



Economic Contribution of the Grangemouth Refinery

August 2024





Scottish Ministers

3A-South Victoria Quay
Edinburgh
EH6 6QQ

Dear Sirs / Madams,

Please find attached the Economic Contribution of the Grangemouth Refinery report ("the Report"), shared by PwC UK with the Scottish Government ("SG") in August 2024, in accordance with our agreement dated 10 January 2024. This Report has been prepared based on data shared by Petroineos ("PI") during the period of January – May 2024.

This report has been prepared in connection with the scope as set out in the engagement letter.

You have asked us to estimate the economic contribution of the Grangemouth ("GM") Refinery to the Scottish economy, both from a Gross Value Added ("GVA") and employment perspective using the latest possible data. In conjunction to this, you have asked us to analyse the refinery's supply chain, helping you determine the types of businesses that are involved with the refinery so that you can better understand the types of organisations the refinery is involved with.

As described in the agreement or as expressly agreed by us in writing, we accept no liability (including for negligence) to anyone else or for any other purpose in connection with this report.

Yours faithfully,

PricewaterhouseCoopers LLP

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Glossary of Terms & Definitions



Gross Domestic Product ('GDP')

GDP is a monetary measure of the final value of the goods and services produced in a country at a given period of time. These typically refer to the prices bought by final users. It considers the aggregate total of the outputs generated within the borders of a country.



Earnings Before Interest, Taxes, Depreciation and Ammortisation ('EBITDA')

EBITDA is an alternative way to measure profitability to net income. EBITDA attempts to represent the cash profit generated by the company's operations.

As we use the income approach for this impact assessment, we use EBITDA to partially define the Direct GVA contribution of the refinery.



Gross Value Added ('GVA')

GVA is a monetary measure of the value a company adds during its production process. Hence, it is the difference between the price of its products (outputs) and the price of the inputs it uses in producing these (or intermediate consumption). Like GDP, GVA is a measure of economic activity but at producer's prices, i.e. without taking into account indirect taxes such as Value Added Tax ('VAT').



Full-Time Equivalents ('FTEs')

FTEs is a unit to measure the amount of workload an employed individual has and makes employed people comparable. However, the number of hours worked as 1 FTE may differ from individual to individual, depending on the average number of contracted hours worked by the employee.

Executive Summary

Key Findings

- The economic contribution of GM Refinery, its supply chain and the employee spending it induces is estimated to be £403.6m in 2023, i.e. around **0.19%*** of the value added across the whole Scottish economy. It is also estimated to support 2,822 jobs across Scotland, of which 532 are its own employees in GM Refinery.
- Grangemouth is in Falkirk council area, which has a large range of deprivation from one zone to another. This is also observed in the town of Grangemouth.
- GM Refinery is responsible for 532 well-paid jobs in Falkirk, the average salary is around 45% above the local average. While this only represents below 1% of the total Falkirk labour force, these relatively well-paid technical jobs may not be easily replaceable in the local economy.

**Based upon latest available forecasts, we have assumed the Scottish GDP (onshore incl. oil and gas extraction) to be worth £212.1bn in 2023. This has been calculated by taking the 2022 GDP estimate (£211.7bn) and multiplying this with the 2023 annual GDP growth rate (0.2%).*

We use 2019 Scottish Supply-Use and Input-Output tables to determine the economic contribution of the GM Refinery. Despite more recent Scottish Supply-Use and Input-Output tables being available, we used 2019 figures as 2020 was a pandemic year and trading activities between industries might be distorted to an average year.

We use an ‘input-output’ model to estimate GM Refinery’s economic contribution to Scotland and to the UK

Overview

GM Refinery’s economic contribution is assessed in terms of its contribution to GDP and employment supported. We also consider wider product market and spillover effects.

Contribution to the economy is measured in terms of Gross Value Added (GVA). GVA is a monetary measure of the value a company adds during its production process. Hence, it is the difference between the price of its products (outputs) and the price of the inputs it uses in producing these (or intermediate consumption). Like GDP, GVA is a measure of economic activity but at producer’s prices, i.e. without taking into account indirect taxes such as Value Added Tax (‘VAT’).

The contribution to the economy and employment is estimated at the direct, indirect and induced levels. The direct contribution results from the company’s own operations: it includes the people employed directly by a company and the economic value the company creates. The indirect contribution is generated in a company’s supply chain through the procurement of inputs. The induced contribution is generated through the spending by employees throughout the value chain from their earnings. It includes both GM Refinery’s own employees and those within its supply chain.

Petroineos provided PwC with the data to estimate its direct economic contribution. We also relied upon data from various statistics authorities to build the economic Input-Output models used in our calculations (as described on the following pages). We did not carry out any testing of, and do not provide any assurance over, the underlying data provided by GM Refinery or obtained from the other external sources, and hence do not provide any assurance over outputs based on such data.

