statistica, 2023).

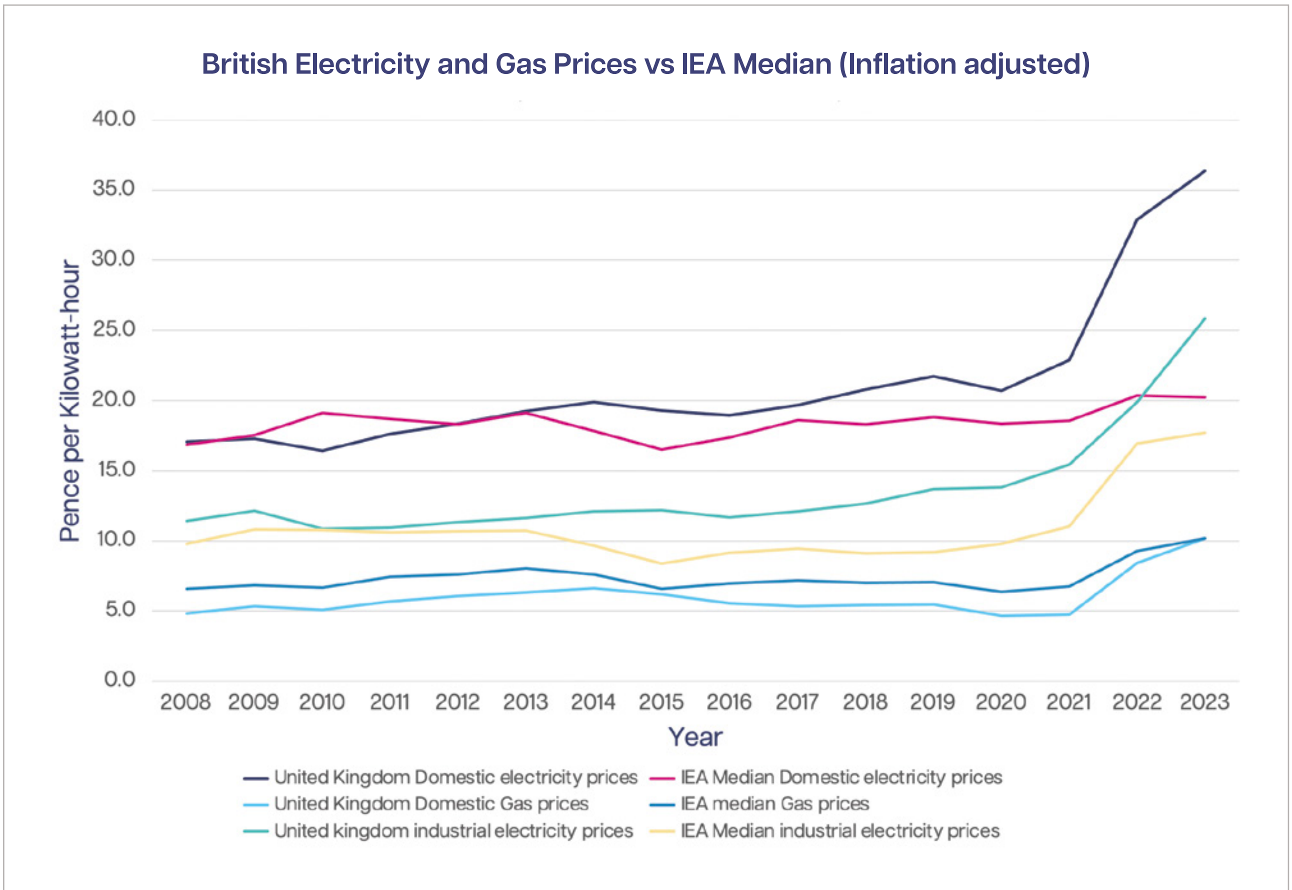
This paper looks at the impact of energy prices on the economy as a whole, but pays particular attention to the energy-intensive manufacturing sector. This sector includes the following industries: chemicals and chemical products, coke and refined petroleum, rubber and plastics, inorganic materials like glass and cement, paper and paper products, wood products, essential metals, and fabricated metals, in addition to equipment.

1.2. Why is British energy expensive?

In recent history, with limited exceptions, Britain has had relatively expensive energy, particularly in the case of electricity. British electricity prices were most internationally competitive between 2003 and 2004, when they were below the European average. At this time, industrial electricity prices were 6.8 pence per KWh in 2025 prices. Out of 28 EU and G7 countries, this was the ninth cheapest international price (UK Government, 2023). At this time, British electricity was 37% dependent on natural gas, 35% dependent on coal, and 22% dependent on nuclear power stations (Our World in Data, n.d.). In 2023, British industrial electricity prices were 25.85 pence per KWh, 46% higher than the average for 24 developed economies, and the most expensive amongst all economies sampled by the Office of National Statistics (ONS). As of June 2024, substantial industrial users of electricity in Britain pay 107% more than the EU median (ONS: Energy Prices International Comparisons). For smaller consumers, the difference is even higher.

As shown in the below graph, high electricity prices since 2022 have been blamed on natural gas price increases following the Russian invasion of Ukraine. During this period, natural gas wholesale costs increased due to shortages, which caused a drastic rise in wholesale costs. While Britain has never relied significantly on Russia for natural gas, European customers did, meaning less gas was available overall.

Figure 2. Industrial electricity prices by country, 2008-2023



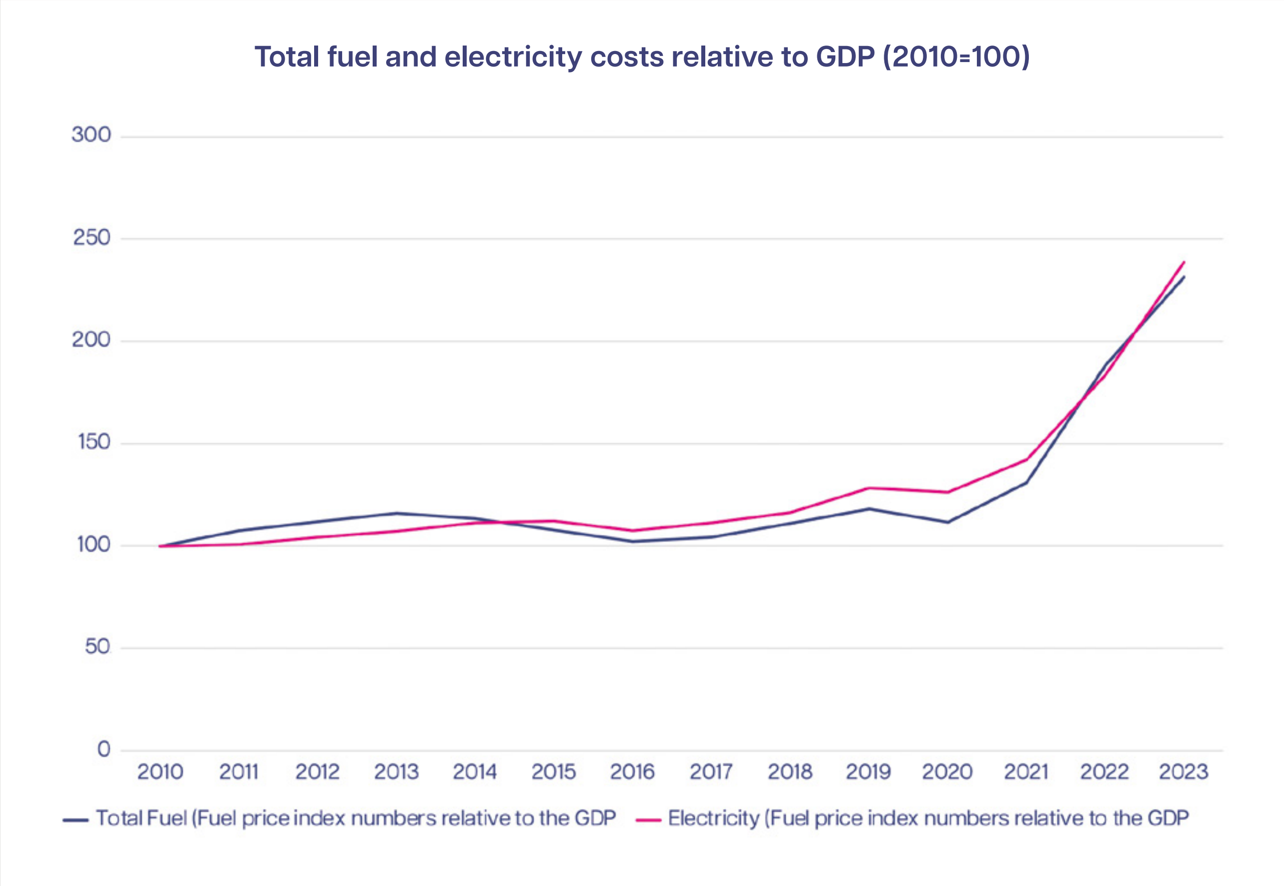
Source: Department for Energy Security and Net Zero: International industrial energy prices

Another reason natural gas is responsible for high electricity prices is marginal pricing on the spot market. Around three-fifths of electricity is sold directly via contracts, but two-fifths is sold either a day ahead or during the same day of usage via auctions – referred to as the spot market. Here, marginal pricing, a standard tool for pricing commodities, means the most expensive wholesale generation source – usually gas – sets the price (House of Commons Library, 2023). The premise is that high gas generation costs are mispricing cheap renewable power. However, this ignores the fact that renewable generators are not required to pay the expanded network and subsidy costs resulting from their generation. Marginal pricing also provides money to renewable generators, a subsidy consumers would otherwise pay through increased levies.

While the 2022 shock brought energy prices into focus, it is not the genesis of the problem. Electricity prices have consistently increased relative to GDP since 2004, even as gas prices declined. A significant reason is the vast expansion in intermittent generation and the network and subsidy costs they incur. Intermittency increases bills through direct subsidies such as ROCs and CfDs. But it also increases prices through increased network costs, the costs for expanding the transmission and distribution networks, and the capacity market mechanism – which is necessary to maintain sufficient dispatchable power to back up an intermittent-heavy grid.

The current intermittent-heavy grid's dysfunction is evidenced by the government's proposed significant market reforms favouring locational pricing, where marginal prices are divided between distinct geographic sectors. This is opposed by major renewable energy developers, who stand to lose money, and by manufacturing trade associations, including the Energy Intensive Users Group (EIUG) (Energy Intensive Users Group, n.d.), Make UK (Utility Week, 2025), and UK Steel (UK Steel, 2024). By contrast, it is supported by technology companies interested in building data centres in remote locations (Social Market Foundation, 2025).

Figure 3. Electricity and Gas prices for British industry.



Source: Department for Energy Security and Net Zero: Industrial energy price indices

As seen above, electricity and gas fuel price indexes have correlated, though not perfectly. Even as gas prices fell from 2013 to 2020, electricity prices rose ahead of GDP.

One primary reason is the growing gap between domestic consumption and production. In 2004, the year with the cheapest electricity price and the last year when Britain was a net energy exporter, wholesale energy consumption was 97% of the production value. By 2023, it was 127% (UK Government, 2024).

1.3. What makes up Britain's high energy bills?

While many commentators focus primarily on direct fuel and generation costs to advertise their particular technology, this is simplistic and ignores system and policy-related costs. A household or business's energy bill is composed of several costs:

Direct fuel and wholesale costs: These are the costs that energy suppliers pay generators (gas plants, nuclear plants, wind farms) for electricity. These were 29% of total expenses in 2020 (WattDirection, n.d.). This is the most volatile cost, with wholesale costs being over 50% of overall electricity costs in 2022 and 2023 (WattDirection, n.d.).

Network costs: The costs of transporting electricity via transmission and distribution lines. Britain's transmission network, operated by the National Grid company, comprises 136,000 miles of lines and cables, and around 185,000 transformers, that transfer electrical energy between two or more circuits through electromagnetic induction (National Grid, n.d.). This was 23% of total costs in 2020.

Policy costs: ROCs, CfDs, FITs, the Climate Change Levy (CCL) and more. Costs associated with the capacity market. This was 25% of total costs in 2020 (WattDirection, n.d.).

Indirect costs: Utility expenses such as marketing, debts, employees and insurance among other costs. This represented 14.5% of costs in 2020 (WattDirection, n.d.).

Value-added tax: VAT is applied to businesses' electricity consumption. The standard VAT-rate for energy bills is 20%, but this can be reduced to 5% (Bionic, 2025). Overall this was 5% of total electricity costs in 2020 (WattDirection, n.d.).

Supplier EBITDA: Earnings before interest, tax, depreciation and amortisation for the supplier. These costs are marginal, usually under 1% of total costs.

Other costs: Payments to Elexon, the company that manages the balancing and metering code. Smart metering costs. Broker commissions. This comprised 2% of total costs in 2020 (WattDirection, n.d.).

Overall, electricity costs relate primarily to generation and raw materials, the cost of transporting and managing such generation, and the subsidies used to prioritise certain types of generation. This does not consider carbon credits, which natural gas plants must buy to offset emissions.

For some time, Britain has had higher policy costs, both in actual terms and as a share of total costs, than its European neighbours. In 2020, Ofgem found that British policy costs, after all exemptions applied, cost energy-intensive industries £14/MWh, more than three times that of Germany and seven times that of France, and were over 20% of total costs (Ofgem, 2021).

1.4. The contribution of public policy to high energy bills

The most basic policy cost is the **Climate Change Levy (CCL),** a rate for businesses using electricity, gas or liquid petroleum gas. The primary rate for electricity and gas is £0.00801 (HM Revenue & Customs, 2024).

Renewable Obligation Certificates (ROCs) are a revenue boost for wind farm operators. They receive ROCs for every megawatt-hour (MWh) they provide, with the number of ROCs and the duration of the ROC contract being variable. ROCs were the first and most expensive net zero subsidy instituted in 2002. Their buyout prices link to the retail price index (RPI). Of Britain's 37 existing offshore wind farms, 28 rely on ROCs. The contracts run for twenty years, with capacity closing in 2017, meaning the last ROC contracts will run out by 2038.

Contracts-for-Difference (CfD) is a scheme whereby suppliers and the government agree on a set price (usually in 2012 pounds), which tracks the consumer price index (CPI). Companies selling their energy under this contract receive the requisite top-up. When they sell their energy for more, they return the money to the government. Aside from the exceptional period of high gas prices in 2022, there have consistently been more subsidies paid to CfD suppliers than vice-versa (Turver, 2024).

The **Feed-in-Tariff (FiT)** scheme has primarily been used to increase residential solar power generation, in effect by getting electricity utilities to pay residents who generate their own electricity. Residents receive a tariff from energy suppliers energy suppliers when they generate electricity they would otherwise take from the grid, and they also receive an export tariff for any excess electricity they send back to the grid. The contracts run for 20 to 25 years, meaning the last ones could remain until 2044. Between 2019 and 2024, FiT-related electricity generation decreased from 9.1 TWh to 8.3 TWh, but the cost of the scheme increased from £1.5 billion to £1.8 billion (Ofgem, 2024).

The FiT scheme was closed to new applicants in 2019. It was replaced in 2020 with the **Smart Export Guarantee (SEG)**. The SEG compels energy suppliers to pay households for all the electricity exported to the grid. Unlike the FiT, it doesn't include a generation rate.

Established in 2014 in response to a more intermittent grid, the **Capacity Market** is essentially an auction in which the government agrees to pay generators (primarily natural gas plants) to have available capacity, which they will be required to provide in the future. In return for subsidies, the generators agree to provide energy, reduce demand for the agreed-upon time, or face penalties. The scheme is split between T-4 auctions, which are for capacity demands four years from the auction, and T-1 auctions, which provide capacity the following year from the completed contract.

There is also the **Green Gas Levy**, which funds biomethane injection into the grid; the **Warm Home Discount Scheme**, which relieves vulnerable customers; and the **Energy Company Obligation (ECO)**, which supports energy efficiency measures like home insulation. New levies are added regularly. For example, £0.80 has been added onto average energy bills to support compensation for those living near soon-to-be-built pylons (Marlow, 2025). The government plans to use levies to fund the majority of the £22 billion it plans to spend on carbon capture and storage infrastructure (Hook, 2025).

Levies on electricity and gas bills are set to continue expanding to fund net zero commitments. These levies are a form of regressive taxation, as energy spending is a much more significant component of poor people's incomes.

Besides levies on consumers, generators and emitters must pay for carbon emissions. British taxes on carbon dioxide emissions, outside of fuel duty for transportation, are the **Carbon Price Support (CPS)** scheme and the **Emissions Trading Scheme (ETS)**.

Created by the government in 2013, the CPS is a tax on fossil fuels for electricity generation. The CPS creates a floor for the pricing of carbon emissions and is currently set at £18 per tonne of CO2. This means gas generators pay £0.0033 per KWh of generation (2EA, 2024).

The ETS is the successor to the EU's ETS, essentially a cap-and-trade system. The government sets a cap to limit total emissions from energy-intensive industries, power generation, and aviation. Companies sell or buy emission allowances in the carbon market (Department for Energy Security and Net Zero, 2024). The cap reduces over time to encourage emission reductions. The government provides free ETS allowances, measured in tonnes of carbon dioxide emissions, which certain energy-intensive users can use (Department for Energy Security and Net Zero, 2025). This is a measure to prevent energy-intensive users from leaving to less heavily regulated juristictions.

