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Fraser of Allander Institute
The Aluminium Industry in the UK

ALFED
ALUMINIUM FEDERATION

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Disclaimer

The analysis in this report has been conducted by the Fraser of Allander Institute (FAI) at the University of Strathclyde. The FAI is a leading academic research centre focused on the Scottish economy.

The report was produced in 2022 in partnership with the Aluminium Federation UK.

The analysis was undertaken independently by the FAI. The FAI is committed to informing and encouraging public debate through the provision of the highest quality analytical advice and analysis. We are therefore happy to respond to requests for technical advice and analysis. Any technical errors or omissions are those of the FAI.

Executive Summary

The aluminium industry is a vital part of the UK manufacturing sector. The strategic importance of this lightweight and highly recyclable metal looks set to increase as the UK economy moves towards more sustainable and circular models of production and consumption.

In this second instalment of our wider aluminium industry report, we update our estimation of the contribution of the wider aluminium industry with the most recent data and expand the scope by including a larger share of aluminium castings. We also discuss our efforts in, and the challenges of, estimating the economic contribution of aluminium to the UK automotive sector. We estimate the gross value added (GVA) contribution of aluminium in UK passenger vehicles to be approximately £1 billion. We however caution the official use of this figure in the absence of more detailed data.

COVID-19 had a predictably negative effect on the output of the wider aluminium industry in 2020. Despite this, our estimation of the direct GVA contribution from the wider aluminium industry has remained similar to the figures we previously presented for 2019.

Economic indicators for the wider aluminium industry

- The wider aluminium industry directly employs 39,000 people across the UK, with the largest share of those employed located in the West Midlands.
- The wider aluminium industry directly contributes around £2.9 billion in GVA to the UK economy.

Economic impact of the wider aluminium industry

The wider aluminium industry is closely tied to many other parts of the UK economy. The production and manufacturing of aluminium goods requires purchasing from suppliers, supporting output, and employment across the UK.

Our economic model of the UK has been used to estimate the amount of economic activity supported directly and through spill-over impacts. We find the wider aluminium industry:

- Supports the employment of 104,000 full-time equivalent (FTE) jobs across the UK.
- Supports the contribution of £7.4 billion in GVA.

Introduction

The aluminium industry is an essential component of the modern UK economy. Aluminium is a lightweight metal with diverse applications which is highly recyclable and is likely to play a critical role in the UK's transition to a more sustainable future.

This report aims to provide an economic overview of the wider aluminium industry, which we define as aluminium production (SIC 24.42), plus a range of aluminium products classified in other industries but directly related to aluminium. Products with aluminium components and several aluminium products could not be included in the wider aluminium industry definition due to insufficient data. These products are classified as part of the extended aluminium industry.

Table 1: Products included in aluminium industry definition

Industry	Constituent SIC	Includes products such as
Narrow aluminium industry	Aluminium production SIC 24.42	Aluminium alloy bars, rods, profiles and hollow profiles (24422250), Aluminium tubes and pipes (24422630), Unwrought non-alloy aluminium (24421130)
Wider aluminium industry	Aluminium production SIC 24.42 + Aluminium products found and quantified in 15.12, 24.43, 25.11, 25.12, 25.29, 25.92, 25.93, 25.99 and 29.32	Aluminium prefabricated buildings (25111050), Aluminium structures (25112370), Metal containers for compressed or liquefied gas (25291200), Casks, drums, cans, boxes (25921240), Aluminium aerosol containers, with a capacity 300 litres or less (25921260), Nails, tacks, drawing pins, corrugated nails and staples (25931400), Aluminium sanitary ware (25991137), Road wheels and parts (29323040)

Industry	Constituent SIC	Includes products such as
Extended aluminium industry	Aluminium products found under SIC codes where it was not possible to quantify aluminium content + Products which are likely to be aluminium and are not specifically labelled as such under SIC codes	Light metal castings for land vehicles (24531010), Articles of aluminium (25992955), Capsules of aluminium (25921350), Bumpers and parts for motor vehicles (29323010), Parts and accessories of vehicle bodies (29322090), Brakes, servo-brakes and their parts (29323020), Suspension systems for motor vehicles (29323050), Radiators and their parts for motor vehicles (29323061), Steering wheels, steering columns, steering boxes and their parts for motor vehicles (29323067), Other parts and accessories, not elsewhere classified, for motor (29323090), Frames and forks for bicycles, other non-motorised cycles and side cars.

We use our classification of the wider aluminium industry seen in the second row of Table 1 to provide a snapshot of the industry in terms of its contribution to the economy through gross value added and employment.

In this report, we use the FAI UK Hypothetical Extraction Model (HEM) to estimate the importance of the wider aluminium industry. This task requires considering the interconnectedness of sectors within the economy and analysing spill-over effects that occur from changing the spending patterns of producers.

One of the main aims of this report was to estimate the economic contribution of aluminium in the UK automotive sector to the UK economy. We discuss in detail the challenges encountered and report the progress made. This report also includes a section in which we discuss the limitations of domestic production data and suggestions to improve the data infrastructure.

The FAI produced this report in collaboration with the Aluminium Federation (ALFED). ALFED represents producers and other key stakeholders operating within the wider aluminium industry.

The remainder of the report is organised as follows -

- Section 1 presents an economic overview of the wider aluminium industry;
- Section 2 discusses the economic impact of the aluminium industry;
- Section 3 explains the challenges of assessing the contribution of aluminium in the automotive sector;
- Section 4 details the methodology used in our estimations;
- Section 5 highlights key assumptions, limitations, and next steps;
- Section 6 concludes the report.