Approach to estimating direct economic contribution

We estimate GM Refinery’s direct contribution to the Scottish economy using an income approach from data contained in its financial accounts that are prepared on an accruals basis for the financial year (rather than relating to the cash spent during the year). The following equation is used:

$$\begin{aligned} &\text{Direct contribution to GVA} \\ &= \text{profit before interest and taxation} + \text{employee costs} \\ &\quad + \text{depreciation} + \text{amortisation.} \end{aligned}$$

Approach to estimating indirect and induced economic contribution

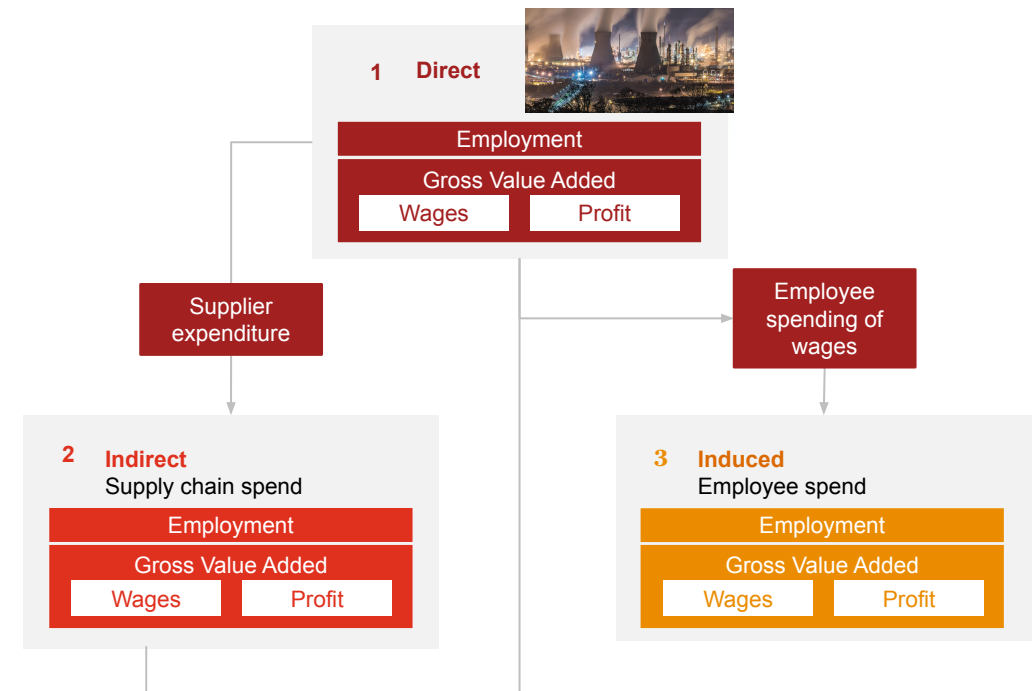
The indirect and induced economic contributions are estimated using an Input-Output model which describes how different industries in the economy relate to each other. On this basis we can estimate how activity by one company stimulates activity elsewhere in the economy.

The GM Refinery’s indirect (or supply chain) contribution is estimated using its procurement data, which we analysed to identify the industry sectors and countries (and nations within the UK) from which it purchases its inputs.

We then estimate the GM Refinery’s input requirements through its entire supply chain and estimate the total value of production stimulated. We also used the data in input-output tables on the share of revenue that constitutes profit and wages for each sector and applied this ratio to the total production value stimulated to estimate the total GVA in the supply chain by sector. We also use government statistics on employment in each sector to estimate the total employment associated with the GM Refinery’s activity.

These steps are repeated to estimate the induced contribution, but through using wage data to estimate how much production is stimulated in the supply chain that supports the products employees buy, e.g. accommodation, food and entertainment.

The relation between the three levels of economic contribution



Latest analysis suggests GM Refinery contributed £403.6m of GVA and supported 2,822 jobs in Scotland in 2023

GM Refinery's economic contribution to Scotland using 2019 multipliers (annualised)

- The GM Refinery supply chain in Scotland is dominated by the *Refining and manufacturing* sector, which footprint amounts to £201.0m of value added and 731 jobs in Scotland.
- This is followed by its use of *Energy, Water and Waste*, which amount to £69.0m of value added and supports 260 jobs.
- In terms of employee spend (induced) impacts, this is concentrated in the *Distribution and Catering* sectors and *Public Admin and Other Services*. Given the relatively high-paying jobs that the GM Refinery creates in the local economy, 463 Scottish jobs are supported through the spending of GM Refinery and its Scottish suppliers' employees.
- The GVA multiplier (2.25x) and jobs multiplier (5.30x) are strong, driven heavily by energy, refining & manufacturing and finance & business requirements from Scotland.
- It is worth noting that in this analysis, we use RC EBITDA* when calculating direct GVA.

	Direct		Indirect		Induced		Total	
Sector	GVA (£m)	Jobs (FTE)	GVA (£m)	Jobs (FTE)	GVA (£m)	Jobs (FTE)	GVA (£m)	Jobs (FTE)
Agriculture, forestry and fishing			0.3	5.5	0.7	12.3	1.0	17.7
Mining			1.0	13.7	0.1	0.9	1.1	14.6
Refining and manufacturing	179.0	532.0	19.7	174.5	2.3	24.3	201.0	730.8
Energy, Water and Waste			66.9	252.5	2.1	7.6	69.0	260.1
Construction			23.0	346.1	0.7	10.3	23.7	356.4
Distribution and catering			5.6	93.7	9.9	201.5	15.6	295.2
Transport and communication			16.3	228.0	2.2	30.8	18.5	258.9
Finance and business			37.2	590.1	20.7	75.7	57.9	665.8
Public Admin and Other Services			10.3	122.9	5.7	99.2	15.9	222.1
Total	179.0	532.0	180.3	1827.1	44.3	462.6	403.6	2821.6

Source: PwC analysis (2024), GM Refinery expenditure data 2023 breakdowns, shared by Petroleos, 2023 RC EBITDA figures.

Note: All figures are based on 2023 procurement data and Scotland's 2019 multipliers as reported by the Scottish Government.