There are also levies placed on oil and gas extraction. There is the standard ring-fenced corporation tax of 30%, an additional supplementary charge of 10%, and an **Energy Profits Levy (EPL)**. Brought in at a rate of 25% in 2022, the government has increased the EPL to 38%, meaning a current headline tax of 78% for oil and gas extraction (Hezlet, 2025).

1.5. Understanding energy intensity

When considering the recent history of high energy prices for British producers, it is unsurprising that British manufacturing has stagnated. Based on the industrial production index, production, after quadrupling from the 1940s to the early 2000s, has essentially remained stagnant for the whole of the 21st century (ONS, 2025).

The reasons for this are manifold. China's manufacturing expansion, in part facilitated by cheap coal and subsidised by below-market loans from local and central government, has undercut the productive competitiveness of Western economies (Scott, 2020). British industry, less consolidated and politically influential than that of comparator nations, has seen a greater exodus of jobs relative to the overall workforce. The failure of British companies to invest in productivity-enhancing technologies like robotics has also played a role. But since 2004, rising industrial electricity prices in Britain have severely harmed our competitiveness relative to other major industrial producers.

Energy intensity is a significant factor to consider for any business. Simply calculated as industry energy purchases divided by industry total purchases of energy, materials, goods and services, excluding purchases for direct resale, energy intensity is relatively low compared to labour and capital costs.

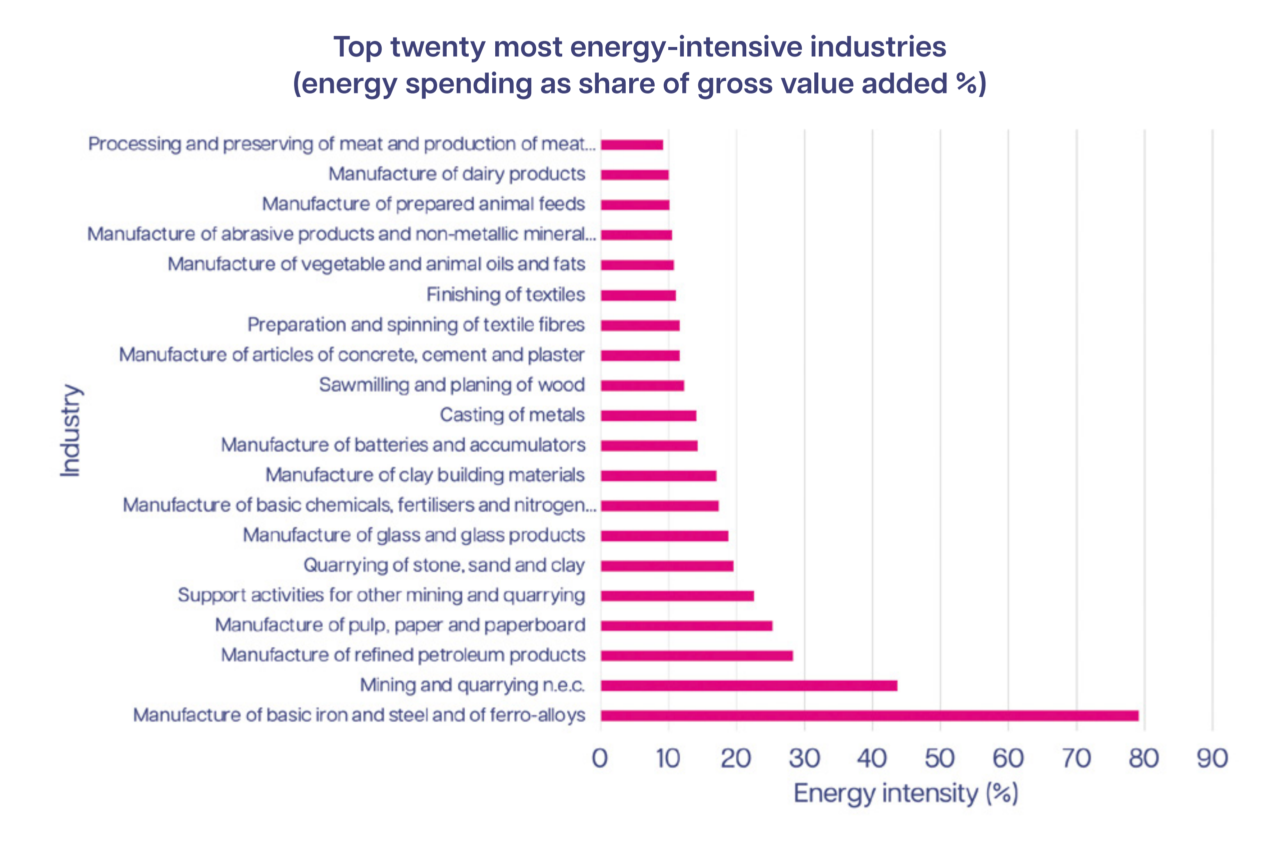
However, alternative measures show that energy intensity can be significantly greater than what appears to be a simple division of total costs. Typical firm mean energy intensity takes the energy intensity metric and calculates it at the level of individual firms, with the mean average taken across all businesses in a given industry (ONS, 2022). This metric avoids skewing toward large companies with much larger balance sheets and lower energy intensity.

For example, the basic energy intensity of motor vehicle manufacturing is 1%, but for a mean British firm involved in motor vehicle manufacturing, it is 12% (ONS, 2022). For some high-end services, like satellite and telecommunication activities, total industry energy intensity is 1%, but for a typical firm, it is 17% (ONS, 2022). Out of 228 recorded industries, for 46 the gap between aggregate energy intensity and typical firm intensity is over 5% (ONS, 2022). This means that, while in broad terms high energy prices or volatile price spikes will affect most industries, it will have acute effects on a large number of smaller and medium-size firms within a given industry. This is particularly hard for small suppliers of larger companies, meaning their higher costs translate into higher capital costs for large vendors.

Energy intensity for manufacturing is also greater when using a metric comparing energy purchases to gross value added (GVA). GVA is the value of an industry's outputs less the value of intermediate inputs used in the production process (ONS, 2018). Energy intensity with the GVA denominator is energy purchases divided by approximate GVA at basic prices, excluding energy purchases for direct resale (ONS, n.d.). This is a more useful measurement than comparing energy purchases to total turnover, as it shows the impact of energy prices on the potential value of an industry's output.

Using the standard method, the energy intensity of the basic iron and steel sector is only 6%, but when using the GVA denominator, it rises spectacularly to 79% (ONS, 2022). For the chemical industry, a change in metric increases energy intensity from 7% to 17%. For motor vehicles, using the GVA denominator increases energy intensity over fourfold from 0.6% to 2.7%. These are industries where net income is routinely below 5%. In short, when comparing energy purchases to the actual value of the industry, manufacturing energy intensity is considerably greater than a simple subtraction of energy purchases from total purchases suggests.

Figure 4. The twenty most energy-intensive manufacturing sub-sectors.



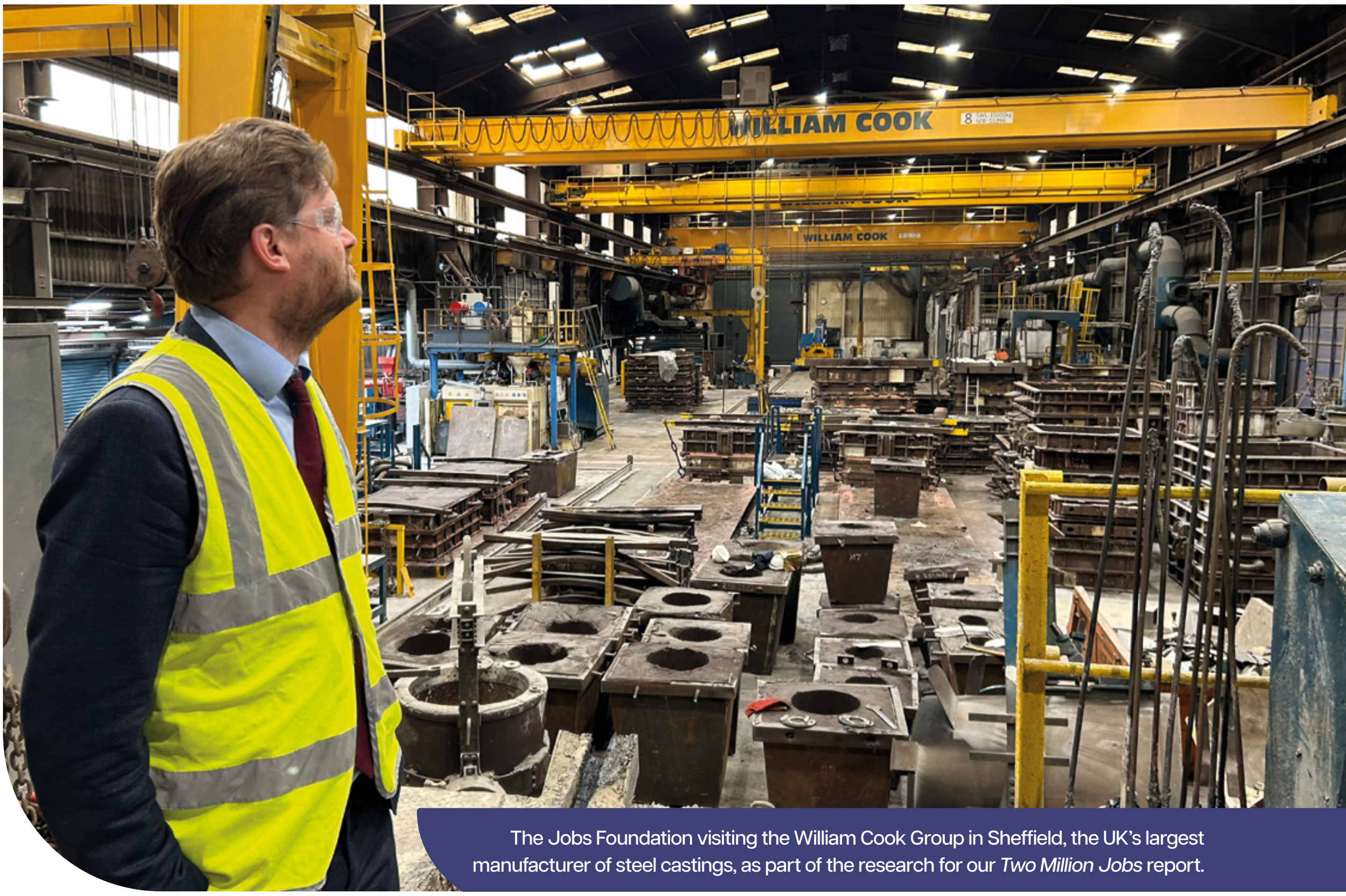
Source: ONS: Business energy spending: experimental measures from the Office for National Statistics' business surveys

Notes

GVA vs Turnover

Turnover measures the total sales of a company, industry or economy. For example, the total turnover of the British manufacturing economy was £670 billion. The service economy's turnover was £3.5 trillion (ONS, 2024). This does not take into account intermediate sales needed to provide final goods and services.

Gross value added (GVA) is commonly used to measure the actual value of a company or industry, as well as GDP. GVA is calculated as turnover minus intermediate transactions. For example, if a steel manufacturer sells £1 million worth of tubes, wires or castings but pays £500,000 in energy, capital and labour costs, its GVA is £500,000. GDP is calculated by taking GVA, adding taxes and government receipts, and subtracting costs like subsidies and deficits.



The Jobs Foundation visiting the William Cook Group in Sheffield, the UK's largest manufacturer of steel castings, as part of the research for our *Two Million Jobs* report.

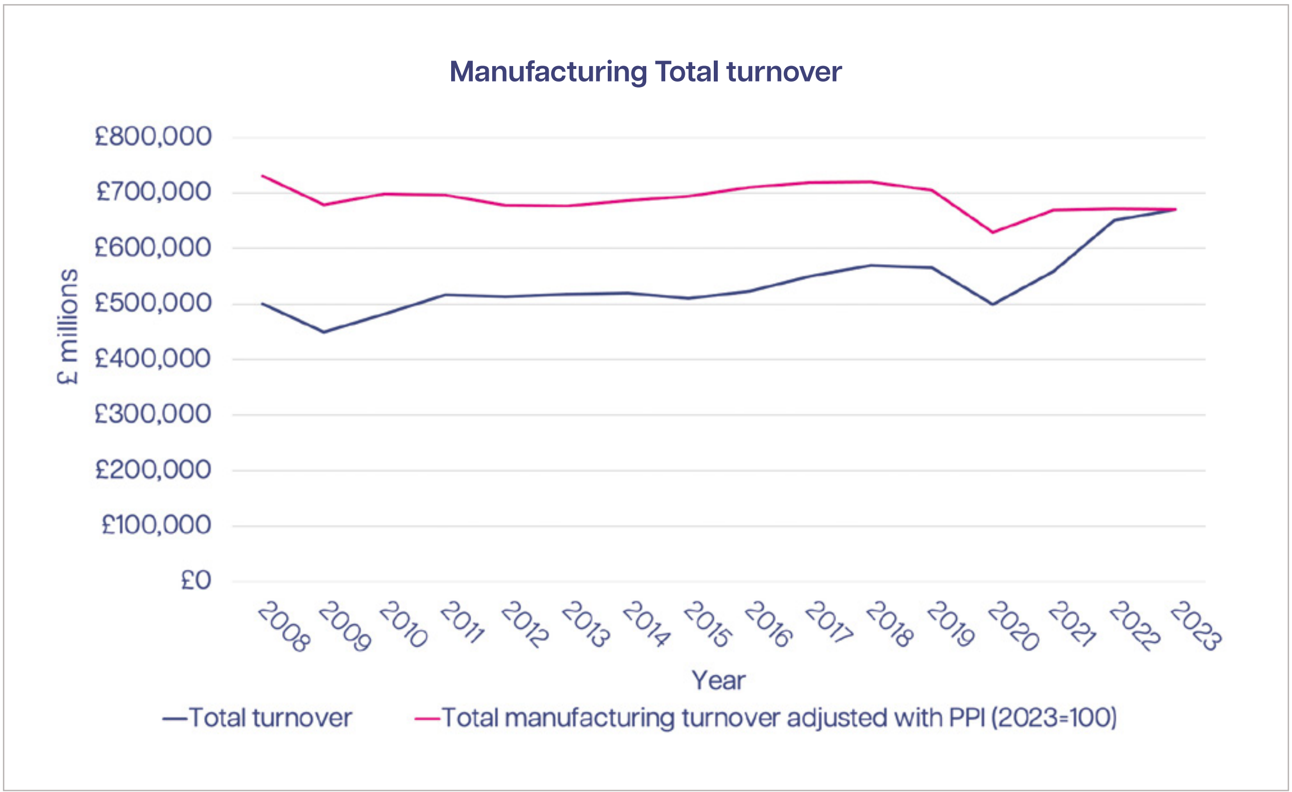
2. Impact of high energy prices on British industry

Economists understand Britain as a post-industrial economy that has long struggled to compete with export-centric economies due to its specialisation in services and lack of technical education and skills. However, the British industry's performance in the late twentieth and early twenty-first centuries was positive. While some heavy industries, like coal production and textiles, suffered and employment contracted, Britain entered the 21st century with an intact steel industry, a net energy surplus, relatively low industrial electricity prices, and record manufacturing value-added.

As recently as 1999, Britain was the fourth largest manufacturing economy in the world by GVA, compared to being the eleventh largest today (Cambridge Industrial Innovation Policy, n.d.). In inflation-adjusted terms, British industrial electricity prices were £0.07 per KWh versus £0.259 per KWh in 2023 (ONS, 2023). From 1993 to 1998, British manufacturing employment increased from 4.1 million to 4.3 million (ONS, n.d.). During this time, electricity prices dropped a remarkable 22% to £0.07 per KWh (in 2023 prices). British industrial electricity prices were at their most competitive in 2003 at £0.058 per KWh (in 2023 prices), operating a grid that was 72% gas or coal and 22% nuclear (Our World in Data, n.d.).

From 2006 to today, however, growth in both turnover and value-added has been flat, something unprecedented in the three-hundred-year history of modern British manufacturing. In 2023, the turnover of British manufacturers was lower than in 2006, when accounting for inflation. Manufacturing output declined 0.7% in 2024, indicating that in real terms, turnover will still be lower in 2025 than in 2006 (ONS, 2023).

Figure 5. Nominal and real turnover (2023 prices) of British manufacturing product sales.