1. The Wider Aluminium Industry

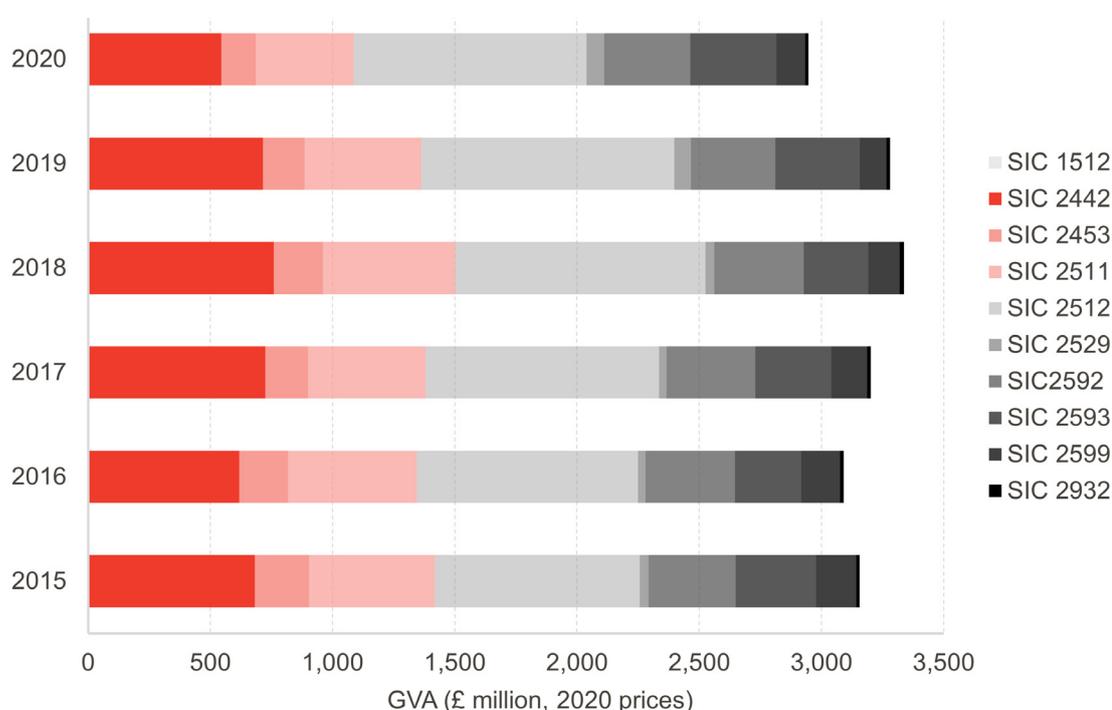
GVA

GVA is a measure of the economic contribution of a firm or industry to the economy. Economists often consider GVA the preferred economic indicator for assessing the importance of a particular sector or industry to the economy.

In 2020 the wider aluminium industry contributed approximately £2.9 billion in GVA to the UK economy, of which aluminium production (SIC 24.42) made up £683 million.

Chart 1 highlights that, wider aluminium industry GVA was lower in 2020 than any other year since 2015. We estimate that between 2019 and 2020 GVA decreased by approximately 10%. This decrease was likely driven by the restrictions put in place to limit the spread of COVID-19.

Chart 1: Wider aluminium industry GVA, 2020 prices



Source: ONS

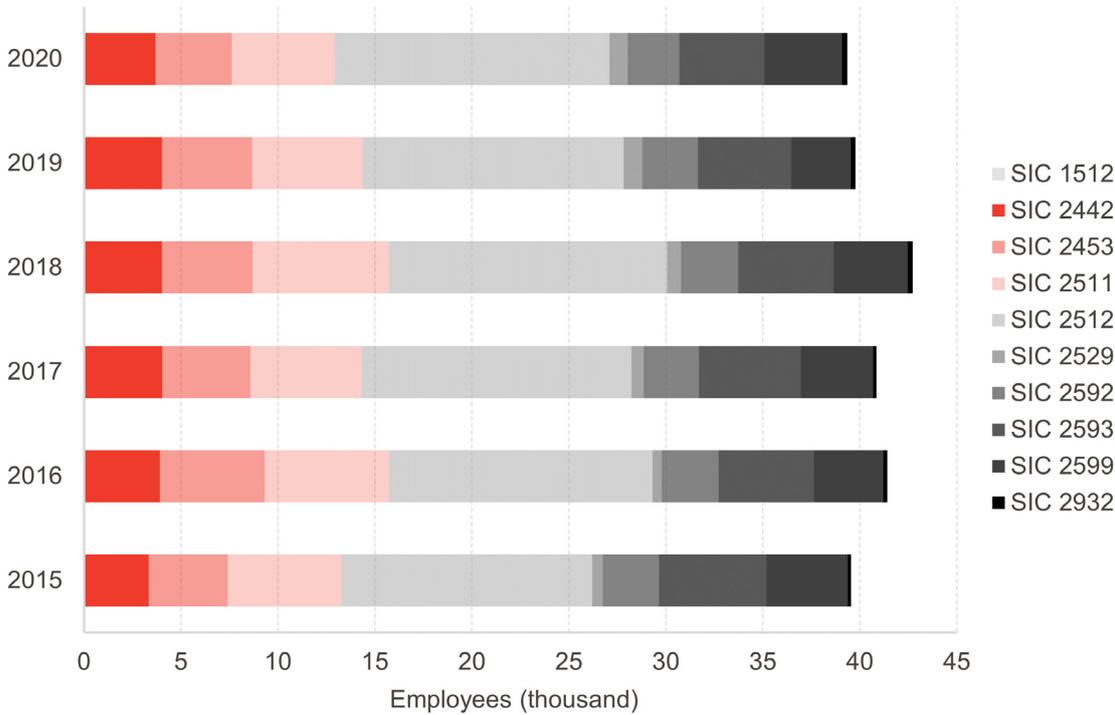
Excluding the significant change between 2019 and 2020, the yearly variation in GVA is likely driven by measurement error due to suppressed values in production data.

In 2020, aluminium production alone accounted for 21% of the total wider aluminium industry GVA. Significant contributions also come from sales of aluminium products such as aluminium doors, thresholds for doors, windows, and window frames. These products, classified under SIC 25.12, account for the largest share (32%) of wider aluminium industry GVA. Since 2015, growth in SIC 25.12 has outpaced most other product groups in the wider aluminium industry.

Employment

In 2020 the wider aluminium industry directly employed around 39,000 people across the UK. Chart 2 shows how employment has changed between 2015 and 2020. Notably, the chart shows that wider aluminium industry employment did not experience as large a decrease as was seen with GVA between 2019-2020. The extensive Coronavirus Job Retention Scheme (CJRS) likely played a significant role in minimising reductions in wider aluminium employment through this period.