*Replacement Cost "RC" EBITDA seeks to modify the Historic Cost "HC" EBITDA standard by replacing historic cost prices with the average cost of crude oil, feedstocks and downstream products. This provides a better measure of the underlying performance of the business by removing some of the volatility in commodity prices. It also allows for a better understanding of the business's hedging and commodity exposures.

**We use a conversion rate of 1 GBP : 1.26 USD to convert RC EBITDA into GBP.

The GM Refinery's surrounding area contains some of the more deprived wards in Scotland

Frequency distribution of Falkirk's intermediate zones in the Scottish Index of Multiple Deprivation (SIMD)

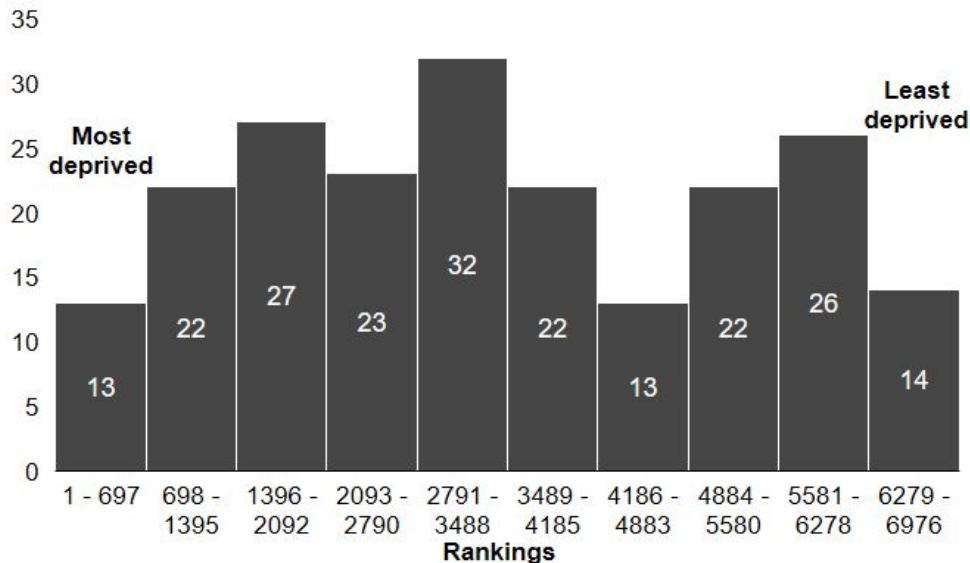
Located in Falkirk, GM Refinery is situated near areas of high deprivation, with some areas in Falkirk such as those close to the town centre being some of the more deprived areas of Scotland in terms of income levels.

Some areas in Falkirk are highly dependent on state welfare support, 37% of the working age population living in the Bainsford and Langlees area is categorised as income deprived (percentage of people in receipt of income support, employment and support allowance, job seekers allowance, working tax credits etc.). This compares to just 12% on average in Scotland overall.

The histogram below plots the distribution of Falkirk's zone rankings in the SIMD. It shows areas of both high and low deprivation.

Frequency distribution of Falkirk's intermediate zones, ranked against all of Scotland's intermediate zones

No. of intermediate zones in Falkirk



Source: Scottish Index of Multiple Deprivation 2020
Economic Contribution of the Grangemouth Refinery

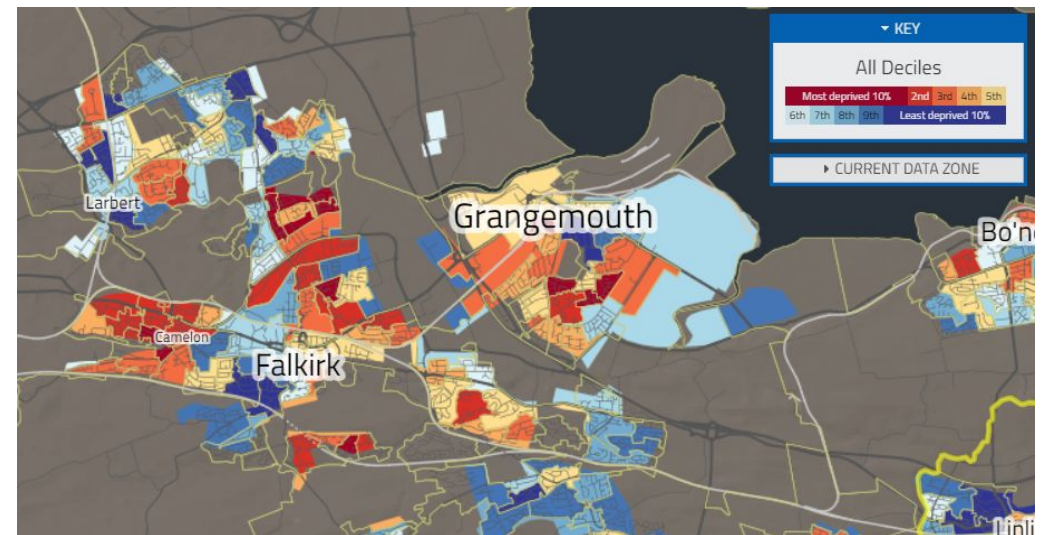
Grangemouth's deprivation mapped according to intermediate zones

Grangemouth is a town of around 18,000 people. It has communities that are in both the top and bottom segments in terms of the latest Scottish Index of Multiple Deprivation.

This suggests high degree of inequality in the local economy. It is possible that changes in the GM Refinery's scope of operation could affect households of different deprivation level in different ways.