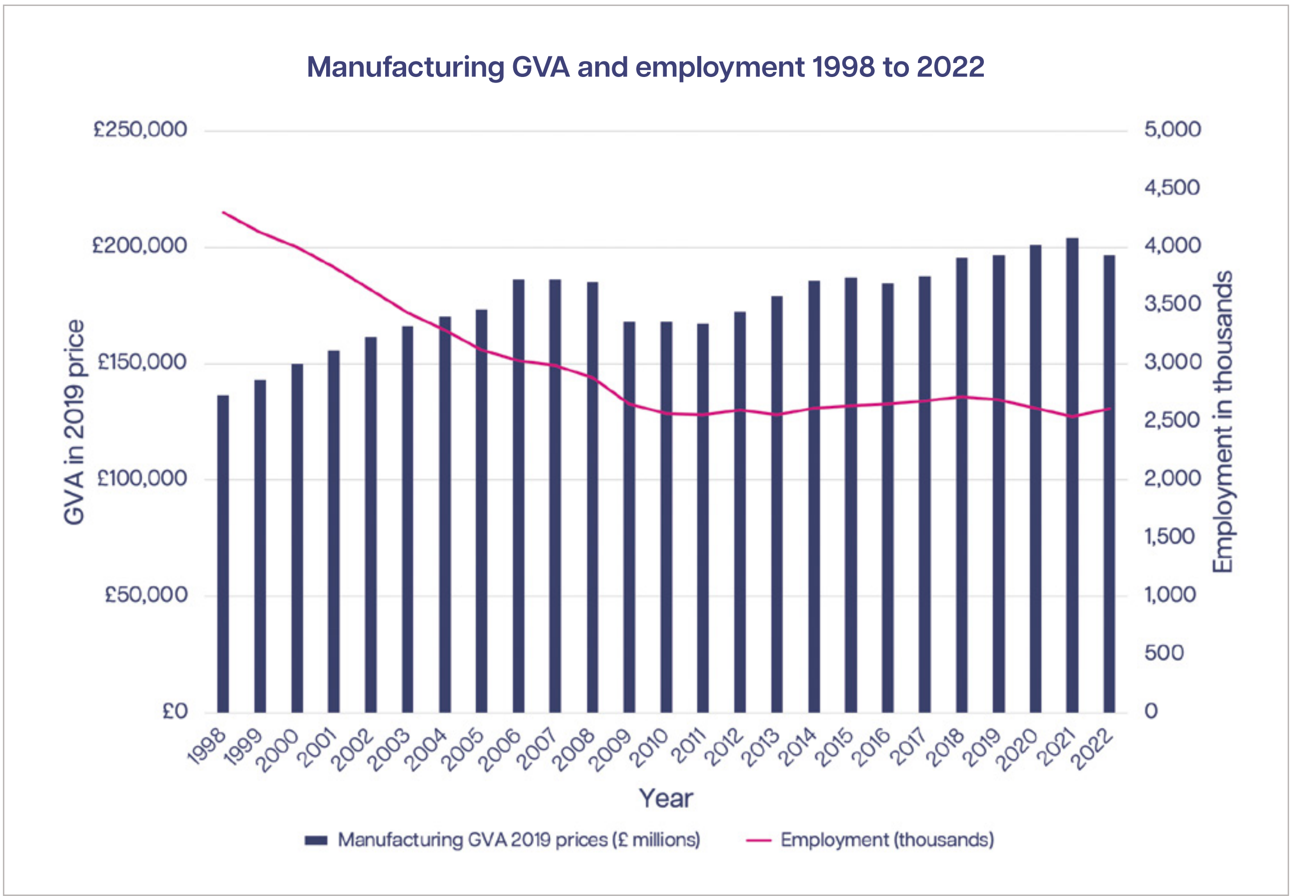


Source: Calculated using the ONS GDP deflator (2023 = 100).

The stagnation of turnover translates to gross value-added output, which has barely grown since 2006. There has been a significant increase in productivity. The British manufacturing workforce has shrunk drastically from 4.3 million in 1998 to 2.6 million in 2022. Productivity per worker, measured by GVA, has more than doubled from £32,000 in 1998 to £75,000 today. Much of these efficiencies were seen before 2008, after which a much slower decline in employment has been concomitant with much lower and even non-existent growth.

British manufacturing today is lopsided in favour of finished goods rather than intermediate goods, best reflected in its GVA-to-turnover ratio. While France and Britain have roughly similar manufacturing GVA levels, France has significantly more turnover, meaning far more manufacturing activity in total. Essentially, Britain has a much higher GVA-to-turnover ratio than other European countries, meaning that its manufacturing sector is higher value-added. In 2019, according to the OECD, the British manufacturing GVA-to-turnover ratio was 38%, while for France, it was 32% (OECD, n.d.).

Figure 6. British Manufacturing Gross-Value-Added (chained volume 2019 prices) from 1998 to 2022.

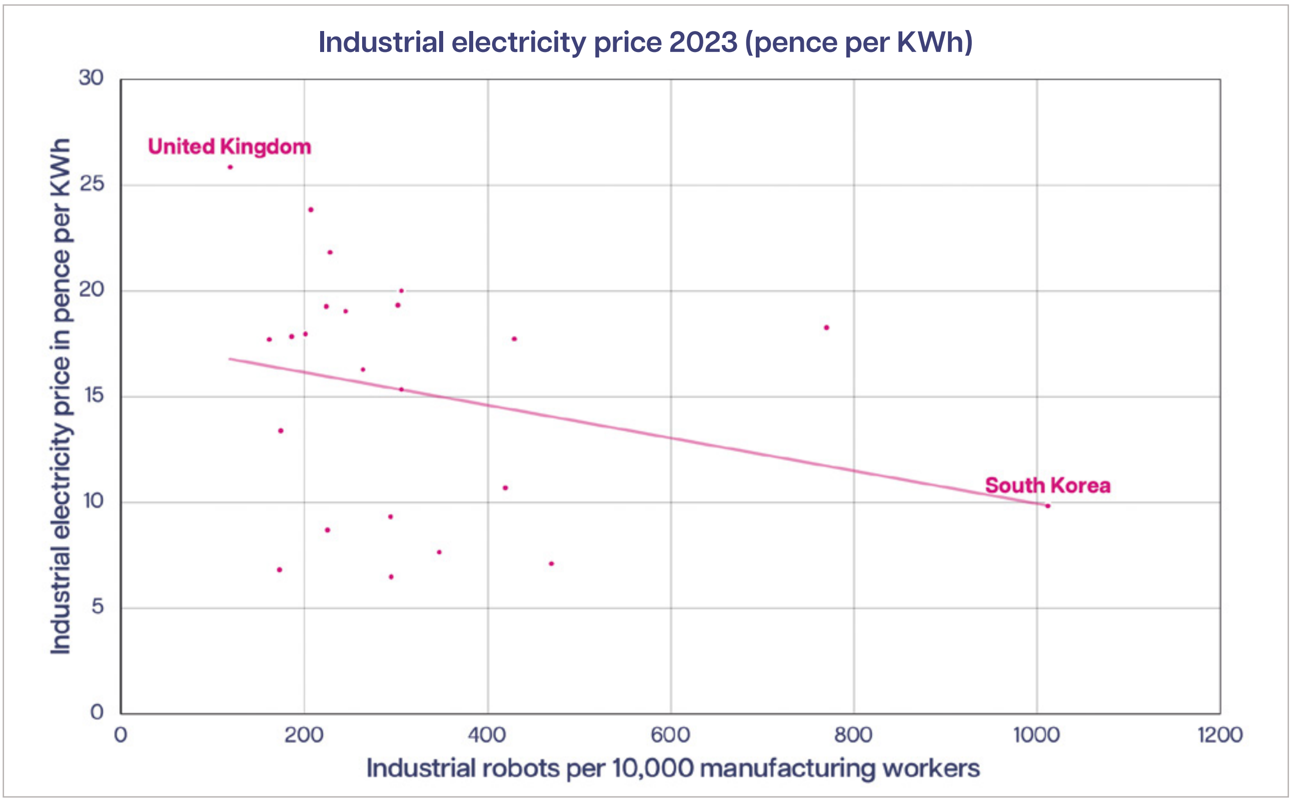


Source: Employment / Regional GVA from ONS

A significant reason for this gap is that British manufacturers disproportionately produce finished products rather than intermediate goods. This means British manufacturing is higher up the value chain, but it also means the supply chain is shallower. Expensive energy and other supply-side challenges exacerbate this problem, effectively meaning manufacturers in Britain have to reach a higher threshold of profitability than their competitors. While being high-value-added is a good thing, the challenges of being a manufacturer in Britain make it artificially difficult to build good businesses.

Britain, as well as having high energy prices, is also well behind other countries in the installation of industrial robots. In 2023, according to the International Federation of Robotics, the average country had 162 robots for every 10,000 manufacturing workers (International Federation of Robotics, 2024). For Britain, it was 119 (Tony Blair Institute for Global Change, 2024). South Korea (1012), Germany (420) and France (186) have significantly more robots deployed. This cannot be explained by industrial composition. The UK has 808 robots per 10,000 employees in the automotive sector versus Germany's 1,492 (Tony Blair Institute for Global Change, 2024).

Figure 7. Robot density and industrial electricity prices for 2023.



Source: IFR 2024 robot density report / ONS international industrial electricity prices

With high energy prices and low levels of automation, British manufacturers are poorly positioned to move quickly in speculative, high-risk markets and increasingly struggle to maintain market shares in mature industries. The record since 2008 has been absolute and relative stagnation in terms of both turnover and value.

The risk of stagnation for another twenty years is significant and has terrible implications for the larger economy. Manufacturing is 9% of gross value added (GVA) for the economy at large, but without London, it is 12%. For the East Midlands it is 17%; for the West Midlands, 14%; for Yorkshire and the Humber, 15%; for the North West, 14%; and for the North East and Wales, 15% (Regional gross value added (balanced) by industry: all International Territorial Level (ITL) regions (ONS)). Any further deterioration of manufacturing incurred from energy prices further exacerbates regional economic inequalities.

These are already at a point where, out of all the regions, only London and the South East produce more than they spend (Keep, 2020). This heightens resentment amongst non-Londoners who see their relative wealth, opportunities and living standards decline, and resentment from those in the Capital who see their taxes spent elsewhere. While regional tension is nothing new in Britain, a further decline of an already stagnant production economy threatens to deepen disparities further. While devolution, planning reform, and other policies could ameliorate the challenges of the non-London economy, the chances of reducing such disparities are far greater with a competitive industrial sector buttressed by cheap energy.

2.1. What is the energy intensive industries sector

This report understands the energy-intensive industries (EII) sector to refer to all industrial groups eligible for levy exemptions under the Department of Business and Trade's rules, provided in Annex 1 of this paper. As of 2023, the EII sector provides 416,000 jobs and has an annual turnover of £170 billion. It is split into 72 eligible groups, which are themselves defined as part of broader industrial divisions (UN Statistics Division, n.d.). In terms of turnover, the EII sector is split below by major industrial groups. This does not refer to the entire turnover of these sectors but to the EII-eligible industries within said sectors.

Figure 8. Turnover in £ Billions by major division, concerning industrial groups eligible for energy-intensive sector exemptions.

Source: ONS Annual Business Survey: Table 4: Annual Business Survey Section C, UK, 2008 to 2023

The government defines these industries as energy-intensive, so they are the sectors most likely to suffer from high energy prices. These industrial groups are likely to have energy intensities of above 20%. Of course, all manufacturing activities suffer from such prices and indirect energy costs carried by more significant inflation. Therefore, the current EII exemption scheme is quite limited in seeking to alleviate the industries for whom current energy prices are unsustainable.

2.2. Chemicals

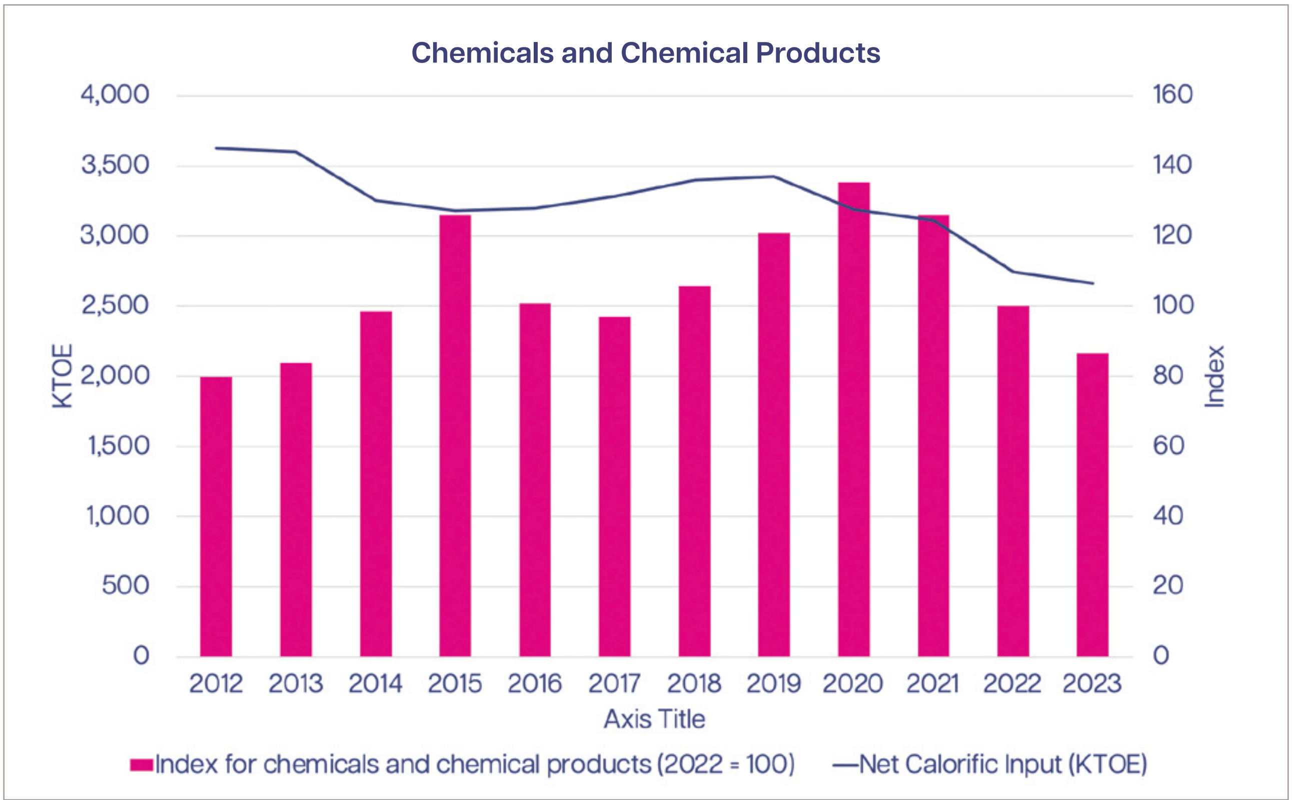
The chemicals industry has a GVA of £13 billion (ONS, 2024) as of 2023, with a turnover of £28 billion (ONS, 2024). When factoring in pharmaceutical products, its GVA increases to £30 billion, and its turnover increases to £45 billion, making it one of Britain's largest manufacturing industries and a major source of exports (ONS, 2024).

As of 2021, 62,000 people worked directly in chemicals and chemical products. The Chemical Industries Association claims that in addition to direct employment, the industry supports 500,000 jobs nationwide. Therefore, chemicals are one of Britain's most prominent manufacturing industries, alongside food and beverages, transport, and fabricated metals.

The chemical industry is heavily concentrated in four major clusters: Teesside in the North East, Humberside in Yorkshire, Merseyside in the North West, and Grangemouth in Scotland. Collectively, these four clusters represent 49% of all chemical industry employment. Another notable cluster in the South is Southampton. Significant British chemical producers exist, notably the petrochemical company Ineos and specialist chemical producers like Johnson Matthey and Croda.

While chemical processes vary greatly, their primary inputs are natural gas for combustion and electricity, with minor inputs from coal, petroleum products, and bioenergy. As seen below, the chemical industry's calorific consumption is significantly related to its output.

Figure 9. Chemical output and calorific consumption of energy.