Chart 2: Wider aluminium industry employment (FTE), 2015-2020



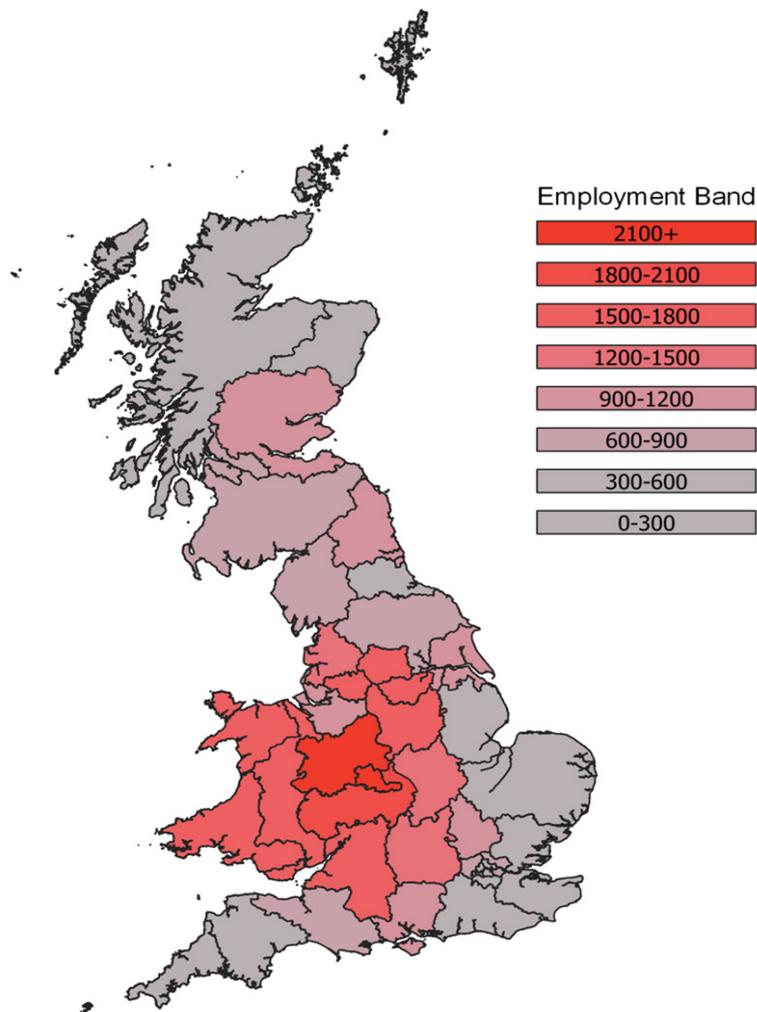
Source: BRES

Employment in the wider aluminium industry experienced a slow growth of around 8% between 2015 and 2018. However, data from 2019 and 2020 reveal that the number of those employed in the industry has returned to the 2015 level.

Aluminium production (SIC 24.42) alone accounts for approximately 3,700 of those employed in the wider aluminium industry. This number represents a slight decrease from the 4,000 employed in the years prior.

Diagram 1 and Chart 3 show how industry employment is distributed across the UK using NUTS 2 regions. In Diagram 1 the darkest red areas represent the highest concentration of industry employment. The largest share of wider aluminium industry employment is located in the West Midlands, where approximately 9% of those employed in the industry are located.

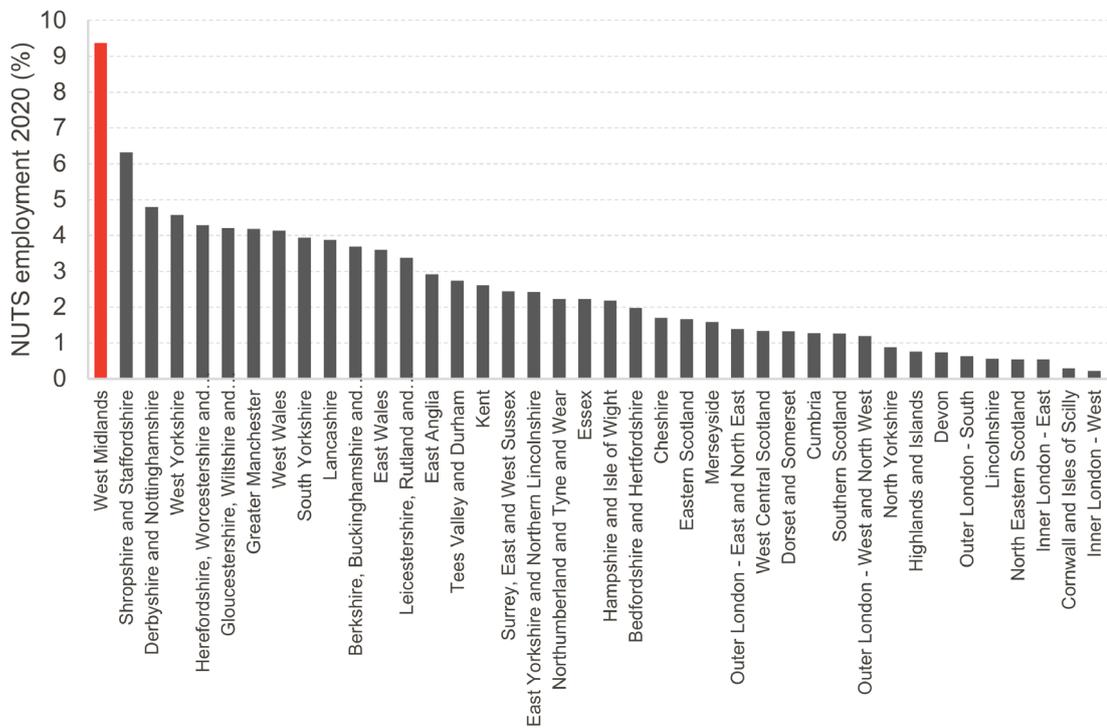
Diagram 1: FTE employment in the wider aluminium Industry in 2020 (count), NUTS level 2



Source: BRES

The red bar in Chart 3 highlights the importance of the West Midlands to the wider aluminium industry. Shropshire, Staffordshire, Derbyshire and Nottinghamshire are other regions where wider aluminium industry employment is highly concentrated.