While our analysis has assumed GM Refinery's employees have, on average, the same consumption pattern as the average household in Scotland, their relatively higher income may mean that some companies in the local service industries, e.g. schools and restaurants, may be more dependent on GM's induced impact than our model suggests.

Deprivation as measured by SIMD 2020 in Falkirk and Grangemouth



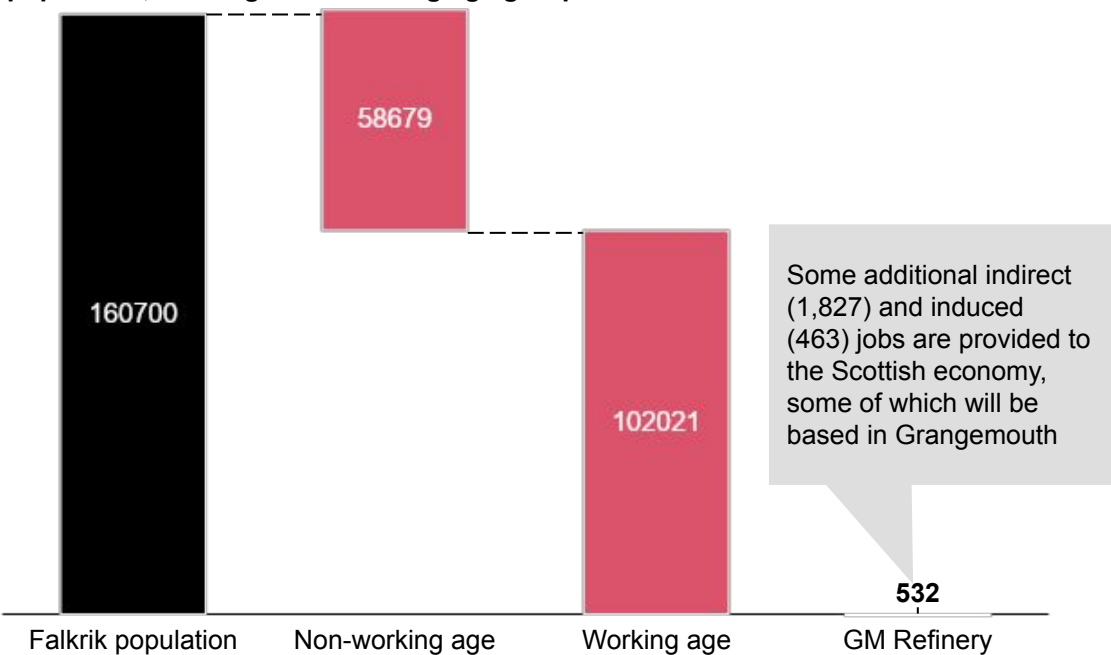
GM Refinery continues to employ only a small proportion of employees in Falkirk, but they remain relatively well compensated

The GM Refinery is a source of skilled technical jobs in the local area

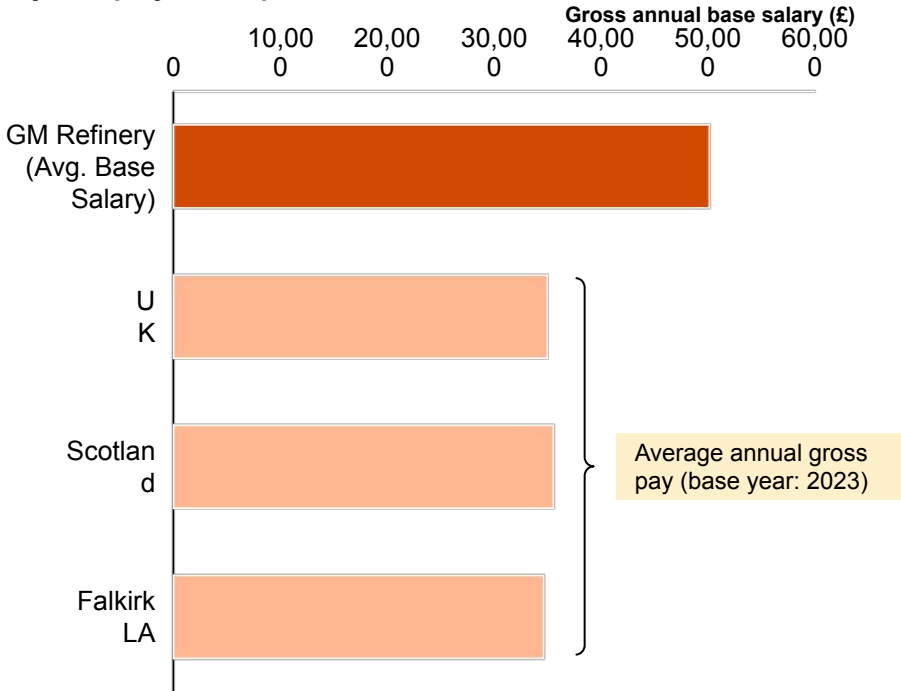
The GM Refinery employs a total of 532 workers in FTE terms. While this represents only a small portion (0.5%) of the working age population in the Falkirk council area (102,021), it does provide a set of relatively well-paid skilled technical jobs.

In 2023, the average annual salary for full time employees in the UK, Scotland and Falkirk local authority (LA) was £34,963 , £35,518 and £34,613 respectively¹. By comparison, GM Refinery’s average base salary is £50,082, i.e. around 45% above the local average^{2,3}. The average base pay is highest in the specialist departments, such as engineering, HQ, and commercial teams, reflecting the business’s role as a key provider of well-paid skilled technical jobs in the locality.