Source: Department for Energy Security and Net Zero: Aggregate energy commodity balance: net calorific values basis (DUKES I:1) / ONS: Index of Production time series

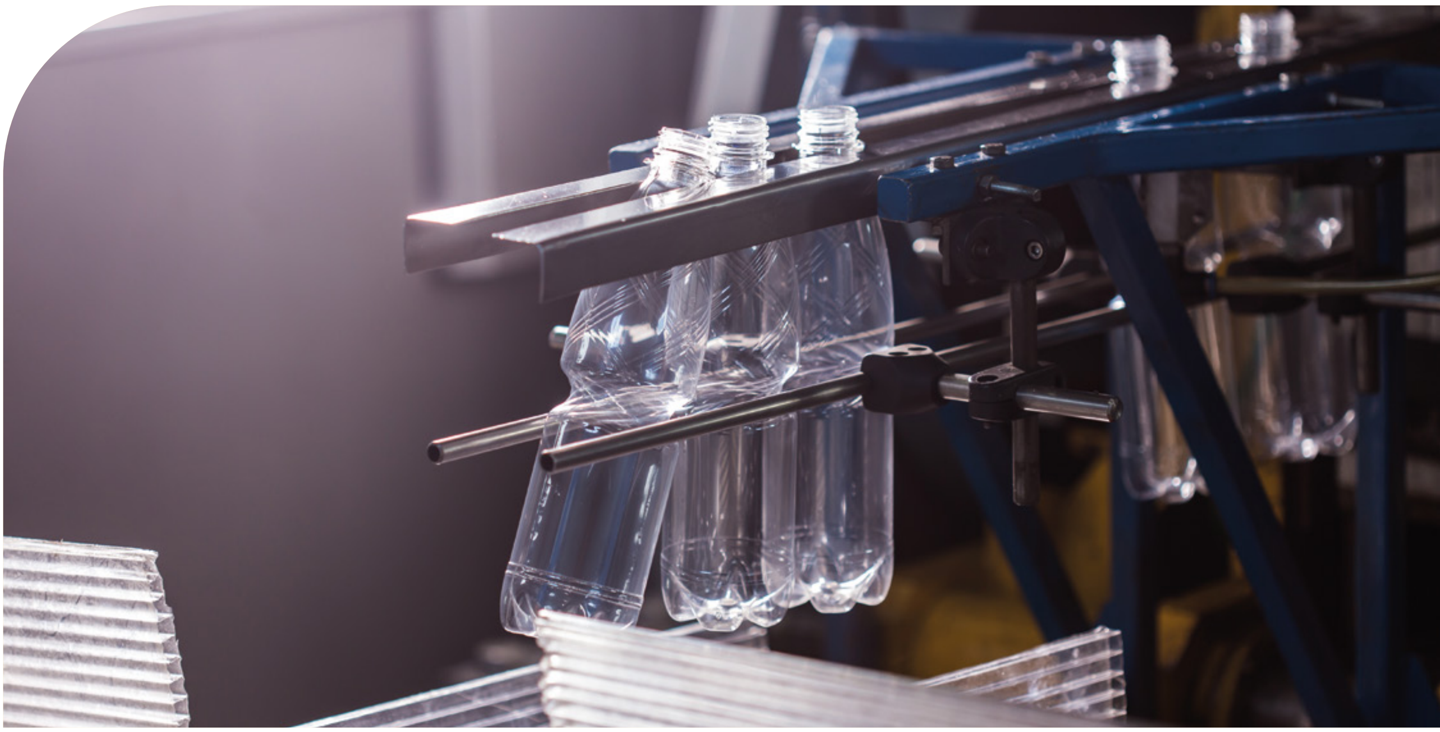
The modern chemical industry's outputs can be roughly divided into: commodity chemicals used as feedstock; fine chemicals used as ingredients; and speciality chemicals designed for end users.

Commodity chemicals include bulk inorganic chemicals like ammonia or chlorine and petrochemicals like benzene, ethylene, propylene, and toluene. Petroleum-based chemicals, or "petrochemicals," are organic because their raw materials are naturally formed, while inorganic commodity chemicals are sourced from metals and minerals. Examples include sulphuric acid, fluorspar, potash and caustic soda.

Fine chemicals are more specialised, high-purity chemicals generally produced in small batches for specific applications in small quantities. For example, the "active pharmaceutical ingredients" used to make drugs in the pharmaceutical industry are considered fine chemicals, as are proteins, peptides, alkaloids, and biocides (PerkinElmer, 2021).

Fine and commodity chemicals combine to form speciality chemicals designed to have a particular effect or serve a specific need. For example, the speciality includes paints, specialised plastics, detergents, surfactants, adhesives, sealants, lubricants, pesticides, solvents, propellants, refrigerants, and other compounds used in branded products.

As recently as 2020, the sector's production levels were near their height. But in the years since, energy costs have seen the mothballing and permanent closure of several major plants. In 2020, Ineos closed its acrylonitrile plant at Seal Sands and announced the end of oil refining production at Grangemouth in Scotland. CF Industries have scaled back fertiliser and ammonia production in Cheshire and Billingham (Storey, 2024). Mitsubishi has closed methacrylate production on Teesside. In 2025, Norwegian chemical giant Yara mothballed their ammonia plant in Hull (Yara International ASA, 2025).

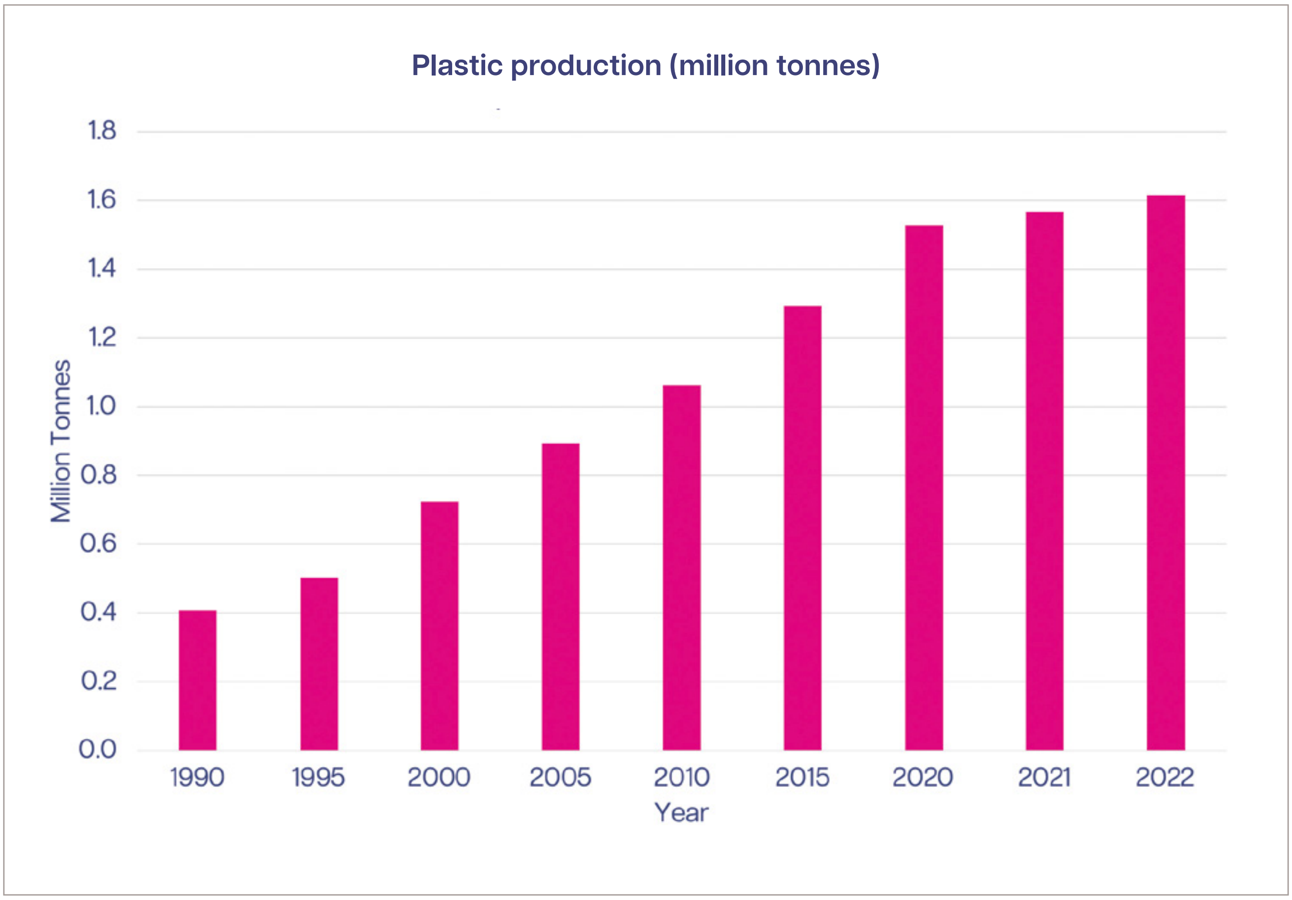


2.3. Plastics and rubber

Ethylene and propylene are the most critical petrochemicals in the production of plastics. They are turned into polymers like polyethylene and polypropylene. These are turned into plastic products like films, filaments, pipes, and coatings. Butadiene is critical to developing synthetic rubbers; benzene derivatives like phenol are needed to manufacture resins and synthetic fibres like nylon.

The British plastics industry had a turnover of £23 billion in 2023 (ONS, 2023). Measured by gross value added, plastics and rubber production was £8.3 billion in 2023 (ONS, 2024). The bulk of this was plastics products like packaging and construction products, alongside components for the automotive industry. The rest came from primary plastic production, spread across nine major sites. These primary plastics include polyethylene, polyvinylchloride and polypropylene. Overall, Britain currently has the capacity to produce nearly 2 million tonnes of primary plastics annually (British Plastics Federation, n.d.). Production has grown historically, from 720,000 tonnes in 2000 (Businesswise Solutions, 2024) to 1.6 million tonnes in 2021. Despite this increase in production, Britain is much more dependent on plastics imports than Germany, France or Spain. In 2021, it consumed 3.3 million tonnes, nearly half of which was imported (British Plastics Federation, n.d.).

Figure 10. Plastics production.



Source: Business Wise Solutions (Via Global Data)

2.4. Metal

2.4.1. Steel

There are three principal modern methods of making steel. New steel can be created using pig iron via a basic-oxygen furnace. Iron ore is reduced by coke sourced from burning coal via a blast furnace. This produces liquid iron that is saturated with carbon. It is then processed into steel as carbon is removed by injections of oxygen. The second option is melting recycled scrap steel in an electric arc furnace (EAF). The final option is using direct reduced iron (DRI) furnaces, which combine iron ore, hydrogen, methane and carbon monoxide to reduce carbon content and create sponge iron mixed with scrap steel in EAFs.

For the Blast Furnace-Basic Oxygen Furnace (BF-BOF) route, the energy composition is about 50% coal, 35% electricity, 5% natural gas, and 5% other gases. For an EAF, it is 75% electricity and 25% natural gas. EAFs are cheaper, less dirty, and increasingly popular, but their emphasis on recycled steel has historically limited the range of products and qualities they can be used for. Over time, EAFs have improved their ability to manufacture higher-quality steel grades. Their main drawback now is that they rely more on electricity.

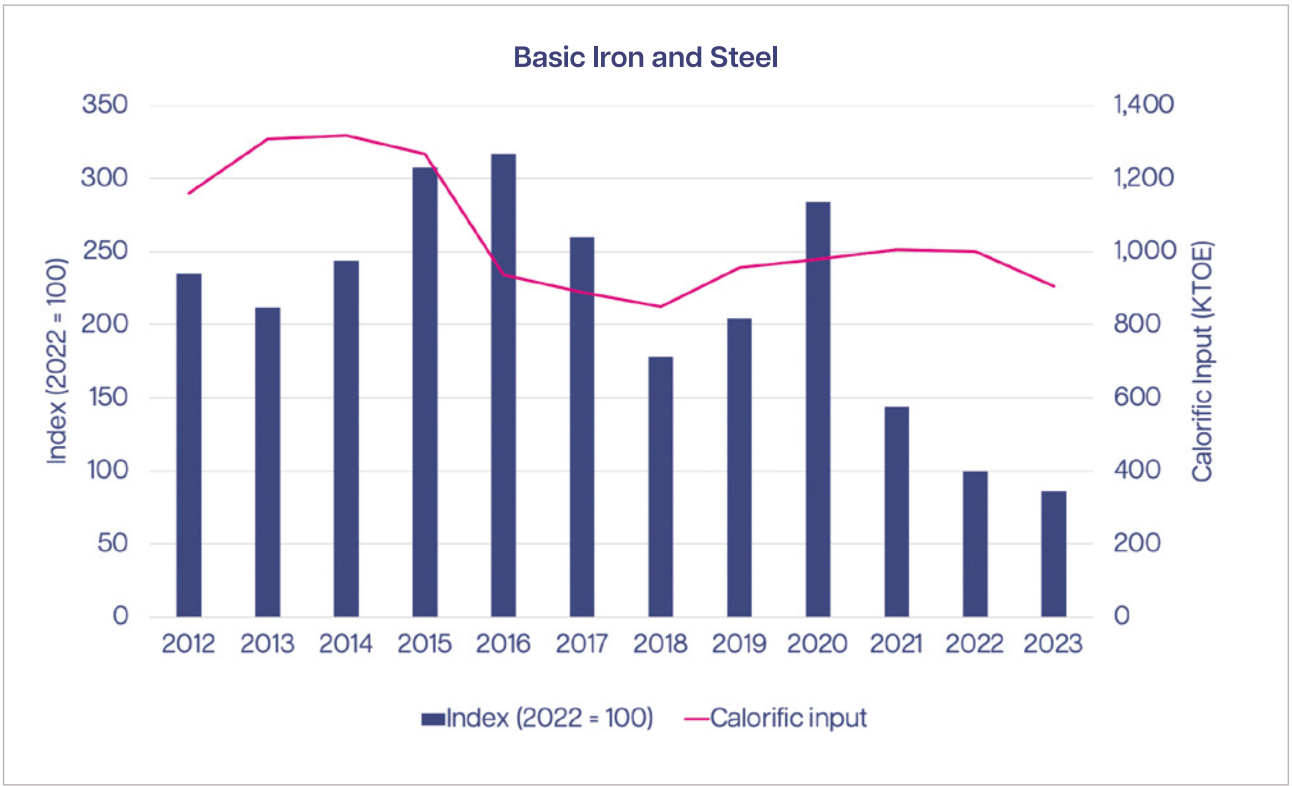
Basic oxygen furnaces, which have been the staple of British steelmaking, remain competitive and, unlike EAFs, can produce virgin steel. DRI furnaces can also make new steel, which can be mixed with scrap steel in EAFs to produce high-grade steel products. Currently, DRI furnaces are carbon-intensive, but there is hope they can be fully powered by hydrogen.

After liquid steel is produced, it typically goes through continuous casting, where it is solidified into semi-finished shapes such as slabs, billets, or blooms. These are then rolled into final products like coils, plates, rods, tubes, sections, and wire. Alternatively, forging or extrusion can be used to shape steel, improving its grain structure and mechanical properties while reducing defects. Casting molten steel and alloys is key for making specialised components. Britain's Sheffield Forgemasters operates one of the few large forge presses capable of producing ultra-heavy forgings, such as reactor pressure vessel components. (Sheffield Forgemasters, 2024).

At its peak in 1970, the British steel industry employed over 300,000 people and produced 28.3 million tonnes of steel, placing it fifth in the world behind Japan and West Germany. Much of the decline had already happened by 1980 as annual production fell to 15 million tonnes. From that period, it was stable for decades, being over 12 million in 2013. In 2021, production was just 7.2 million tonnes, with 33,000 employed throughout the entire supply chain. By 2023, this had fallen further to 5.6 million tonnes (UK Steel, 2024). In 2024, the figure was 4 million tonnes.

Today, Britain is the 26th largest producer globally, behind Italy, Spain, Austria, Saudi Arabia, Egypt, Poland, and Belgium. Even in the United Kingdom's broader de-industrialisation context, the steel industry's performance has been abysmal. In real terms, it has declined by over 50% over the last thirty years, even as broader manufacturing output has remained stagnant. Measured by the industrial production index, the iron and steel industry in 2023 is less than 25% of what it was in 2000.

Figure 11. Calorific input and index of production for essential iron and steel production from 1998 to 2023.



Source: ONS: Aggregate energy commodity balance: gross calorific values basis / Index of Production time series.

The British Steel industry has two major blast furnace facilities: Scunthorpe (previously owned by British Steel and now controlled by the government) and Port Talbot (owned by Tata), with a combined capacity of 7.5 million tonnes per annum. These are being retired and turned into arc furnaces. Tata Steel closed its two blast furnaces in late 2024, and is building a single large EAF with a capacity of 3 million tonnes. British Steel did indicate that, with government support, it would build two EAFs with a combined capacity of 4 million tonnes annually, to replace its blast furnaces at Scunthorpe. However, no deal was reached.

These projects are only possible through significant government support. Of the £1.25 billion needed to build Port Talbot's EAF, Tata is spending £750 million, and the government is providing £500 million (UK Steel, 2024). British Steel asked to receive £600 million in government grants to build its two EAFs (Yermonlenko, 2024). If electricity prices remain high in Britain, these new furnaces are unlikely to be profitable in the long term, as the energy intensity of basic steelmaking is 79% (ONS, 2022).

In April 2025, following failed negotiations on funding new electric arc furnaces, British Steel said it would close down the remaining blast furnaces at the Scunthorpe plant, ending Britain's ability to make steel from scratch. The government hastily took effective control of the plant, even buying new supplies of coking coal to keep the plant running. It is not clear yet whether the plant will be permanently nationalised.

There are currently four large electric arc furnaces in the country: Celsa Steel in Cardiff, Liberty Steel in Rotherham, and Marcegaglia and Sheffield Forgemasters in Sheffield.

In addition to these significant sites, there are dozens of smaller facilities. These arc furnaces depend on cheap electricity to be competitive. They are shielded by government exemptions, but remain financially precarious and reliant on government business. Sheffield Forgemasters itself was bought by the Ministry of Defence in 2021.

2.4.2. Aluminium and non-ferrous metals

While iron and steel products represent the bulk of British and global metal production, non-ferrous metal production remains a significant industry, with a turnover of £4.5 billion in 2023. Aluminium is the most significant, with nearly £2 billion turnover. It is resistant to corrosion and has a high strength-to-weight ratio, making it a critical input for aircraft, cars, packaging and construction materials.

The manufacture of primary aluminium consists of three steps: bauxite mining, alumina production, and electrolysis. Bauxite is a clay-like mineral rich in aluminium oxide (alumina), but contains many impurities that must be removed. Four tonnes of bauxite are needed to produce two tonnes of alumina which in turn produces one tonne of aluminium (Dahlstrom et al, 2004). Aluminium is formed at about 900°C, but once formed it has a melting point of only 660°C, making recycling much easier and more cost-effective than production (He, 2006).