Chart 3: FTE wider aluminium industry employment in 2020 (%), NUTS level 2



Source: BRES

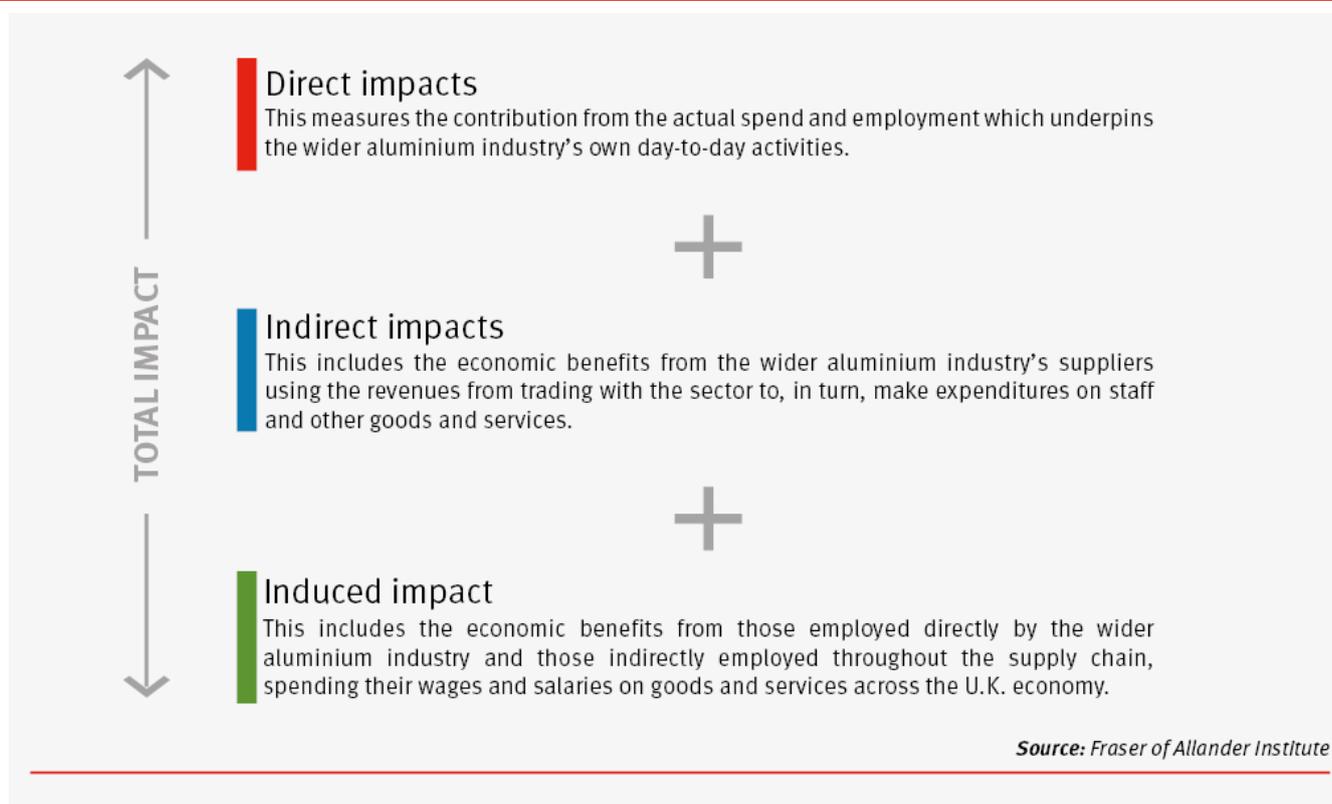
2. The Economic Impact of the UK Aluminium Sector

In this section, we apply a hypothetical extraction model (HEM) to assess the wider aluminium industry's overall impact on the UK economy.

The HEM is an analytical tool that allows for the simulated removal of the wider aluminium industry from the economy. By observing and calculating the changes that occur when this happens, we can estimate the impact that the wider aluminium industry has on the UK economy.

In our model we observe three different types of impact when removing the industry from the economy - direct, indirect, and induced.

Diagram 2: Direct, Indirect and induced impacts



Results

Our model's estimate of the impact to the UK economy in terms of GVA and employment, supported by the wider aluminium industry in 2020, is shown in Table 2.

The HEM model produces a slightly larger figure than our detailed calculation using ONS data.

The wider aluminium industry directly contributes approximately £3.26 billion to the UK economy.

This figure does not capture the indirect or induced impacts of the industry on the rest of the UK economy. When spill-over effects are included, the total contribution of the wider aluminium industry to the UK economy is around £7.4 billion.

Table 2: Economic Impact of the wider aluminium industry

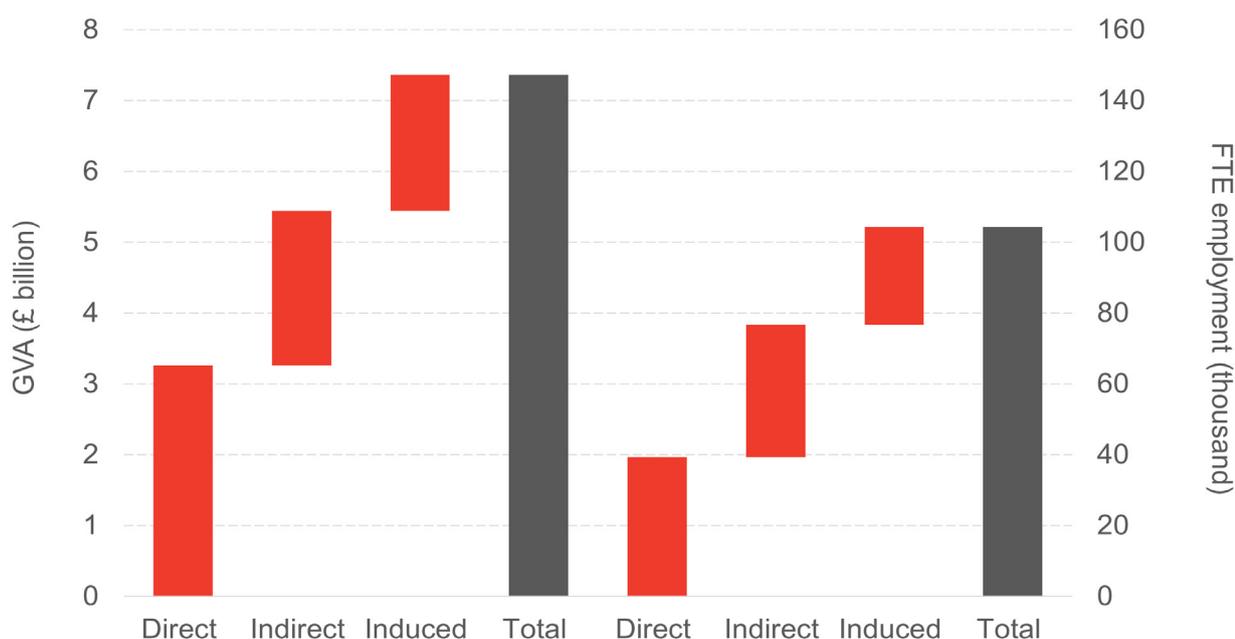
Impact	GVA (£ million)	Employment (FTE)
Direct	3,261	39,360
Indirect	2,179	37,282
Induced	1,923	27,595
Total	7,363	104,237