Number of people employed directly by GM Refinery, relative to Falkirk’s population, working / non-working age groups – November 2023 estimates¹



GM Refinery’s employee compensation in context to UK, Scotland and Falkirk^{2,3}



Source: 1) ONS - Annual Survey of Hours and Earnings (ASHE) - Earnings and hours worked, place of residence by local authority; 2) GM Refinery's employee salary data 2023; 3) ONS - 2023 Estimates of the population for the UK, England and Wales, Scotland and Northern Ireland
Economic Contribution of the Grangemouth Refinery

We have calculated GM Refinery’s expenditure to identify the expenditure that is relevant for measuring economic activity

Total expenditure of the GM Refinery, by category and by geography, 2023 only

Category	Description	Treatment	Total expenditure (Domestic & International) 2023		Total expenditure (Domestic only) 2023	
1	Total supplier expenditure (excl. purchase of crude oil and similar feedstocks)	Included	£	611,559,678	£	605,485,832
2	Fully reimbursable costs, inter-group transactions, carbon levies	Excluded	£	(213,191,681)	£	(213,191,681)
3	Estimated Value Added Tax (VAT)	Excluded	£	(59,628,551)	£	(59,628,551)
Total Net Spend			£	338,739,446	£	332,664,601

GM Refinery expenditures are categorised into 3 different types of transactions

To provide a more thorough picture of the expenditure from GM Refinery’s procurement data, we refined the spending into three categories types alongside GM Refinery’s accounts team.

Category 1 captures the total spend procured directly by GM Refinery across the four entities that constitutes the refinery. It includes all operational spending related to GM Refinery but excludes the purchasing of crude oil and other feedstocks that are arranged by the Petroineos London office. The annual value of this spend varies with commodity prices but runs to billions of dollars every year.

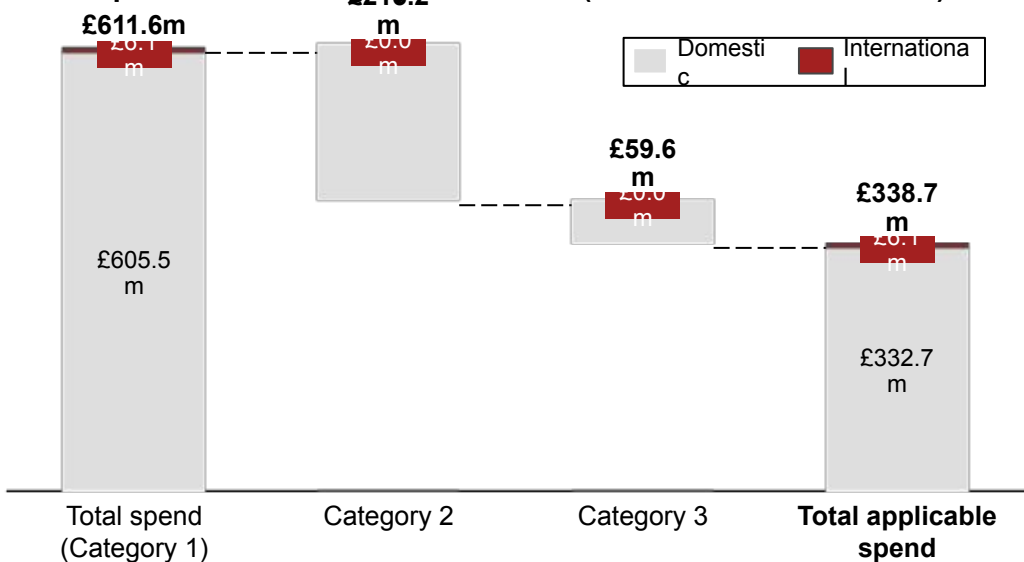
Category 2 related to spending that is fully reimbursable expenditure, inter-group transactions and other costs that are similar to taxes. This is removed from the spend generated in Category 1 as it is not relevant for measuring economic contribution.

Category 3 relates to the total estimated VAT spend for each entity. Since VAT is excluded from GVA, we exclude this from Category 1 spend as it does not have an impact to the economic contribution measurement.

Net spend is subsequently a measure of the total spend after Category 2 and 3 items are deducted from Category 1.

Source: GM Refinery expenditure data 2023 breakdowns, shared by Petroineos
Economic Contribution of the Grangemouth Refinery