Aluminium is often referred to as congealed electricity for its high electricity costs. The cumulative energy intensity of steel is between 3 and 6 MWh per tonne (Harvey, 2024). By contrast, the energy intensity of primary aluminium smelting is close to 14 MWh per tonne (Statistica Research Department, 2023). The energy-intensive nature of the initial production process equates to over one-third of overall production costs, which means that production locations are largely dictated by the availability of electricity that is both reliable and cheap.

British aluminium production has declined markedly. In 2009, the country had a cumulative capacity of over 300,000 tonnes per annum. Since then, a major plant at Anglesey in Wales was closed, and in 2012, the aluminium smelter at Lynmouth in Northumbria ceased production, eventually closing in 2018 (Civitas, 2012). The only remaining aluminium smelter is owned by the company GFG Alliance in Lochaber, Scotland. It has an annual capacity of just under 50,000 tonnes (Alvance British Aluminum, n.d.), which is around a quarter of annual consumption (Statistica Research Department, 2022). By contrast, Iceland, with a population of under 400,000 (100,000 less than the city of Bradford), has an annual capacity of 900,000 tonnes (Blondal, 2024).

In 2023, Britain consumed 176,000 tonnes of primary aluminium metal and consumed 173,000 tonnes of recycled metal (Aluminum Federation, 2023). Much of the recycled metal comes from Britain itself (Ecosurety, 2024). After importing primary aluminium, Britain produced 338,000 tonnes of semi-fabricated aluminium products, of which it exported 202,000 tonnes (Aluminium Federation, 2023). It also imported 611,000 tonnes of semi-fabricated products, consuming 800,000 tonnes in total (Aluminium Federation, 2023).

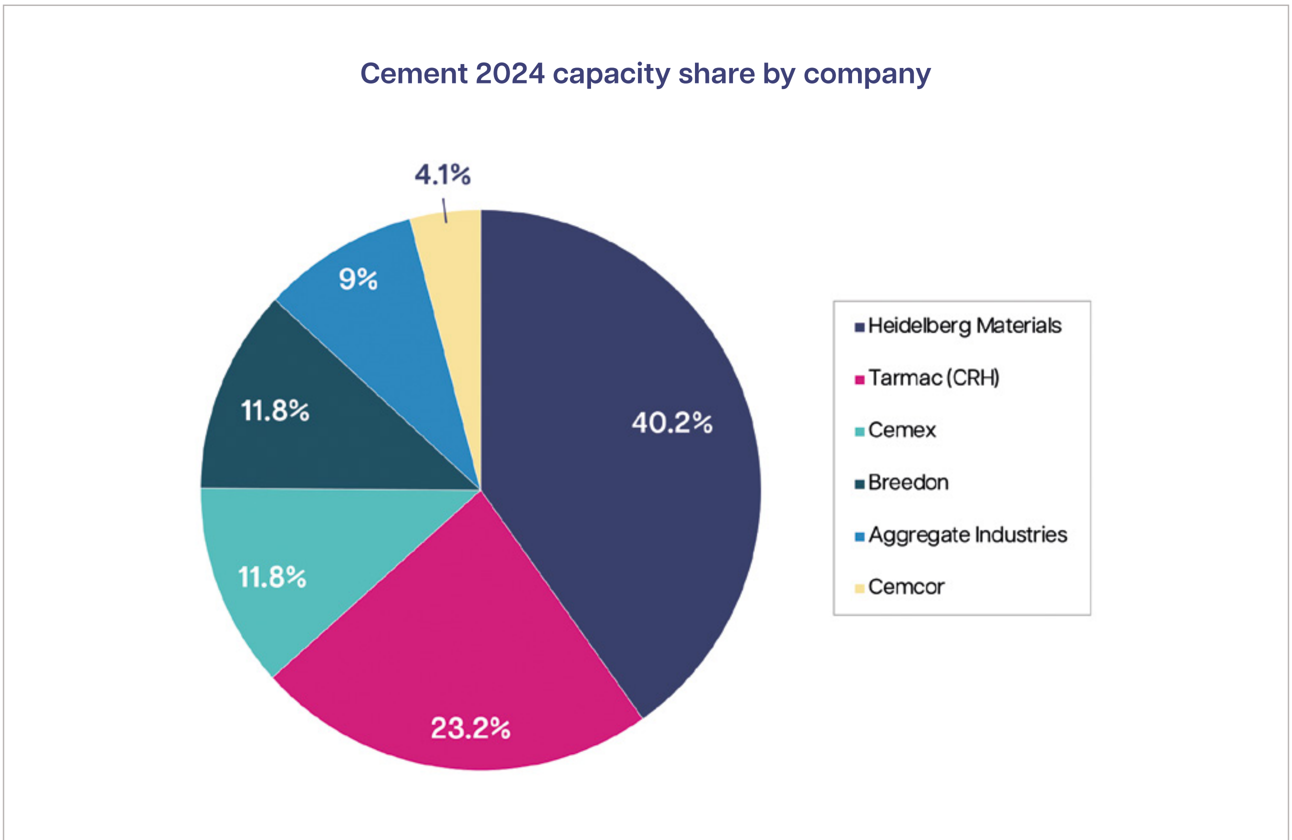
2.5. Non-Metallics

2.5.1. Cement

Cement production contributes nearly £1 billion in turnover (ONS, 2023). Cement is the essential binding ingredient in concrete, the world's second most consumed substance after water (World Cement Organisation, n.d.). Concrete, indispensable to all construction activities, is a mix of roughly 10% cement, 15% water, and 75% aggregates like sand, gravel and crushed rock (Mineral Products Association, 2023). Cement is made by grinding raw materials like limestone and clay into fine powder, then heating them in a klinker to temperatures up to 1,450°C. The resulting 'clinker' is then ground into a cement mill and combined with gypsum, which increases the setting time of the mixture (Thermo Fisher Scientific, 2023).

Cement is also used as a binder for mortar, a material used for bricklaying, plastering and tiling. In this case, the cement is mixed with finer sand aggregates and is usually 20% of the final mixture (Beesley & Fildes, n.d.). Cement is also used in the production of cement plaster, which is often used for interior and exterior walls. Overall, 20 cement plants supply 817 ready-mix concrete plants, 192 precast concrete plants, and 83 mortar plants (Mineral Products Association, 2023).

Figure 12. Cement 2024 capacity share by company.



Source: Research based on map resources provided by MPA Cement, a subsidiary of the Mineral Products Association.

Britain's cement industry is split between six major producers across fifteen significant sites, with twelve outside of London. These include Breedon, Cemcor, Cemex, Heidelberg Materials, Lafarge Cement, Imerys, and Tarmac, a subsidiary of the Irish building materials conglomerate CRH. Currently, there are 11 million tonnes of annual clinker capacity, with 40% controlled by Heidelberg Materials.

Britain's cement industry has declined markedly in the 21st century. Production fell from 11 million tonnes in 2001 to 7.6 million tonnes in 2023, while imports rose from 1.5 million tonnes to 3.6 million tonnes (MPA Cement, 2024). Up to 2008, Britain had a positive trade balance of concrete products, a major derivative of cement (Mineral Products Association, 2023). According to the ONS, the cement industry's energy costs represent 12% of GVA, making it vulnerable to price shocks.

2.5.2. Ceramics

Ceramics are inorganic, non-metallic materials that exhibit an extensive range of high-performing properties and behaviours. As of 2023, British ceramics production has a turnover of around £2.5 billion, a GVA of £720 million and employs 8,000 people (UK Research and Innovation, 2021). Ceramics are materials made by shaping and then heating natural substances like clay, minerals or powders to very high temperatures. They have several useful properties that make them preferable to metallic components. They are heat-resistant and retain their structure without deforming. They are non-conductive of electricity, highly durable, and corrosion-resistant.

Owing to their high strength, high operating temperatures, wear resistance, and tailorable properties, they are embedded in high-performing products and are replacing metals in advantageous applications. For example, ceramic coatings are used for the blades in Rolls-Royce aircraft engines. Major subgroups of ceramic products include bricks, tiles, ornaments and refractory products. Refractories are ceramic products designed to withstand very high temperatures. As an example, refractory material will be used to line the internal segment of blast and electric arc furnaces to prevent heat damage. Britain's largest refractory business is Vesuvius PLC, a large international supplier of refractories headquartered in London and owning a major factory in Derbyshire.

2.5.3. Glass

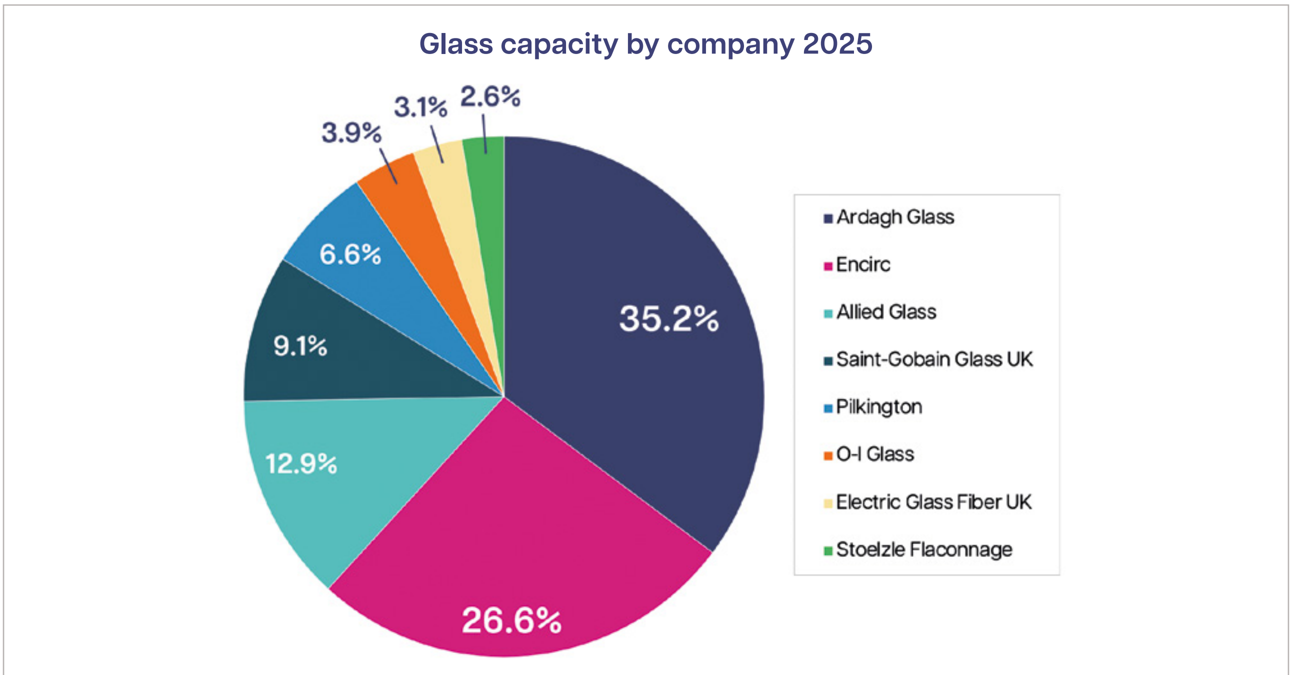
Glass production had a turnover of £4 billion in 2022 (ONS, 2024) and a GVA of £1 billion, employing over 20,000 people directly (UK Research and Innovation, 2021). Glass relies on four main raw material inputs: silica, limestone, soda ash and cullet (recycled and broken glass). Britain is relatively self-sufficient in silica production, producing nearly 5 million tonnes per year, with 40% of this used in glass manufacturing (Silica and Moulding Sands Association, n.d.). Britain is a mild net limestone exporter, but has only one factory based in Cheshire producing soda ash. These raw materials are mixed into a furnace, melted at temperatures of 1,600°C, and moulded into products.

There are various categories of glass: cullet, flat glass, container glass, crystal and tableware, fibreglass, and special glass (British Glass, 2024). About 3 million tonnes of glass is produced domestically in Britain, with a significant amount imported (British Glass, 2024). In 2023, Britain imported 1.1 million tonnes of glass, 800,000 tonnes of which was from the EU. In total, this had a value of £2.2 billion (British Glass, 2024).

The UK has three major flat glass manufacturers: Guardian Glass, Pilkington and Saint-Gobain Building Glass. The UK has six major glass container manufacturers: Allied Glass, Ardagh Group, Beatson Clark, Encirc, O-I Glass, and Stoelzle Flaconnage. Electric Glass Fiber UK, a subsidiary of the Japanese firm Nippon Electric Glass, produces continuous glass fibre.

The total annual glass production capacity is 3 million tonnes, but only 14% is owned by British corporations. The largest suppliers by capacity are the Irish Ardagh Group and Spanish Vidrala (via its ownership of Encirc).

Figure 13. Glass capacity share by manufacturer.



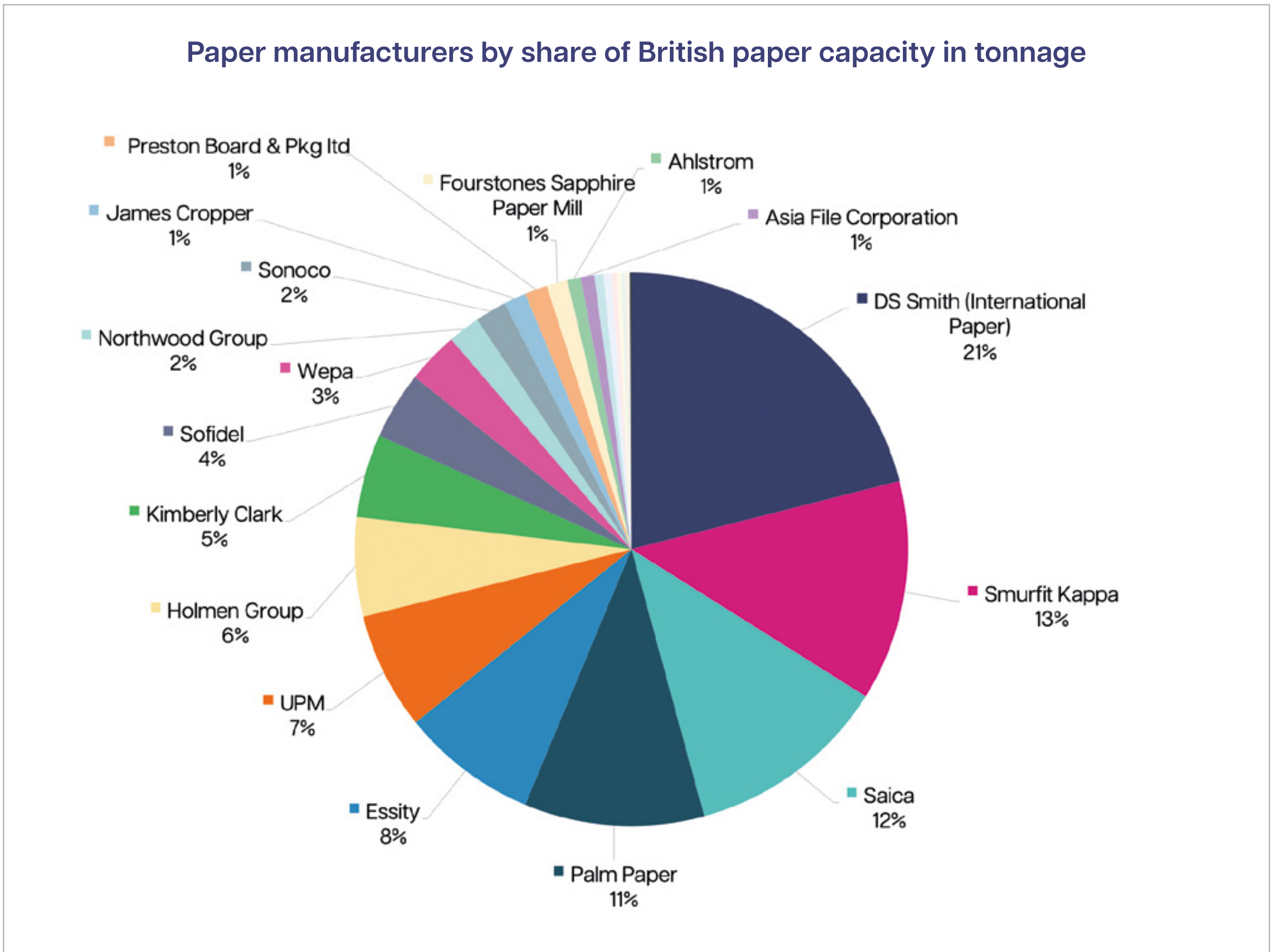
Information collected from company websites and British Glass.

2.6. Biomass

2.6.1. Paper and wood

The British paper industry had, as of 2023, a total turnover of £13.2 billion and GVA of £4 billion (ONS, 2024). It employs over 50,000 people (UK Research and Innovation, 2021). Britain produced 3.5 million tonnes of paper in 2022, versus a total consumption of 7.2 million tonnes (PULPAPERnews, 2024). Production is spread across nearly thirty major producers. The largest producer is DS Smith, which is located in Kemsley, Kent, and can produce 800,000 tonnes per year. In 2025, British paper mills had an annual capacity of roughly 3.8 million tonnes.