Source: FAI Calculations

When direct indirect and induced impacts are considered, we estimate that the wider aluminium industry supports around 104,000 FTE jobs.

Chart 4 illustrates the direct, indirect, induced, and total economic impact of the wider aluminium industry to the UK economy.

Chart 4: Economic impact of the wider aluminium industry



Source: FAI Calculations

3. The contribution of aluminium in the automotive sector

Within domestic production data, automotive manufacturing is classified under SIC 29. In 2020, SIC 29 employed approximately 162,000 FTE workers and contributed £12 billion in GVA to the UK economy.

Aluminium is an increasingly important material for automotive manufacturers, due in large part to the desire to substitute heavier materials like steel for lighter alternatives. This light-weighting process is critical for helping manufacturers meet CO₂ emission and sustainability targets.

A 2019 study published by Ducker Frontier in cooperation with the European Aluminium Association estimates the aluminium content of an average European passenger car to be 176.2k. The authors project this value will increase to 199kg by 2025.

This project focussed on two goals regarding aluminium's role in the UK automotive sector:

1. to estimate the aluminium content of the average UK passenger car, and
2. to estimate the share of SIC 29's GVA contribution that is attributable to the wider aluminium industry.

Goal 1

Discussions with industry experts revealed that the UK manufacturers several vehicles with a relatively large aluminium content. According to the 2019 Ducker Frontier report, Jaguar Land Rover (JLR) manufactures several vehicles with a high aluminium content, including the Range Rover, which contains 4.5 times as much aluminium as the average European vehicle. We hoped to find publicly available data on the material content of vehicles produced in the UK. However, this data is not currently available. We made substantial efforts to access vehicle content information from automotive benchmarking firms to replicate the Drucker Frontier report findings for the UK. Due to the significant upfront costs of accessing this data, we were ultimately unsuccessful.

Goal 2

Achieving the second goal is methodologically challenging, even if the aluminium content of the average UK passenger car could be determined. We have, however, provided a rough estimation of the GVA contribution of aluminium in the automotive industry which is detailed below.

Table 3 shows the subgroups at the four-digit level and the share of total sales they account for within SIC 29.

Table 3: Constituent sales of SIC 29 (%)

SIC		% Share
2910	Manufacture of motor vehicles	69%
2920	Manufacture of bodies (coachwork) for motor vehicles; manufacture of trailers and semi-trailers	6%
2931	Manufacture of electrical and electronic equipment for motor vehicles	1%
2932	Manufacture of other parts and accessories for motor vehicles	24%

Source: ONS

As can be seen from Table 3, approximately 69% of sales in SIC 29 comes from SIC 2910. SIC 2910 covers the manufacture of motor vehicles and includes passenger cars and commercial vehicles such as vans, lorries, buses, fire engines, and armoured vehicles.

According to GDP output approach data (low-level aggregates) from the ONS, the GVA contribution of SIC 29 totalled approximately £12 billion in 2020. Therefore, it is reasonable to allocate 69% of £12 billion (£8.3 billion) in GVA to SIC 2910.

The Society of Motor Manufacturers and Traders (SMMT, 2021) estimate that 93% of the 987,098 vehicles produced in the UK in 2019 were passenger cars. We assume based on this statistic that 93% of the £8.3 billion GVA contribution of SIC 2910 (£7.7 billion) is attributable to passenger cars.

The final step in this process is to determine the aluminium content of the average UK passenger car.