Total expenditure in category breakdown (Domestic & International) 2023



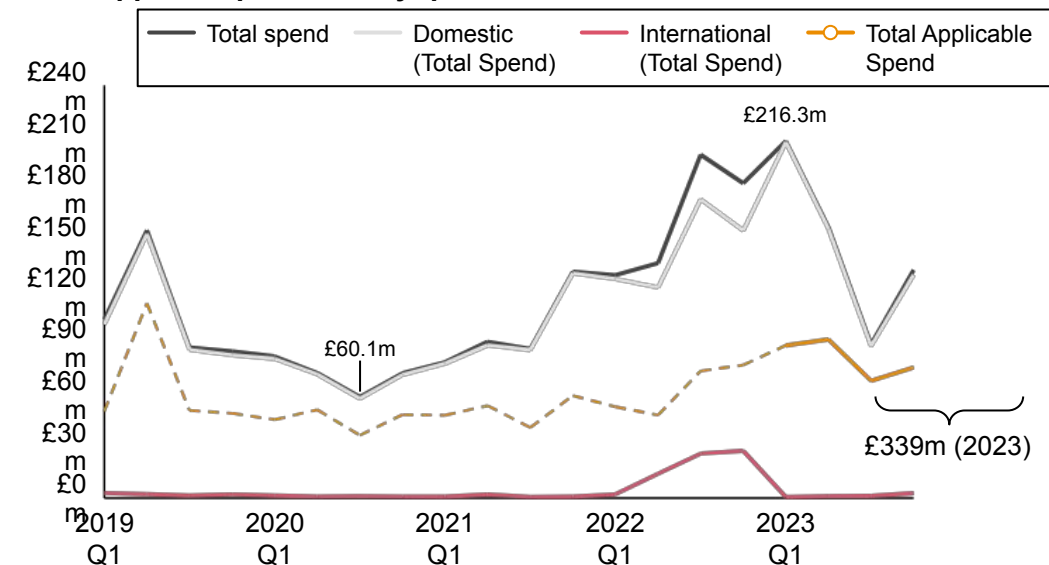
GM Refinery's expenditure peaked in 2023 Q1 and reached a low in 2020 Q3, demonstrating that expenditure varies frequently

GM Refinery's total expenditure peaked in 2023 Q1

When assessing the procurement data directly, it is evident that over the five-year period between 2019 - 2023 the refinery observed its highest quarterly expenditure in 2023 Q1 (£216.3m), with the 2022 Q3 – 2023 Q1 period seeing a particular high level of spending when compared to other quarters. The refinery spent just less than a third of its 2023 Q1 spend in its lowest quarterly expenditure in 2020 Q3, where the refinery spent just £60.1m. This evidence is based upon observing the procurement data directly shared by Petroineos, and does not include adjustment factors such as intra-group transactions, VAT, carbon levies or reimbursable costs that would analytically need to be omitted from the procurement data to find a more accurate adjusted expenditure figure.

The reason for the lower expenditure in 2020 Q3 is due to multiple factors including lower energy costs (due to reduced demand following the pandemic outbreak), the difficulty to execute maintenance / project work in the months following the pandemic outbreak and the necessity to control expenditure in a difficult economic environment.

Total supplier expenditure by quarter, 2019 Q1 – 2023 Q4¹

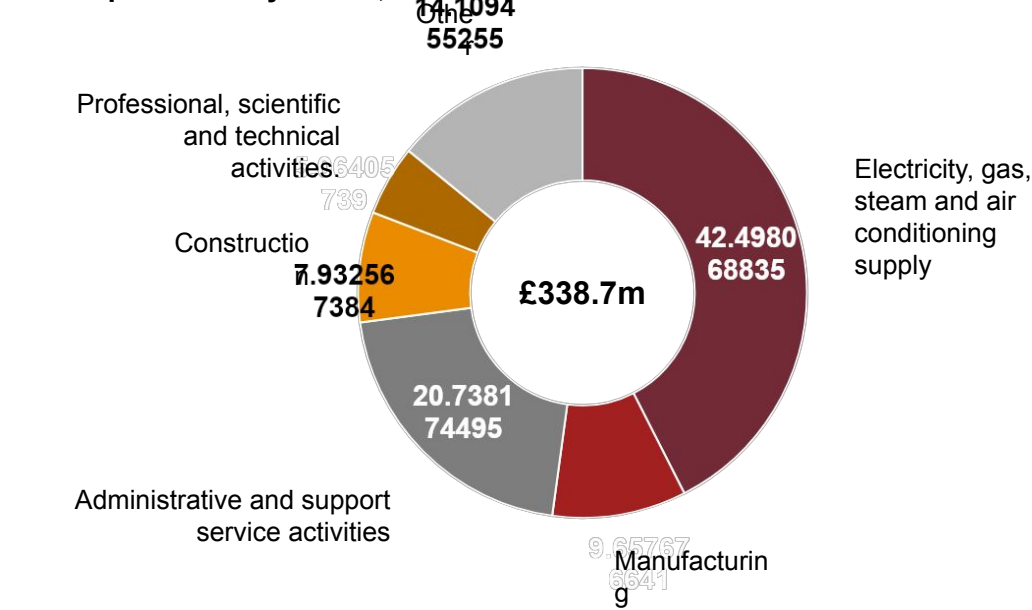


Source: 1) GM Refinery procurement data 2019 -2023 shared by Petroineos; 2) GM Refinery expenditure data 2023 breakdowns shared by Petroineos
Economic Contribution of the Grangemouth Refinery