Figure 14. Paper manufacturers by share of British paper capacity in tonnage.



Source: Confederation of Paper Industries.

Like other energy-intensive industries, the paper industry has declined recently due to high prices, causing some companies to shut plants permanently. In 2024, the Swedish manufacturer Essity announced the closure of its speciality paper plant in Manchester (Schmidt, 2024).

3. Where are these jobs?

3.1. Parliamentary Constituencies most reliant on jobs in EIIs

As detailed throughout this report, the economic consequences of escalating energy costs are not abstract—they are visible and deeply human. In past decades, entire communities have borne the brunt of industrial decline precipitated by changing economic tides. Businesses operating in energy intensive industries both provide jobs directly in their operations, provide a sense of community and identity, and support even more jobs throughout the local supply chain.

To quantify the impact of high energy prices on different communities, this report collates the locations most at risk of job losses from continued high energy prices by calculating the parliamentary constituencies with the biggest employers in energy intensive sectors.

The constituencies playing host to the most jobs in energy intensive industries includes a range of areas across different nations and regions of the country, with varying demographics and economic trends. These constituencies were all won by Labour at the last General Election, with varying degrees of majority, and include prominent figures such as Yvette Cooper, the Home Secretary, and Stephen Kinnock, the Minister for Social Care.

Each of these areas hosts or historically hosted significant industrial capacity—particularly in steel, chemicals, cement, aluminium, paper, and glass production. These sectors have high energy intensity ratios, making them exceptionally vulnerable to the UK's persistently high input costs. In Scunthorpe, the closure of blast furnaces at British Steel has become symbolic of a broader malaise, with steel production collapsing from over 12 million tonnes in 2013 to just 4 million in 2024. The energy intensity of primary steelmaking exceeds 70% of gross value added, rendering it unsustainable under current price conditions.

Similarly, the chemical complexes of Grangemouth and the refineries in South Wales and the North West have suffered repeated shutdowns. Firms have already mothballed or abandoned operations due to energy costs that make British production uncompetitive on a global stage. Constituencies like Alloa and Grangemouth or Alyn and Deeside have already lost hundreds of high-wage, high-productivity jobs – positions that, once gone, are unlikely to return.

These impacts will ripple outward. The average worker in an energy-intensive manufacturing role earns significantly more than counterparts in retail or hospitality, and these positions often support local supply chains, small businesses, and community infrastructure. In places like Rawmarsh and Doncaster, factory closures not only erode economic output; they diminish social cohesion and identity.

The story of British deindustrialisation is not just one of economic metrics, it is one of lost pride, broken ladders of opportunity, and rising regional resentment.

3.2. Methodology

The data on employment detailed in the following graphs is collected from a range of sources including individual companies websites, financial reports, and investor documents of the companies themselves. Some job figures from smaller companies are collated from news reports in local newspapers. To note, not all companies in energy intensive industries publicly list their workforce levels. As such, these figures should be treated as the best available estimate of employment in EIIs, but as an inherently conservative estimate. The real number of jobs dependent on EIIs throughout the supply chain will be significantly higher than this.

These figures also do not reflect the wider jobs supported across local communities by companies in EIIs. Estimates from the UN (2025) indicate that the manufacturing sector has the largest multiplier effect when it comes to jobs, creating more than double the number of jobs of the non-manufacturing industry, and triple that of the average modern services job. The true levels of jobs supported by EIIs, and thus at risk as a result of continued high energy prices, will be significantly higher than the figures listed below.

> *"The real number of jobs dependent on EIIs throughout the supply chain will be significantly higher than this."*

Figure 15. Which constituencies have the most jobs in energy intensive industries?

Rank	Parliamentary Constituency	Total identifiable workforce	Owner	Subsidiary	Jobs	Sector	Country of Owner
1	Alloa and Grangemouth	2930	Owens-Illinois	O-I Glass	500	Glass	USA
			Ineos / PetroChina	Petroineos	430	Petroleum refining	UK / China
			Ineos	Petrochemical plant	2000	Chemicals	UK
2	Scunthorpe	2835	Jingye Group	British Steel - Scunthorpe	2700	Steel	China
			GFG Alliance	Liberty Merchant Bar	135	Steel	UK
3	Aberafan Maesteg	2530	Tata Steel	Tata Steel - Port Talbot	2000	Steel	India
			Wepa	Wepa	280	Paper	Germany
			Sofidel	Sofidel	250	Paper	Italy
4	New Forest East	2500	ExxonMobil	Esso	2500	Petroleum refining	USA
5	Cardiff South and Penarth	2038	Sev.en Global Investments	7 Steel	2000	Steel	Spain
			HDM Steel Pipe	HDM Tubes	38	Steel	Turkey
6	Brigg and Immingham	1200	Knauf	Knauf UK		Plasterboard	Germany
			Yara	Yara		Chemicals	Norway
			Prax Group	Lindsey Oil Refinery	400	Petroleum refining	UK
			Phillips66	Humber Refinery	800	Petroleum refining	USA
7	West Ham and Beckton	1000	American sugar holdings (ASR Group)	Tate & Lyle sugars	1000	Sugar	USA
8	Penistone and Stocksbridge	959	GFG Alliance	Liberty Speciality Steels - Stocksbridge	959	Steel	UK
9	Ellesmere Port and Bromborough	945	AB Nynas Petroleum/Shell	Nynas/Shell	45	Petrochemicals	UK / Sweden
			Essar	Essar Energy	900	Petroleum refining	India
10	Alyn and Deeside	910	Tata Steel	Tata Steel - Shotton	700	Steel	India
			Kimberly Clark	Kimberly Clark	210	Paper	USA
			Essity	Essity		Paper	Sweden
			Heidelberg Materials			Cement	Germany
11	Newport East	834	Tata Steel	Tata Steel - Llanwern House	600	Steel	India
			GFG Alliance	Liberty Steel - Newport	180	Steel	UK
			Knauf	Knauf UK	54	Plasterboard	Germany
12	Pontefract, Castleford and Knottingley	750	Ardagh Group	Ardagh Glass	200	Glass	Luxembourg
			Verallia	Allied Glass	300	Glass	France
			Stölzle Glass	Stoelzle Flaconnage	250	Glass	Austria
13	Rawmarsh and Conisbrough	750	GFG Alliance	Liberty Special Steels	750	Steel	UK
			Marcegaglia	Marcegaglia - Rotherham		Steel	Italy
14	Runcorn and Helsby	750	Vidrala	Encirc		Glass	Spain
			Ineos	Ineos	750	Chemicals	UK
15	llanelli	650	Tata Steel	Tata Steel - Trostre Works	650	Steel	India
16	Sheffield Brightside and Hillsborough	640	Ministry of Defence	Sheffield Forgemasters	640	Steel	UK
17	Central Ayrshire	625	Ardagh Group	Ardagh Glass	225	Glass	Luxembourg
			UPM	UPM Caledonian	400	Paper	Finland
18	Sittingbourne and Sheppey	580	Knauf	Knauf UK	140	Plasterboard	Germany
			International Paper	DS Smith	440	Paper	USA
19	Chatham and Aylsford	500	Smurfit Kappa	Smurfit Westrock Townsend Hook	500	Paper	Ireland
20	Mid and South Pembrokeshire	500	Valero	Pembroke Refinery	500	Petroleum refining	USA
21	Beverley and Holderness	490	Ineos	Ineos	340	Chemicals	UK
			Mitsubishi Chemical Group	Mitsubishi Chemical Group	150	Chemicals	Japan
22	Redcar	490	Jingye Group	British Steel - Lackenby	400	Steel	China
			Mitsubishi Chemical Group	Mitsubishi Chemical Group	90	Chemicals	Japan
			Alpek Polyester	Alpek Polyester		Chemicals	USA
			SABIC	Petrochemical plant		Chemicals	Saudi Arabia
23	Corby and East Northamptonshire	450	Tata Steel	Tata Steel - Corby	450	Steel	India
24	Newton Aycliffe and Spennymoor	410	Mitsubishi Chemical Group	Mitsubishi Chemical Group	100	Chemicals	Japan
			Ineos	Inovyn	310	Chemicals	UK
25	Christchurch	400	Reid Steel	Reid Steel	400	Steel	UK

Figure 16. Map of the UK showing the constituencies with the most jobs in energy intensive industries

These figures should be treated as the best available estimate of employment in EIIs, but as an inherently conservative estimate. Not all companies publicly list their workforce levels, and these figures also do not reflect the wider jobs supported across local communities by companies in EIIs

4. How have governments tried to mitigate the impact of high energy prices

In the face of high electricity prices for industry and households, governments have been compelled to intervene drastically to save businesses and households from financial hardship. The total net cost of energy support policies in 2023 was £51 billion (Office for Budget Responsibility, 2022), roughly 2% of GDP – or the size of the entire defence budget (Ministry of Defence, 2023). £41 billion of this went to energy bill support for consumers.

In February 2023, the government announced the 'British Industry Supercharger (BIS)'. This expanded package of exemptions for energy-intensive industries is funded through levies on household energy consumers and taxation.

The scheme provides the following exemptions:

- The EII Renewable Levy Exemption Scheme allows energy-intensive companies to avoid renewable levies. The Supercharger has increased available deductions from 85% to 100%, leading to expected reductions of £5 per MWh.

- This scheme now also includes a full indirect exemption from Capacity Market charges. These exemptions began in October 2024 and are expected to reduce costs by £5 per MWh.

- EII Network Charging Cost Compensation. This is compensation for the charges paid for using the electricity grid to reach a £10 per MWh reduction. Compensation will begin in April 2025.

The purpose of the Supercharger is to make Britain's strategic energy-intensive industries more competitive across Europe and tackle the challenge of indirect carbon leakage (Energy Advice Hub, 2023).

The criteria for the exemptions are as follows:

- The Sector Level Test. This means your business must carry out one of the activities the government deems to be eligible. These all have an electricity intensity of at least 7% and are subject to international competitive pressures. The full list of eligible activities is listed in Annex 1 of the official guidance (Energy Advice Hub, 2025).

- The Business Level Test. The business must demonstrate that its electricity intensity is 20% or over – that is, its electricity costs amount to 20% or more of its earnings before taxes, interest, depreciation and amortisation (EBITDA) over a specified reference period.

- The application for EII exemption must include evidence of the proportion of electricity needed to manufacture the product for at least three months.

In 2024, these exemptions offered the potential to see costs reduced by £30 per MWh. The overall annual costs of the scheme are projected to be £320 million to £410 million for the first year (Department for Energy Security and Net Zero, 2024).

These exemptions were put in place because, up until 2023, Britain significantly lagged European countries regarding exemptions for energy-intensive industries. Countries like Germany, France and the Netherlands have been willing to exempt up to 90% of network costs for extra-large energy-intensive consumers of electricity, siphoning the costs onto households instead (Ofgem, 2021).

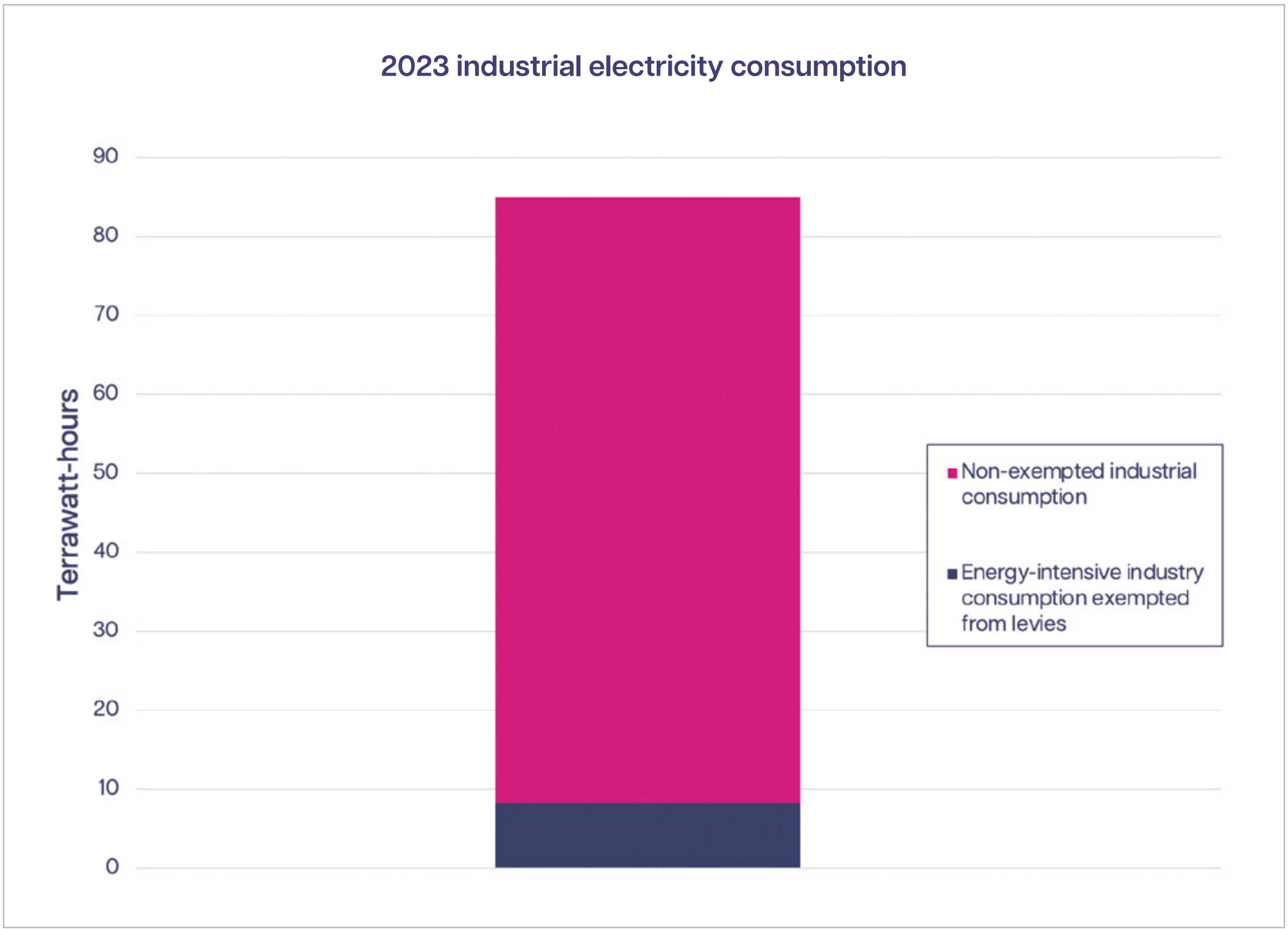
It is debatable whether the Supercharger can close the competitiveness gap with immediate neighbours. In 2021, OFGEM found that German and French energy-intensive industries enjoyed 50% discounts compared to their British competitors, due to exemptions and lower wholesale prices.

The degree to which the Supercharger scheme and exemptions can save British heavy industry is debatable. The average industrial electricity price for extra-large electricity users in the manufacturing industry was £150 per MWh in 2023 (ONS, 2025). Electricity prices for extra-large customers in the non-domestic sector were even higher, at £240 per MWh (ONS, 2025). This category includes large businesses and operations like data centres and hospitals, which are not eligible for exemptions. The energy supercharger assumes a £31 per MWh reduction in costs in 2025 for those eligible parties (Energy Advice Hub, 2025).

Based on this, it is clear that British and European governments have used exemptions as sticking plasters to alleviate the high costs of their electricity bills. The current eligibility criteria are restrictive. For example, if a company combines energy-intensive process manufacturing with high-value-added discrete manufacturing, it can only apply for exemptions on energy used for the former activity. The exemption only applies to a handful of the most energy-intensive industries, but it is more than likely that other sectors will lobby for further exemptions.

The actual scope of exemptions on industrial electricity consumption is limited. In 2023, the total amount of EII-exempted electricity was 8.3 TWh (Low Carbon Contracts Company, n.d.), while the total electricity demand for industry was 85 TWh. For heavy industry (essential metals, mining and quarrying, cement, ceramics, rubber, plastics, paper and chemicals), it was 46 TWh. Based on this, in 2023, exemptions covered 9% of industrial electricity demand and 18% of heavy industrial electricity demand.

Figure 17. Industrial consumption (exempted EII and non-exempted industrial consumption.)



Source: Low carbon contracts company for exempted EII consumption. ONS (Energy Consumption in the UK (ECUK): End Use Tables September 2024 release) for non-exempted industrial consumption.

Following the Supercharger scheme, the amount of exempted electricity increased to 10 TWh in 2024 (Low Power Contracts Company, n.d.). Ultimately, these exemptions are not long-term fixes. As German industrialists have found, shifting the cost of subsidies onto consumers and households does not represent a foolproof strategy for industrial competitiveness. It is also politically challenging to do in perpetuity, as the pain of high costs shifts from producers to consumers.

4.1. What do future trends for industry look like?

According to a 2024 report from the European Roundtable of Industry, European countries are anticipating a permanent long-term rise in wholesale electricity prices (European Round Table for Industry, 2024). From 2013 to 2019, European wholesale prices were €38 per MWh. In 2022, they rose dramatically from €130 to €280 per MWh. By 2030, estimates for wholesale prices range between €50 to €70 per MWh, around double the forecasts for the U.S. and China (European Round Table for Industry, 2024). Given that Britain has generally had higher wholesale prices than its European neighbours and incurs more policy and network costs, it is likely on the current trajectory that Britain will remain an expensive zone in a non-competitive region.