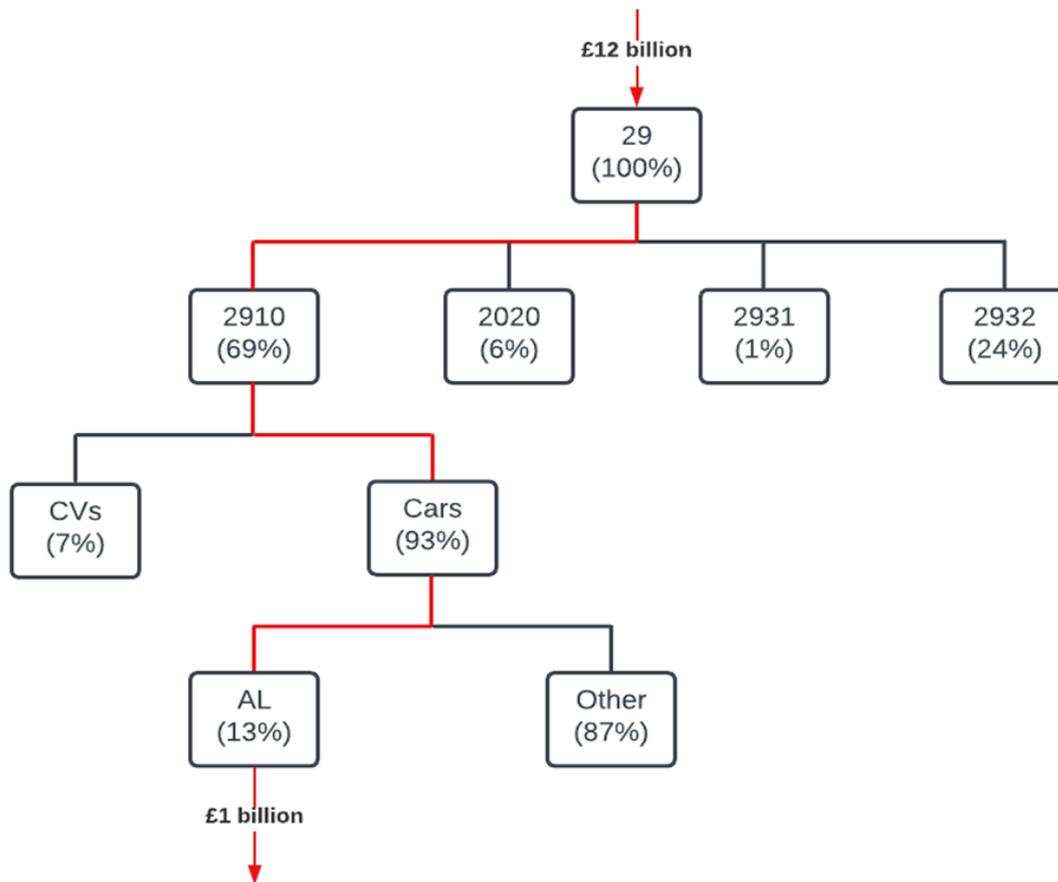
As mentioned above, our efforts to derive a first-hand figure were unsuccessful. We, therefore, turn to the 2019 Ducker Frontier estimation of 176kg.

We find that aluminium accounts for 13% of the weight of an average European passenger car and use this figure as our proxy for UK aluminium weight to total weight ratio in passenger cars.

Diagram 3 shows the process outlined above in a flow chart to help make clear the assumptions made.

Using this rough calculation, we consider that since 13% of the average passenger car's weight is aluminium, 13% of the £7.7 billion GVA contribution of an average passenger car is attributable to aluminium. Under this set of assumptions, we estimate that the GVA contribution of aluminium in passenger cars to be approximately £1 billion.

Diagram 3: Flowchart of GVA contribution of aluminium in passenger cars methodology



Source: PRODCOM and SMMT Automotive

Note: 1 flowchart showing the flow of GVA from SIC 29 to the wider aluminium industry GVA of passenger cars (AL).

There are several methodological issues with the approach outlined above. The first is that the aluminium weight to total weight ratio being used is being taken from European data which may lead to measurement bias in the results.

The second issue is that weight is a far from ideal proxy for value. There are many components of a vehicle and using weight to determine value does not capture the distinction between complex parts such as engines and electronics and simpler parts such as doors and bonnets. Furthermore, this method does not fully capture the opportunity cost associated with using an alternative material.

The third issue is that many vehicles manufactured in the UK may use imported aluminium components which are not themselves manufactured in the UK. With the current data limitations this a particularly challenging point to address.

Additionally, the same method cannot reasonably be applied to the other subgroups within SIC 29 as there is limited data available regarding the aluminium content of products within SIC codes 2920, 2931, and 2932.

Our conclusion is that in the absence of quality data, it is reasonable to estimate that in 2020, the GVA contribution of aluminium in the automotive sector to the UK economy was approximately £1 billion. However, we recommend that caution should be taken when using applying this estimate due to the large number of assumptions required to estimate this contribution. Therefore, we do not feel confident including the GVA contribution of aluminium within SIC 2910 in the direct GVA calculation of the wider aluminium industry.

4. Methodology

To our knowledge, the two reports published by the Fraser of Allander Institute have been unique in their attempt to define the aluminium industry in a way that expands upon aluminium production.

In consultation with ALFED it became clear that there was a need to create a wider definition- one which encompasses several domestically manufactured aluminium products that exist outside of the narrow definition of aluminium production.

Defining the wider aluminium industry

The process of determining what could be considered part of the wider aluminium industry can be summed up in three steps:

- Step 1: SIC codes were used to identify sections of industries which were clearly aluminium. This included what we have already described as the narrow aluminium industry (SIC 24.42).
- Step 2: Use the ONS UK Manufacturers' Sales by Product Survey (PRODCOM) to assess how much of a given SIC code could be allocated to the wider aluminium industry.
- Step 3: Use harmonised system (HS) commodity codes which are used in HMRC overseas trade data. This data was used to estimate the share of a given 8-digit SIC code that could be attributed to the wider aluminium industry when PRODCOM could not be used.

Three examples of this process are discussed below:

Example 1.

SIC 25 - Manufacture of fabricated metal products

SIC 2512 - Manufacture of doors and windows of metal

SIC 25121050 - Aluminium doors, thresholds for doors, windows and their frames

By searching through PRODCOM, we found that aluminium doors, thresholds for doors, windows and their frames (SIC 25121050) account for approximately 6% of total UK manufacturer's sales in SIC 25.

We determined that as the sales of this product account for 6% of sales, it was reasonable to assume that we could extract a 6% share of SIC 25's GVA and attribute it to the wider aluminium industry.

Example 2.

SIC 29 - Manufacture of Motor Vehicles, Trailers and Semi-trailers

SIC 2932 - Manufacture of other parts and accessories for motor vehicles

SIC 29323040 - Road wheels and parts and accessories thereof SIC 29323040 (41%)

The sales of road wheels and parts and accessories thereof totalled £96 million in 2019. Within PRODCOM, SIC code 29323040 is noted to have the corresponding HS commodity code 870870 for overseas trade.

Due to the nature of overseas trade data and its use for applying trade tariffs, HS commodity codes often offer a higher degree of detail regarding what a product is made of. In this case HS 870870 is broken down into four subcategories, one of which is 87087050 (aluminium road wheels and aluminium parts and accessories thereof).

Using export data from 2019 it was possible to determine proportion road wheels and accessories exported that were aluminium. This figure was then used as a proxy for the share of domestic production that could be assumed to be aluminium.

Using this method, we were able to take a 41% share of the total UK manufacturer's sales for SIC 29323040 and attribute it to the wider aluminium industry.