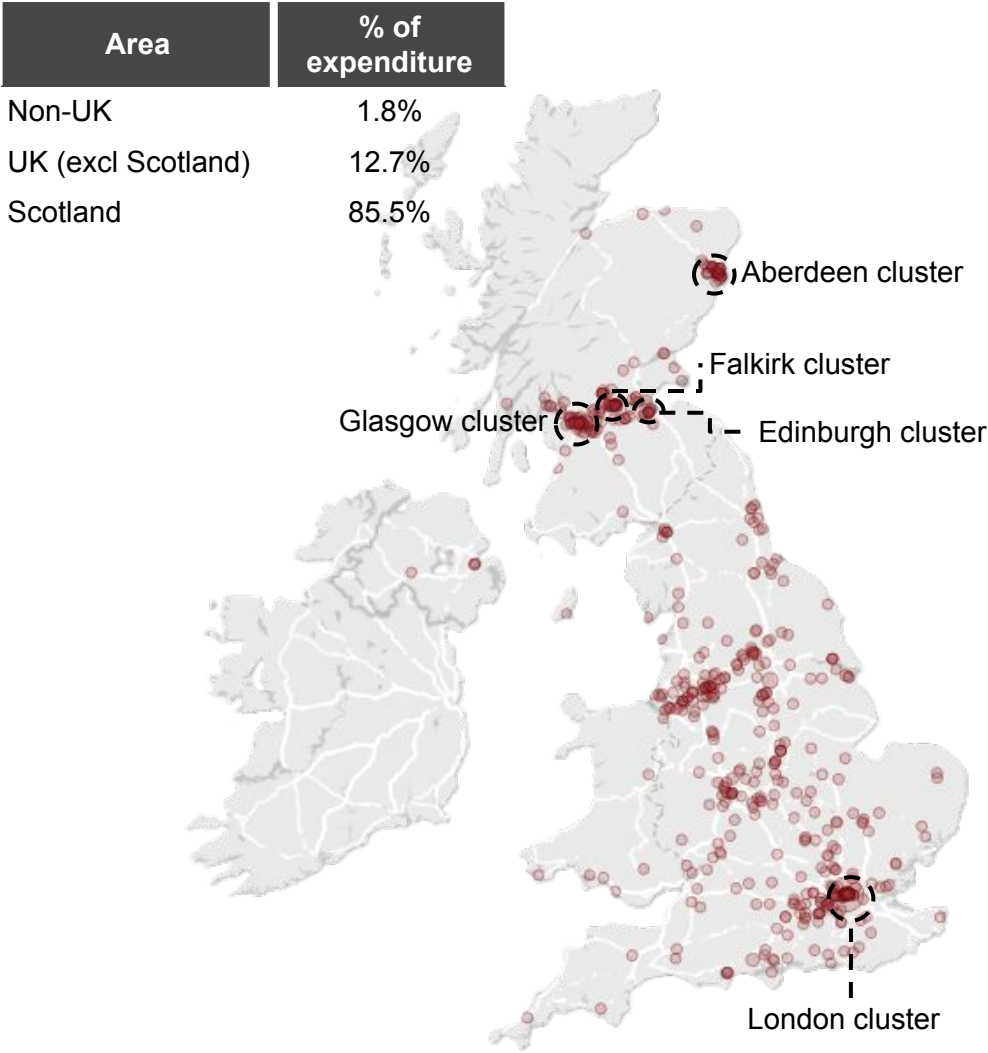
Since we were not able to classify the pre-2023 expenditure figures to understand the applicable expenditure for Scotland, (*PwC UK was commissioned to measure the impact of the refinery's contribution in 2023 only*), we have not been able to generate an entirely accurate picture of the applicable spend over this period. However, by using the Category classifications for each company generated in 2023 (the totals included in the previous slide), and assuming these breakdowns are consistent between 2019 – 2022, we can estimate what the applicable spend to the Scottish economy may potentially have been during this period. This follows the same approach used in the previous slide to categorise spending by companies into Categories 1, 2 and 3 and is represented in the graph below.

Looking into the sectoral spends for 2023, the refinery spent just over half of its total expenditure on goods & services from suppliers based in the Utilities and Manufacturing sectors. This provides an indication of the sectors which might be more reliant on GM Refinery's business.

Total expenditure by sector, 2023, top 5 sectors shown²



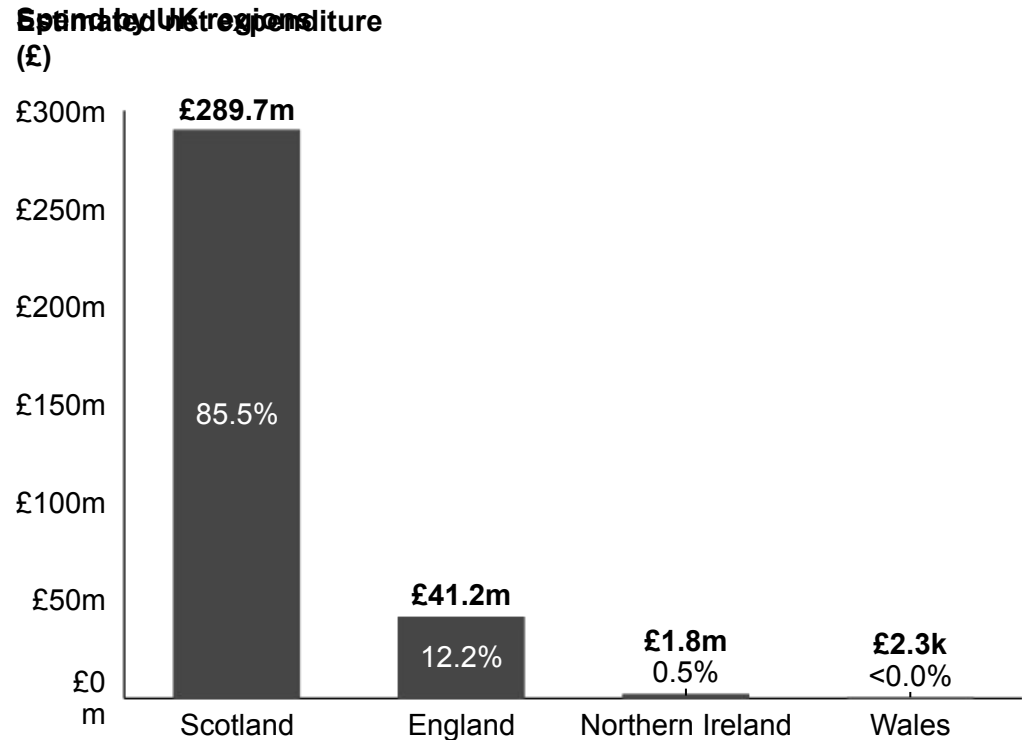
GM Refinery has a broad supply chain across the UK, with the majority of expenditure based on companies in Scotland



Distribution of suppliers across the UK

Suppliers of the refinery are distributed widely across the UK, but there are a few notable areas where GM Refinery purchases are concentrated. These include the areas directly around the GM Refinery (Falkirk), Aberdeen, Edinburgh, Glasgow and London.