Energy-intensive industries rely on multiple industrial processes, particularly the combustion of fossil fuels for industrial heat and electricity. In line with government targets, most major representatives of these sectors have made various commitments to becoming carbon neutral. The Board of European Industry estimates that full decarbonisation will be astoundingly expensive. For example, it estimates the European cement industry will have to invest 470% of its annual turnover to become carbon neutral, while for chemicals, it is 140%, and for steel, it is 80% (European Round Table for Industry, 2024). Britain faces a similar challenge. The UK Green Steel fund, which plans to invest £3 billion (BBC News, 2024) to electrify steelmaking, is more than the gross value added of the entire industry in 2023 (£2.3 billion) (Jozepa et al, 2025).

From 2021 to 2024, European aluminium manufacturers idled 50% of their capacity (European Round Table for Industry, 2024). After decades of manufacturing maintaining roughly the same level of GVA – despite high energy prices and foreign competition – the inability of British and European businesses to compete internationally is becoming evident.

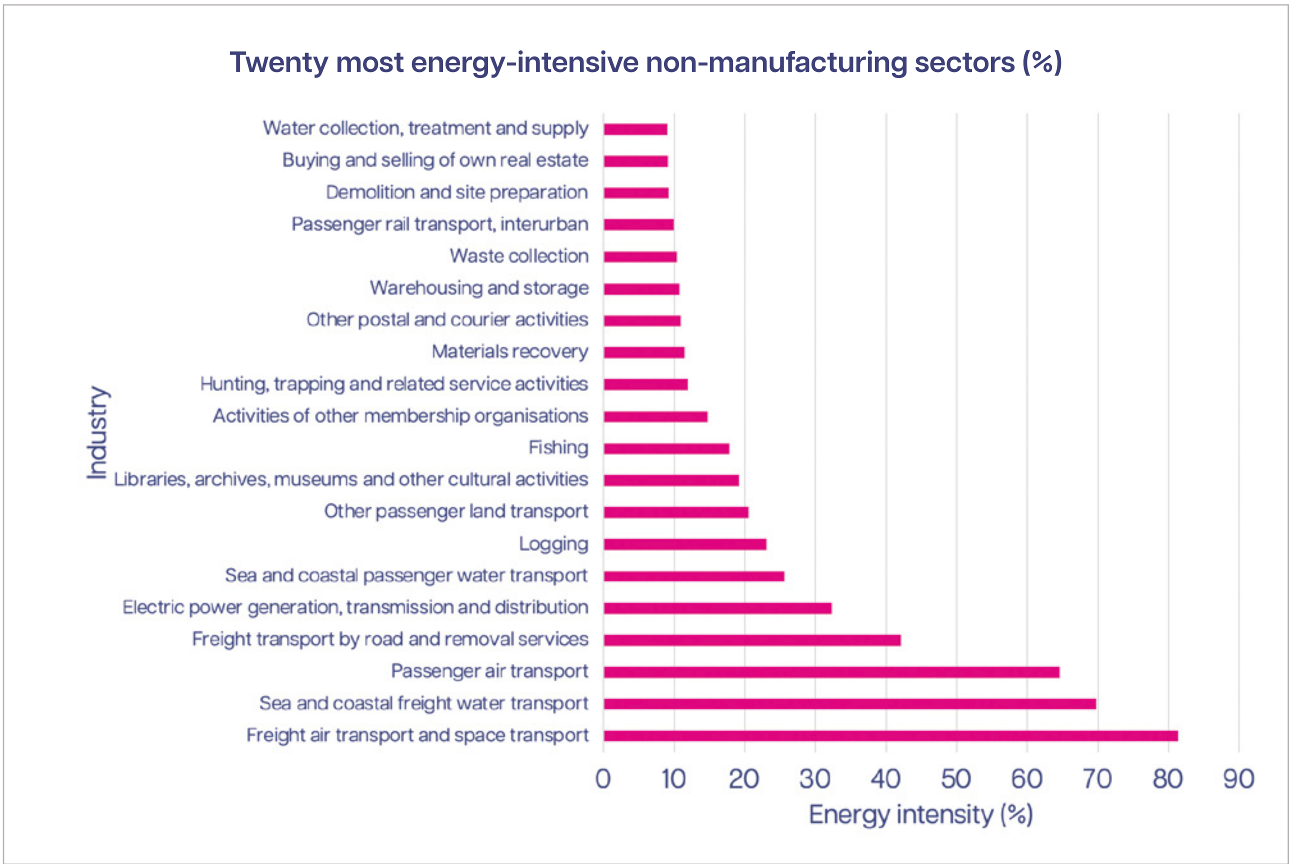
British industry has gone through three stages in the 21st century. Up to 2008, manufacturing GVA increased even as employment fell and net imports rose due to increased exposure to heavily subsidised economies from abroad. Low electricity prices from a grid dominated by gas, coal and nuclear power improved competitiveness. However, offshoring saw manufacturing business investment decrease. After 2008, GVA and business investment recovery was slow, while electricity prices increased, leading to contractions in energy-intensive industries. Thirdly, after the coronavirus pandemic and the Russian invasion of Ukraine, sky-high electricity prices and increased competition from abroad, manufacturing at large is facing declines in output and energy-intensive industries are under existential threat. The trajectory of the 21st century is clear. Without significant changes in government priorities, British manufacturing will decline relatively and in real terms.

4.2. Do high energy prices impact the service sector?

Some argue that manufacturing is not a key part of Britain's economy and that our primary concern should be services. However, high electricity prices are a broad-based dampener of consumption as well as production. According to the ONS, in 2022, during the height of the energy price hike, food and drink services were the most likely to cut trading by at least two days a week (ONS, 2022).

Energy costs are also a significant input cost for all forms of transportation. Regarding GVA, the air freight, sea freight, and air passenger transportation sectors have an energy intensity rate of over 60%. The aviation and shipping sectors are more energy-intensive than chemical manufacturing, which inevitably involves passing on prices to consumers. As seen below, multiple non-manufacturing activities have over 10% of GVA energy intensities.

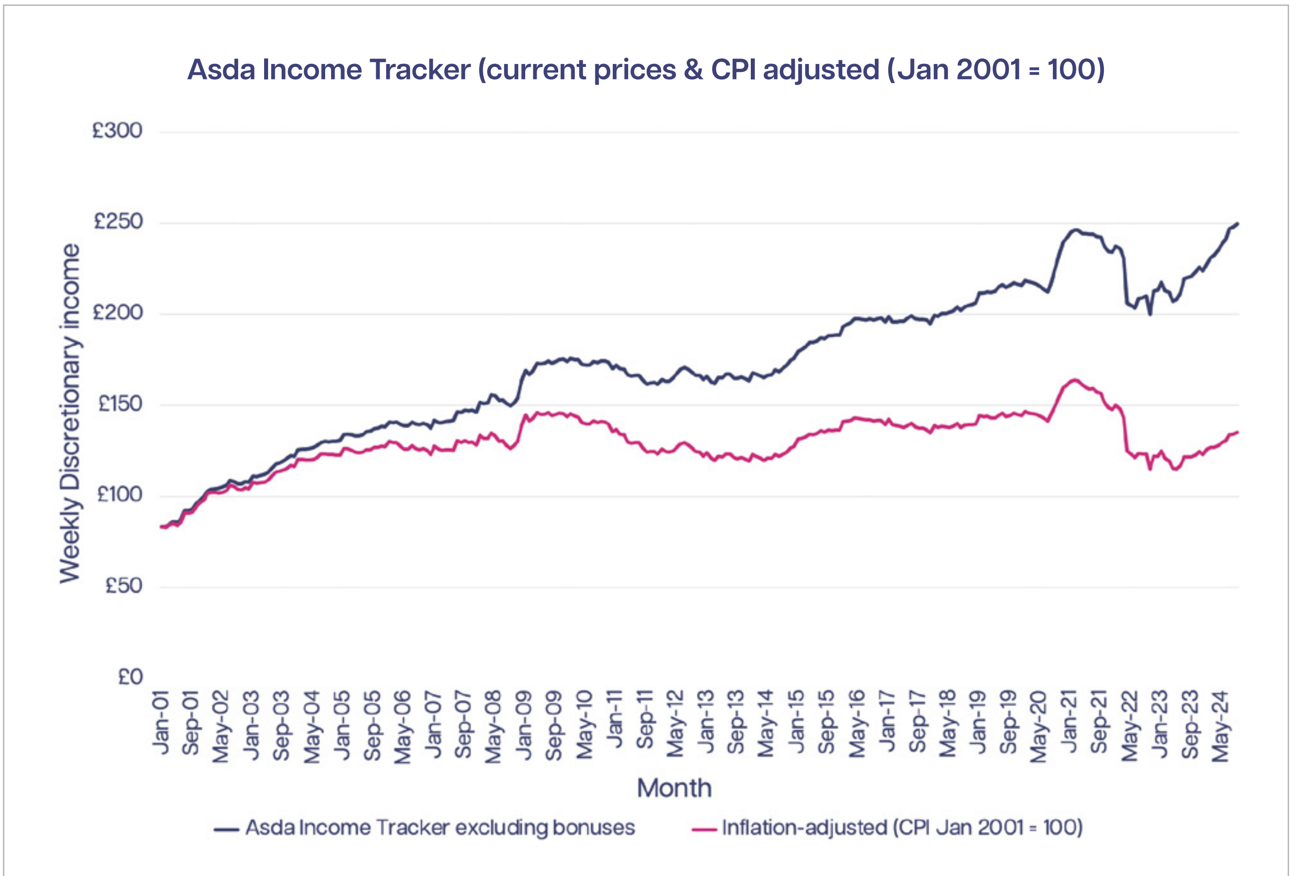
Figure 18. The 20 non-manufacturing industries with the highest electricity intensity.



Source: ONS: Business energy spending: experimental measures from the Office for National Statistics' business surveys

While this paper primarily concerns production, rising energy prices correlate with general wage stagnation and discretionary spending. When looking at the food retailer Asda's Income Tracker and applying the consumer price index to account for inflation, weekly discretionary income stagnated from 2001 to 2024.

Figure 19. Asda Income Tracker in both current and inflation-adjusted prices.



Based on information collected by Asda. Inflation is calculated from CPI data, with January 2001 = 100.

4.3. How will energy prices impact emerging sectors like data centres?

While the British economy has weathered high energy prices, it has fallen behind in high-growth sectors critical to future industrial growth. One example is data centre capacity. Data centres are susceptible to electricity costs because electricity ranges from between 40% and 60% of operating costs (International Data Corporation, 2024).

Computing is demanding ever more electricity, particularly as data centres are being tasked with training increasingly complex artificial intelligence programs. From 2022 to 2030, according to Grid Strategies, U.S. data centre capacity is expected to grow from 17 GW to 45 GW (Wilson & Zimmerman, 2023). This estimate entails data centres growing to nearly 8% of total U.S. electricity demand (Wilson & Zimmerman, 2023).

Large data centres are central to modern computing. Artificial intelligence workloads, including natural language processing, large language models (LLMs), computer vision, and other programs, are completed in large data centres, often referred to as clusters or superclusters. They require specialised hardware called AI accelerators. These accelerators, either in the form of graphics processing units (GPUs) or application-specific integrated circuits (ASICs), are housed in their thousands across hundreds and even thousands of specialised servers. As of early 2025, 80% of AI accelerators are sourced from Nvidia (Tran, 2025).

One way to measure data centre capacity is by combining the thermal design power of all the GPUs or ASICs in a cluster. Thermal design power (TDP) measures the maximum amount of heat a chip will safely produce under a workload, measured in watts. This indicates raw performance and the cooling required to keep the system running. TDP is not equivalent to the total power supply needed to power a cluster but is a significant component of it.

Grok-3, an LLM developed by Elon Musk's xAI, was trained on 100,000 Nvidia H100 chips at a data centre in Memphis, Tennessee. These chips have a TDP of 700 W, meaning xAI's Memphis cluster had a TDP of 70 MW (Wang, 2025). Additional power requirements include memory, storage, networking overhead, and power required for cooling and non-IT equipment.

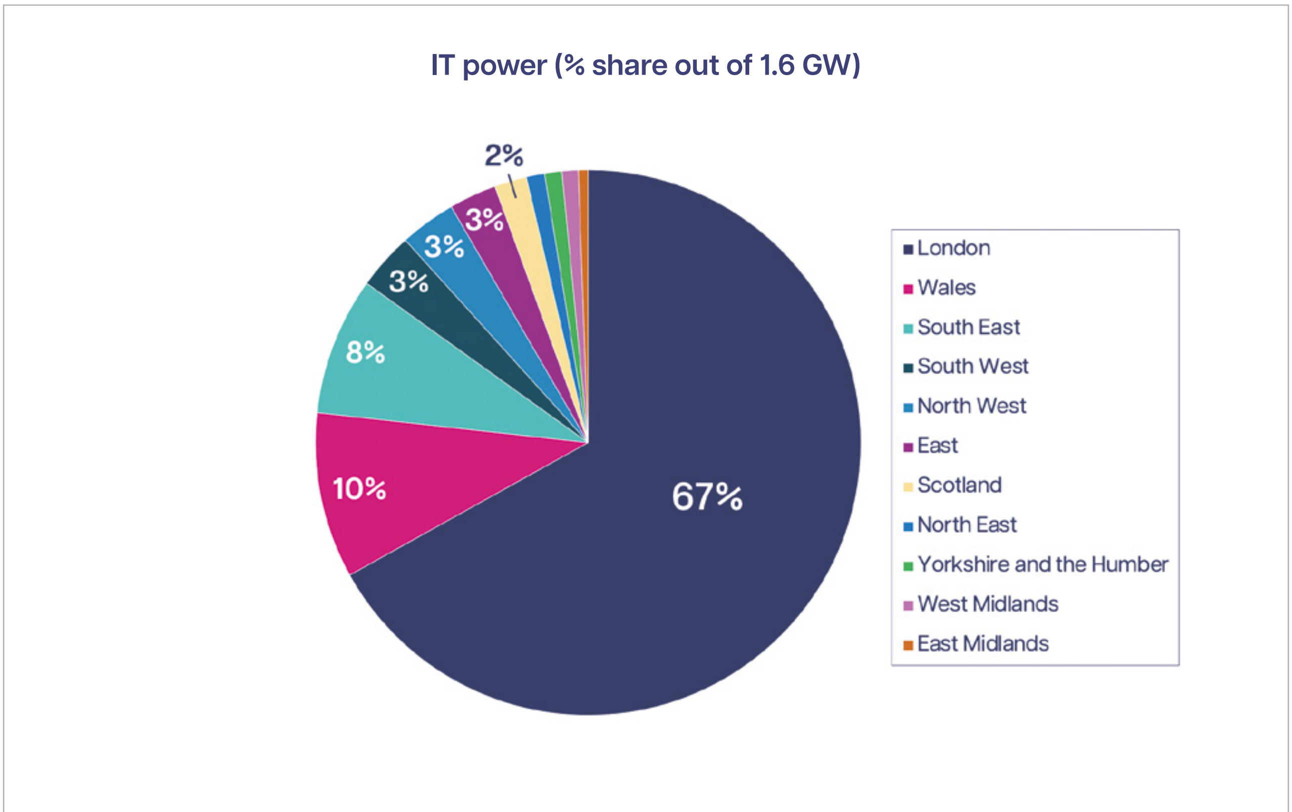
The power usage effectiveness (PUE) ratio, widely used by data centre operators, measures IT-specific consumption as a share of total data consumption. In most modern data centres, the PUE is around 1.2 to 1.5, meaning that for every 1MW of electricity needed for IT equipment, 0.2 to 0.5MW is required for cooling or other non-IT needs.

xAI's total demand for 100,000 chips was estimated to be 150 MW (Wang, 2025). A further 100,000 was added in late 2024, increasing demand to 250 MW (Wang, 2025). The company's plan for 2026 is to add hundreds of thousands more chips to reach a total electricity demand of 1.2 GW (Wang, 2025). Numerous other companies are building similarly large AI clusters in the U.S., including Open AI, Alibaba, Oracle, Meta, Microsoft and Google.

AI-specific data centres are a growing component but only part of overall data centre activity. By the end of 2025, ABI Research projects over 6,000 public data centres worldwide (ABI Research, 2024). As of 2023, Google had the largest operational data centre capacity, at 3.5 GW, more than double Britain's current capacity of 1.6 GW (Ozsevim, 2023).

Britain has many data centres, mainly located around London and the M25. Measured in terms of the maximum rated IT load of colocation data centres, London accounts for 67% of the UK's data centre capacity (UK Parliament, 2025). As of 2024, the country has 1.6 GW of data centre capacity. For context, the world's largest data centre cluster in Northern Virginia has a capacity of nearly 5 GW. As of early 2025, the U.S. has a total of 25 GW of data centre capacity, and an additional 55 GW is expected to be needed by 2030 (Bloom Energy, 2025).

Figure 20. Regional Data Centre Capacity 2024.