Example 3.

SIC 25 - Manufacture of fabricated metal products

SIC 2592 - Manufacture of light metal packaging

SIC 25921350 - Capsules of lead; capsules of aluminium

We found that sales of capsules of lead and capsules of aluminium (SIC 25921350) totalled £72 million in 2019.

Within PRODCOM there was no indication of the proportion of capsules that were made of aluminium. Attempts were made to use HS commodity codes in the same way as was described in example 3 above.

When HS commodity codes did not offer a higher degree of detail, we concluded that there was insufficient data to determine a fair share of this SIC code that could be considered as aluminium.

Despite a share of this SIC being a good candidate for inclusion, data limitations led to this SIC code to not be included in our wider definition of the aluminium industry.

Estimating the economic indicators

ONS GDP(O) Low-Level Aggregates data provided current price estimations of GVA for various SIC codes. GVA figures are often available at the 2-digit and sometimes 3-digit levels.

The decision was made to take the most granular GVA data available and then to find the corresponding share of that SIC code that was considered to belong to the wider aluminium industry.

Although a GVA figure was available for SIC 24, the data also included a figure for 24.4-5. Once we determined the share of 24.4-5 that could be attributed to aluminium we calculated the GVA contribution of the wider aluminium industry that comes from SIC 2.4-5. An example of this process is shown below in Table 4.

Table 4: Determining GVA from industry shares

	GVA contribution
Total UK manufacturers sales in SIC 24.4-5	£2,626,913,000
Sales of aluminium products in SIC 24.4-5	£1,318,822,000
Share of total sales that are from aluminium sales	0.50
GVA of SIC 24.4-5	£1,367,000,000
Share of GVA that can be considered as part of wider aluminium industry GVA	0.50
Wider aluminium industry GVA from SIC 2.4-5	£686,292,004

Source: FAI calculations

This process was reiterated for the remaining SIC divisions where aluminium products had been found. A total GVA figure for the wider aluminium industry was then calculated by aggregating all of the individual GVA figures.

Modelling the economic impact

Modelling the impact of the wider aluminium industry was carried out using the 2016 FAI UK HEM. This model removes wider aluminium industry from the UK economy and estimates the impact this would have on the surrounding industries in terms of GVA and employment.

GVA

GVA is the value of goods and services produced minus intermediate goods and services consumed in the production process. GVA is similar to GDP however a key difference is that GVA does not take into account taxes and subsidies i.e., GDP at basic prices

Employment

Employment here refers to full-time equivalent (FTE) jobs. One FTE job is equal to a single person working full-time hours or two people each working half the hours of a full-time worker over the same period.

HEM methodology

The 2016 FAI UK HEM is built using the UK government's input output (IO) tables. IO tables are often used to model supply chains and estimate multiplier effects in the economy. The Hypothetical extraction model is effective in estimating the impact on the economy of removing the economic activity of an industry.

A useful feature of the HEM is that it can be used to remove part of an industry and leave the remaining part in place. This makes the HEM useful for modelling the impact of the wider aluminium industry as it is a composite industry, containing shares of multiple industries e.g., the manufacture of basic metals (SIC 24), manufacture of fabricated metal products (SIC 25), and manufacture of motor vehicles; trailers and semi-trailers (SIC 29). This model allows an examination of the spill-over effects that occur when sales and purchases of the wider aluminium industry are removed.

The model compares the before and after states to estimate the importance of the industry to the UK economy.

The model is set up to extract shares of 2-digit SIC codes. For this reason, it was necessary to recalculate some of the 3-digit SIC shares.

Table 5 shows the share of each individual 2-digit SIC industry that was taken and extracted by the 2016 FAI UK HEM. The combination of these shares is how we define the wider aluminium industry.

Using the shares of 2-/3-digit SIC codes, it was also possible to find employment statistics for the wider aluminium industry using the Business Register and Employment Survey (BRES).

The BRES employment data was added to the FAI 2016 UK HEM to improve the accuracy of the model.

Table 5: Determining GVA from industry shares

2-digit SIC	Extracted share of 2-digit SIC
13-15	0.003%
24	19.44%
25	13.84%
29	0.09%

Source: FAI calculations

5. Assumptions, limitations and next steps

Assumption 1

The wider aluminium industry as we have defined it is spread over multiple 2-digit and 3-digit SIC codes.

In order to estimate a GVA figure, a method was required to assess how much of each 2- or 3-digit SIC code's GVA figure should be taken.

This report makes the following initial assumptions about how the GVA share can be calculated:

- The share of 2-/3-digit SIC code that can be attributed to the wider aluminium industry can be found by dividing the total UK manufacturer's sales by the total aluminium product sales in the same 2–3-digit SIC.
- The share of a 2-/3-digit SIC code that can be considered as part of the aluminium industry, is an appropriate share to use when calculating the same SIC code's wider aluminium industry GVA figure.

An example of this process can be found in Table 4.

Assumption 2

When data limitations made it impossible to take shares of 2-/3-digit SIC codes using only PRODCOM, we turned to HS commodity codes from HMRC overseas trade data.

This process involved trying to find HS commodity codes which offered a higher degree of detail regarding what a product was made of.

When a useful HS commodity code was found, we were able to calculate the share of exports in that product group that were aluminium products.

We assumed that this traded share could act as a suitable proxy for the share of domestically produced aluminium products under the same SIC code found in PRODCOM. An example of this process can be found in example 2 of the methodology section.

Limitation 1

We consider the GVA and employment figures given in this report to be the lower bound of likely estimates for the size of the wider aluminium industry.

The lack of detailed data on domestically manufactured aluminium products is likely to have resulted in a significant underestimation of GVA and employment statistics.

A large number of products which we believe to be good candidates for inclusion in our definition, are due to data constraints, not included in these report's estimations.