Expenditure on suppliers that are focused on business support activities such as transport services, is the sector with the highest spend in Edinburgh making up 87% GM supplier spend in these regions. In comparison, Falkirk's expenditure is highly concentrated in the public services & defence sector, which constitutes 60% of the total Falkirk economy spend.

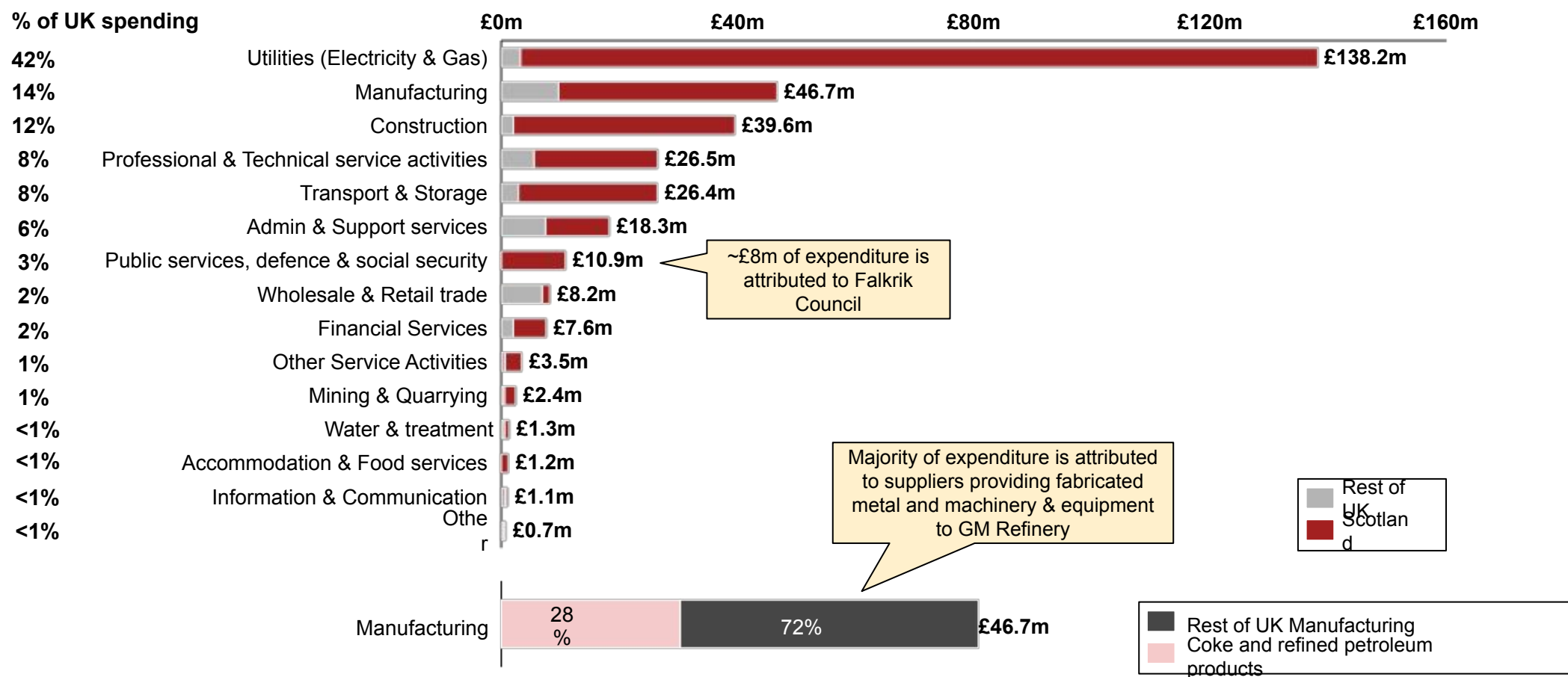


Source: GM refinery expenditure data 2023 breakdowns shared by Petroineos, UK Companies House
Note: Entities were mapped according to UK Company House data. Some services are delivered more locally.
Economic Contribution of the Grangemouth Refinery

GM Refinery purchases from a wide range of sectors across the UK, with a majority in the Utilities (Electricity & Gas) sector

Analysis of GM Refinery's UK expenditure by sector suggests it has a broad supply chain across the UK

The GM Refinery spends the largest proportion of its cash on purchasing goods & services from the Utilities sector, which includes the purchasing of electricity and gas services. There is also a notably high expenditure on companies that provide manufacturing & construction services, of which majority expenditure is attributed to fabricated metal and machinery & equipment suppliers to GM Refinery.



Source: GM Refinery expenditure data 2023 breakdowns shared by Petroineos, UK Companies House

Note: "Other" includes real estate activities, education, human health and social work activities, arts and entertainment, and activities of households as employers.

Economic Contribution of the Grangemouth Refinery



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