Source: UK Written questions, answers and statements

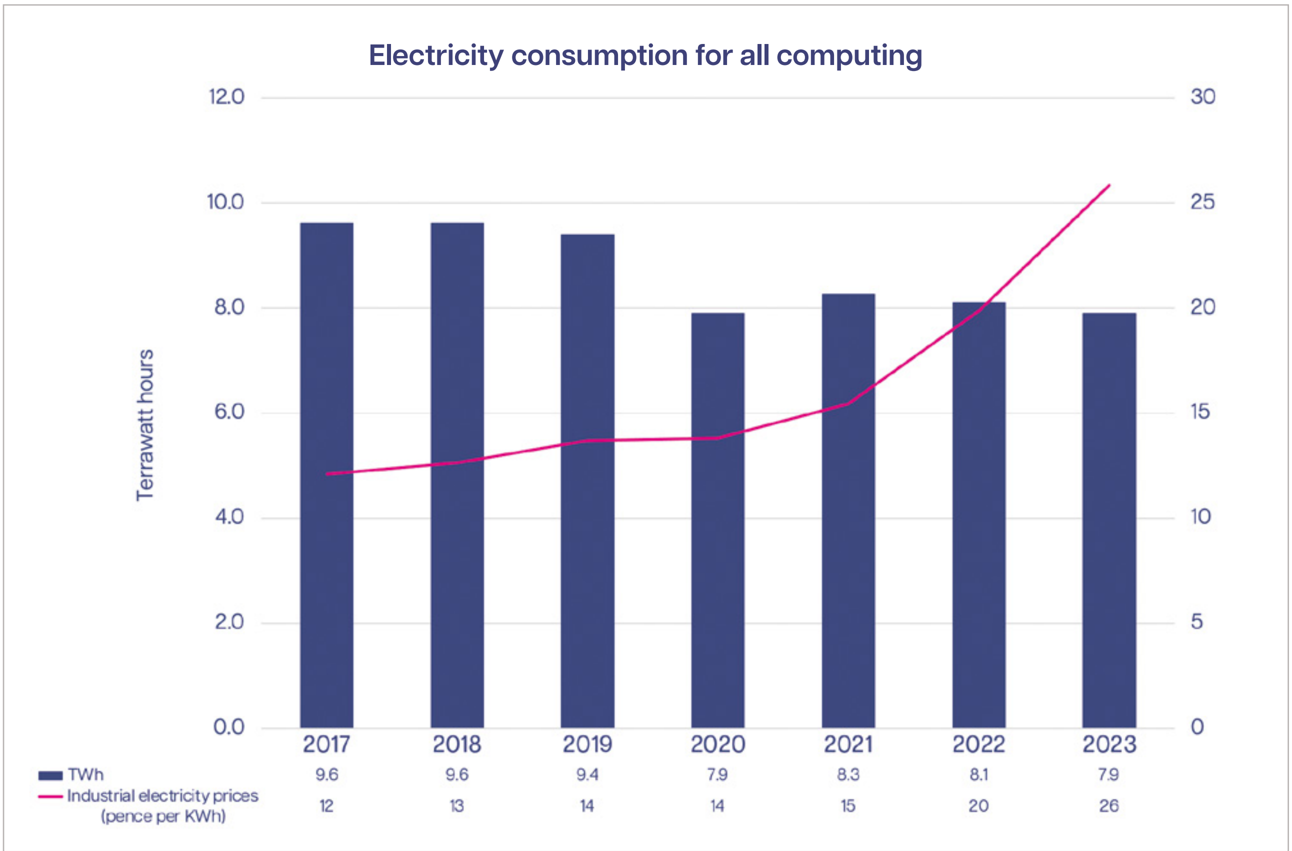
Britain's data centre electricity consumption is not fully understood. When looking at electricity end use for computing services, data centre energy consumption appears to have declined by 17% from 9.6 TWh in 2017 to 7.9 TWh in 2023 (Department for Energy Security and Net Zero, 2024). The National Energy System Operator (NESO) reported data centre consumption was 3.5 TWh in 2020 and projects it could increase tenfold to 35 TWh by 2050 (National Grid Electricity System Operator, 2022). Bloomberg New Energy Foundation estimated British data centre consumption at 7.2 TWh in 2021 (Kamiya and Bertoldi, 2024). Independent Commodity Intelligence Services (ICIS) estimates British data centre electricity consumption is 13 TWh annually as of 2025 (ICIS, n.d.).

By contrast, ICIS reported that Germany had data centre consumption of 21 TWh, meaning Britain is the second largest data centre market in Europe (ICIS, n.d.). The Borderstep Institute estimated that data centres in Germany consumed 14 TWh in 2018, increasing to 18 TWh in 2022 (Kamiya & Bertoldi, 2024). For France, The French Environment Agency (Ademe) estimated that data centre consumption was 11 TWh in 2020 (kamiya & Bertoldi, 2024). Data centres in the Netherlands consumed 6.3 TWh in 2021.[3] For Ireland, it was 5.25 TWh in 2022 (Kamiya & Bertoldi, 2024).

Due to its early adoption, Britain has been a strong market for data centres in Europe. However, differences in energy prices are looking to reduce our competitive advantage. ICIS projects that, by 2035, British data centre consumption will be overtaken by French demand. It would also be less than the combined demand from Norway and Sweden, two sparsely populated countries with very low energy costs that expect to become significant data centre hubs (ICIS, n.d.).

Further afield, data centres are being built on an entirely different scale. Data centre growth in the U.S. is most notable. From 2018 to 2023, data centre energy consumption more than doubled from 76 TWh to 176 TWh, rising from 2% of national electricity consumption to over 4% (Shehabi et al , 2024). In Japan, data centres consumed over 20 TWh of electricity in 2021 (Kamiya & Bertoldi, 2024). In China, data centres consumed an astonishing 237 TWh in 2021 (Zhang & Wang, 2024).

Figure 21. Electricity consumption for all computing services from 2017-2023 and electricity prices in pence per KWh.



Source: Department for Science, Innovation and Technology (DSIT): Estimate of Data Centre Capacity: Great Britain 2024 / Department for Energy Security and Net Zero: International industrial energy prices

Relative electricity prices impact where companies are willing to invest in data centres. XTX Markets, founded in 2015 by Russian-born British entrepreneur Alex Gerko, relies on energy-intensive data centres to process AI programs designed to create pricing forecasts for various securities. For this, XTX has relied on a specially designed supercomputer with over 25,000 AI accelerator chips located in Iceland. The small Nordic island nation has one of the lowest electricity prices for enterprises in the world, at $0.08 per KWh, compared to $0.52 for Britain (Statistica Research Department, 2024). In early 2025, XTX announced a £1 billion investment in a new data centre complex in Kajaani, Finland (Irrera & Lee, 2024). The country, which gets 60% of its electricity from nuclear and hydroelectric power, has some of the cheapest industrial electricity in the developed world. In 2023, its average price was £0.07 per KWh, versus £0.26 per KWh for Britain.

In 2025, the BCS Institute released a survey of data centre operators. Over 70% of surveyed companies cited the availability of power as the most important determinant of where they would invest, well ahead of other factors like skills, land price, total build cost, access to fibre-optic network, or political stability (Hart, 2025). Some 84% of respondents reported that they expect their power consumption levels to rise over the next three years (Hart, 2025).

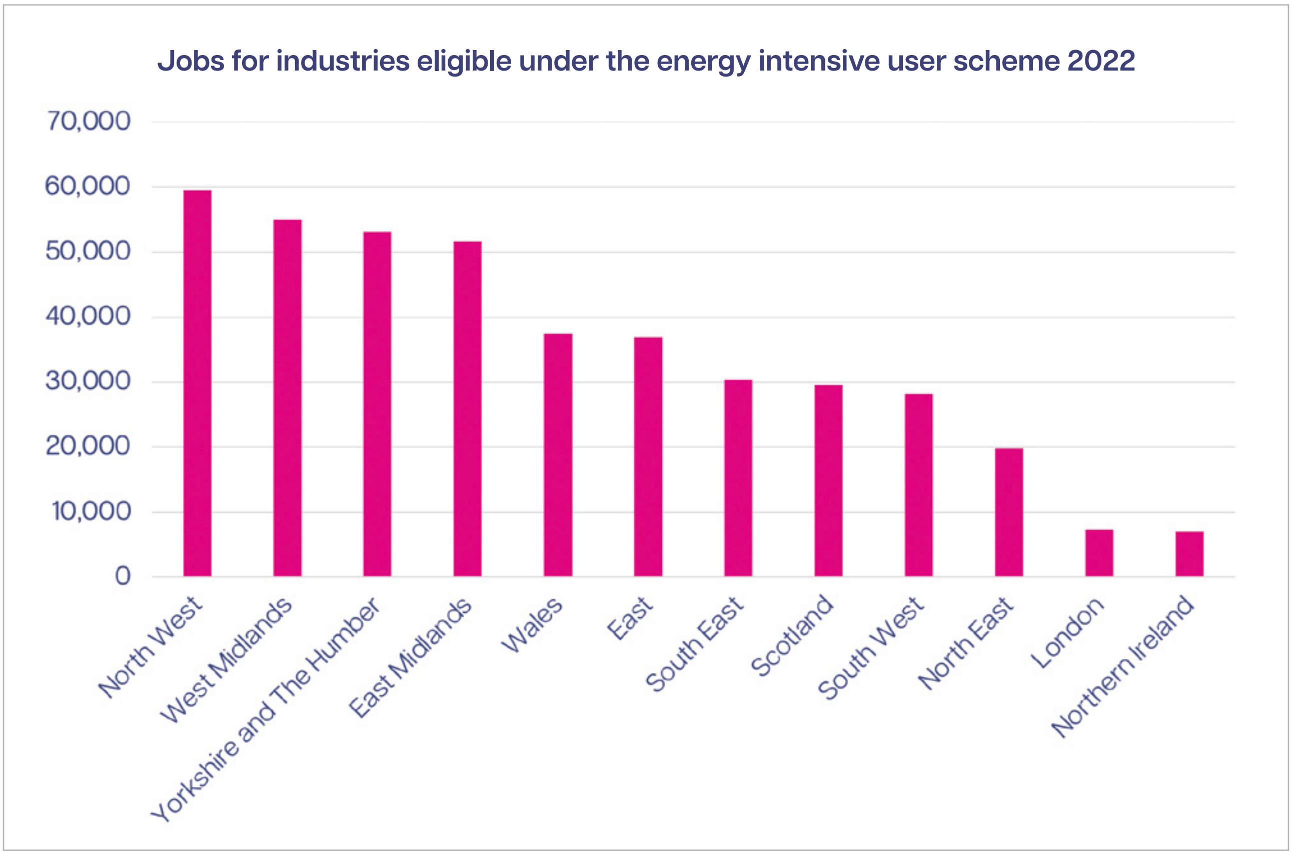
The Chinese startup Deepseek's release of the R1 large language model, and Alibaba's Qwen 2.5-Max model in January 2025 has briefly led to questions about whether such large energy consumption levels can be expected. This is based on their impressive energy efficiency gains over existing U.S. LLMs. For example, Deepseek R1 (based on the V3 model) took 800 MWh to train, versus 1300 MWh for Chat GPT-3 (Young, 2025). Efficiency gains such as these are unlikely to undermine projected growth in energy demand since the overwhelming future AI-related electricity demand will come from inference, meaning the continual running of models rather than their training (Young, 2025).

With the future of software development being increasingly energy-intensive, countries with low electricity prices stand to gain, and high-price jurisdictions stand to lose. While British AI developers can outsource training to third parties, being utterly detached from computer infrastructure will negatively impact Britain's broader artificial intelligence ecosystem in the long term.

4.4. The energy-intensive industry's contribution to jobs

Eligible energy-intensive industries include those that can access exemptions from energy levies. Overall, there were 416,000 energy-intensive industry jobs in 2022, amounting to 17% of total manufacturing employment (ONS, 2025). The industry is geographically spread, with the North, the Midlands, and Wales having the most employment. 57% of energy-intensive jobs are in the North of England and the Midlands.

Figure 22. Energy Intensive Industry (EII) jobs by region.



Source: NOMIS

While making up 17% of manufacturing jobs, the EII sector makes up 25% of manufacturing turnover. In 2023, the EII sector had a turnover of £170 billion, versus a total manufacturing turnover of £670 billion (ONS, 2024). The EII sector also accounted for 18% of manufacturing GVA in the same year. For context, the Low Carbon Renewable and Energy Efficient Economy (LCREE) is the Government's assessment of economic activity directly related to achieving net zero. In 2022, the LCREE had a turnover of £69 billion, but 56% came from construction, electricity, gas and steam supply. Only 28%, or £20 billion in turnover, came from LCREE manufacturing. Therefore, based on turnover, the energy-intensive industries (EII) sector is 8.5 times the size of the much-vaunted "green industrial revolution" expected to rejuvenate British manufacturing. The turnover from LCREE manufacturing is lower than that of the rubber and plastics industry alone.

5. Conclusion

Britain has a well-developed manufacturing base, much of which is energy-intensive and reliant on low, stable energy prices. The sector employs nearly 500,000 people and pays good wages across the country. However, the industrial base already operates in a challenging global environment, where overproduction from countries like China is saturating supply and putting massive pressure on Western manufacturers.

Since 2004, British industrial electricity prices have trended above the norm in developed countries. More recently, they have become unsustainable. The current raft of exemption measures can barely mitigate their impact. British manufacturing capacity has declined sharply since the coronavirus pandemic. Given our uncompetitive energy prices, it has limited scope to recover.

High electricity prices mean a lopsided economy skewed towards London, dwindling employment opportunities across the country, and diminished production. This is detrimental to the country's account balance, regional inequality, and state capacity, particularly when the government seeks to increase defence spending. As this report shows, high energy costs threaten both existing jobs and jobs of the future, so energy prices need to be brought down.

Key statistics

- For 2024, a very large British industrial electricity consumer (over 70 GWh per annum), the cost of electricity was 150% that of a German competitor, 260% that of a French competitor and 320% that of a Swedish competitor (DESNZ).
- In 2023, the British energy-intensive industrial sector employed nearly 416,000 people, had a turnover of £170 billion, and a gross value added of £36 billion. This is roughly twice the employment, turnover, and value of the low-carbon, renewable, and energy-efficient economy, which is expected to be the primary source of future economic growth under the government's plans to achieve net zero.
- In 1999, Britain had the fourth-largest manufacturing base in the world in terms of gross value added. Today, it is eleventh and falling sharply. In inflation-adjusted terms, there has been little growth in manufacturing turnover or gross value added since 2006.
- British industrial electricity prices were most competitive in 2004, at 0.059 pence per KWh (in 2023 prices), which was cheaper than the EU average. In 2023, they were £0.26 per KWh, 60% above the European average and nearly 400% higher than the U.S. and China.

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A message from our CEO, Georgiana Bristol

“We are building a coalition of business leaders and entrepreneurs from across the country; all uniting behind the message that a successful society requires successful businesses.

We want to help business leaders do even more to help their local communities, by sharing best practice about employing and training people from less privileged backgrounds and demonstrating that business is a force for good. We also want to hear evidence and practical examples from business about what policy changes they require in order to thrive and do even more good across society. To do this, we need your support by joining our Business Council.

Membership of our Business Council is free, voluntary, and private, and comes with no formal obligations or requirements.

As a member, you’ll be invited to our events where we host speakers from the worlds of business, politics, the third sector and the media. This gives members the opportunity to hear from exciting figures and meet with like-minded individuals working in business. You’ll receive regular updates through our newsletter, and you’ll also be able to feed into our research programme. Finally, we love to publicise success stories from our Business Council members across our networks and highlight examples of great work.

We’d love you to be part of our journey.”

For any questions, please get in contact with Georgiana at 02034751382 or georgiana@thejobsfoundation.com

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"High energy prices are doing real damage to industries across Labour's heartlands, putting high-skilled and high-paid jobs at risk. To help rebuild our industrial base as we pursue a jobs-first transition to Net Zero, we must see our domestic energy sector supported to keep good British jobs and bring down the cost of energy for UK industry".

Henry Tufnell, Labour MP for Mid and South Pembrokeshire

"The impact of persistently high energy costs is doing untold damage to British businesses. If we don't get serious about tackling the cost of energy, we won't just lose industries, we'll lose the chain of businesses that sustain our economy".

Simon Boyd, Managing Director of REIDSteel

"High energy costs are not just an immediate financial burden, they're a barrier to future investment, expansion, and job creation. The UK urgently needs a level playing field if it wants to retain and grow its industrial base and protect high-skilled and well-paid jobs".

Chris Seymour, Managing Director of William Cook Holdings

"Businesses across both the hospitality and retail sectors are being crippled by the high cost of energy. If we continue at this rate, the hospitality sector will find it harder and harder to support the UK's high streets and create good employment".

Luke Johnson, Chair of Revolution Bars

"Every time we lose skilled jobs in the North Sea, we weaken our energy security, push up costs for businesses, and abandon communities that have powered this country for generations. This report is a wake-up call for policy makers to work more closely with industry and workers to develop a long-term plan to safeguard British jobs and resources in the national interest".

George Reed, Managing Director of Oberon Solutions Scotland

"The UK is well-positioned to lead in the development of next-generation data centre infrastructure, but rising energy prices are making it increasingly challenging to build and operate data centres competitively. A stronger policy framework is needed to ensure the UK remains globally competitive by recognising the strategic importance and energy demands of digital infrastructure".

Mark Pestridge, Executive Vice President & General Manager of Telehouse Europe