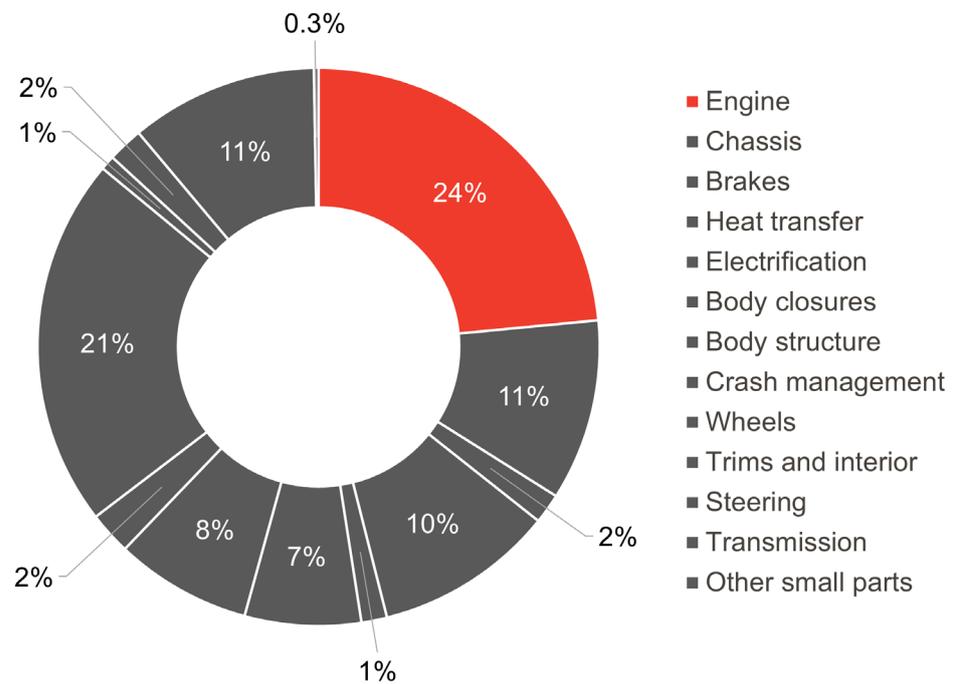
One example worth discussing is the numerous aluminium automotive vehicle components which could not be included. This report was able to quantify the GVA contribution that arises from the production of aluminium vehicle wheels.

Due to data limitations, we were not able to account for any other automotive component.

A 2019 Ducker Frontier report on the aluminium content in European cars estimates that road wheels account for approximately 21% of the aluminium content in an average European vehicle. This report indicates that a significant proportion of the aluminium content vehicles is located within the engine, suspension systems, body components, brakes, and heat exchangers.

Chart 5 highlights how this report could be greatly improved by including in our definition the remaining 79% of aluminium content in the average European vehicle.

Chart 5: Average aluminium component content per vehicle 2016 (total European car production)



Source: Ducker Worldwide

Limitation 2

It is important to discuss the limitations of this report in the context of the available data. There are two methods for classifying aluminium products used in this report:

- The first method involves using Standard Industrial Classification (SIC) codes. SIC codes are the classification system used in PRODCOM.
- The second method of classification is the harmonised system (HS) commodity codes used in HMRC overseas trade data.

The two methods of classification are largely used for different end goals.

PRODCOM is a survey of UK manufacturer's product sales, as such, it and the classification system it uses are geared towards the use of a given product. Put simply, PRODCOM is less concerned about what a product is made from and more concerned about what it is made for.

HS commodity codes are primarily used in HMRC overseas trade data.

Within this system products are categorized according to the material they are primarily made of. Aluminium products, for example, are in general located in Chapter 76. These data, however, do not allow us to estimate the size of the wider aluminium industry as it tracks imports and exports and does not include observations of domestic production.

There is a considerable lack of harmony between these two sources of data which makes analysis of the wider aluminium industry challenging.

The current data landscape lacks a source of information which classifies products by the material they are comprised of and includes information on the level of domestic production. This is a considerable barrier to overcome when estimating the size of the wider aluminium industry.

Next Steps

As discussed above, our estimation of the size of the wider aluminium industry captures a small share of aluminium products manufactured for the automotive industry.

Our efforts estimating the aluminium content of the average UK passenger car, and estimating the share of SIC 29's GVA contribution that is attributable to the wider aluminium industry, were considerably limited due to a lack of publicly available data.

To move forward with achieving these goals, it is necessary to communicate with industry leaders such as JLR to understand at a detailed level the relationship these producers have with aluminium products.

Another route would be to pay the significant upfront costs to obtain automotive benchmarking data from private firms who hold these data.

Once the aluminium content of an average UK passenger vehicle can be robustly determined, there remains an issue with attributing value in a fair and consistent method.

We have shown here a rough method for attributing the GVA contribution of aluminium located in SIC 2910. We believe this to be a useful first step in the process. Future research may also consider widening the search for aluminium products to include aerospace and shipbuilding industries.

Additionally, this report has focused on the value aspect of aluminium production and products. A different perspective could be gained by viewing the aluminium industry in terms of tonnage produced.

Taking a different perspective may help to overcome some of the data limitations present when taking a value approach to determining economic indicators and the impact of the industry on the UK economy.

6. Conclusion

This report has updated and expanded upon our first attempt to understand the economic contribution of the wider aluminium industry to the UK economy.

The notable changes from our earlier report include broadening the share of cast metals included in our definition of the wider aluminium industry, and our attempt to quantify the GVA contribution of aluminium to the UK automotive industry.

In the UK, the wider aluminium industry directly contributes around £2.9 billion in GVA. This figure increases to approximately £7.4 billion once spill-over effects are considered.

The wider aluminium industry employs individuals across the UK, with a significant concentration of those employed being located around the West Midlands.

In total, approximately 39,000 people were directly employed by the wider aluminium industry in 2020. Once spill-over effects are taken into account, we estimate the industry supports a total of 104,000 FTE jobs.

Due to data limitations and the set of assumptions made, we have not included the estimated £1 billion GVA contribution of aluminium in the UK automotive industry.

Aluminium is increasing in importance for UK automotive manufacturers due to the pressure to replace heavier materials with aluminium in order to meet environmental targets.

Moving forward, a credible estimation of the value of aluminium in the UK automotive sector will require detailed publicly available data on the aluminium content of vehicles.

We believe these estimates represent the lower bound of the size of the aluminium industry.

Future research, which more accurately captures the range of aluminium products manufactured by the UK automotive industry, will allow for a more accurate account of how strategically important the wider aluminium industry is to the UK economy.

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