



THE IMPACT OF THE ALUMINIUM SECTOR ON THE UAE ECONOMY

DECEMBER 2018



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EXECUTIVE SUMMARY

US \$5.47 bn

Total contribution of the aluminium sector to the UAE economy in 2017.

For every \$1 of GDP generated by the aluminium sector, a further \$1.26 was supported elsewhere in the economy.

60,950

Total number of UAE-based jobs supported by the aluminium sector in 2017.

For every job in the aluminium sector, a further five were supported elsewhere.

Emirates Global Aluminium, or EGA, is the largest industrial company in the United Arab Emirates outside the oil and gas sector, and was the **world's largest producer of 'premium aluminium'** in 2017. It operates aluminium smelters in Abu Dhabi and Dubai, and sells its products to more than 350 customers in over 60 countries. This report examines the contribution that both EGA, and the wider aluminium sector, make to the UAE economy.

In 2017, the aluminium sector is estimated to have generated a US \$5.47 billion (AED 20.09 billion) total contribution to the UAE economy--equivalent to 1.4 percent of total national GDP, or 1.8 percent of its non-oil economy. This total includes economic activity the aluminium sector stimulates through its expenditure with local suppliers, and by the payment of wages to staff, which are then spent in the UAE's consumer economy.

We calculate that for every US \$1 of GDP generated by the aluminium sector itself, a further US \$1.26 of activity is supported elsewhere in the UAE economy.

In 2017, the aluminium sector supported 60,950 jobs across the UAE. This is equivalent to 1.0 percent of all national jobs. We calculate that for every individual working in the sector itself, a further five workers are supported in other parts of the UAE economy, due to the industry's expenditure with local suppliers and payment of wages which are then spent in the local consumer economy.

Looking at EGA itself, GDP per job is extremely high by national and global standards, at almost US \$320,000 (around AED 1.17 million) in 2017. This reflects the capital-intensive nature of the firm's operations, use of advanced technology, strong workforce skills, and the high values achieved by its products in the global marketplace. **And over 15 percent of the company's own workforce are Emirati nationals, which is far higher than the national average.**



EGA

1. INTRODUCTION

Emirates Global Aluminium, or EGA, is the largest industrial company in the United Arab Emirates outside the oil and gas sector, and was the world's largest producer of 'premium aluminium' in 2017. It operates aluminium smelters at Al Taweelah in Abu Dhabi, and at Jebel Ali in Dubai, and sells its products to more than 350 customers in over 60 countries.

This report, prepared by Oxford Economics and commissioned by EGA, examines the contribution that EGA, and the wider aluminium sector in the UAE, make to the economy of that country.

1.1 THE UAE'S ALUMINIUM SECTOR

Production of goods containing aluminium can be thought of, simplistically, as involving six phases:

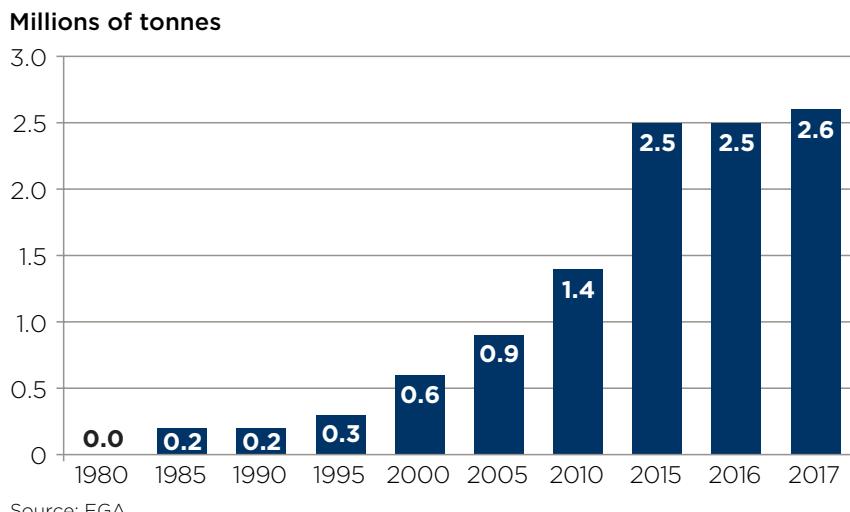
1. Mining of the bauxite ore
2. Refinement of bauxite ore to produce alumina
3. Smelting of alumina to produce liquid aluminium
4. Casting of liquid aluminium into ingots, billets, and other primary aluminium products
5. Processing of primary aluminium into semi-finished products such as window frames and car parts
6. Semi-finished products are supplied to industries including automotive, construction, packaging and electronics

At present, the UAE's aluminium sector comprises EGA, which produces primary aluminium, and a range of independent firms producing semi-finished products ("fabricators"). Twenty-six such firms are customers of EGA. Most of the primary aluminium produced by EGA is exported to customers around the globe and end-users include some of the leading brands in the automotive, aerospace, construction, electronics and packaging sectors. UAE-based fabricators also supply products to leading brands in a wide range of sectors.

For now, all the alumina required is imported into the UAE. However, EGA is developing a refinery at Al Taweelah, near its smelting plant in that city. Once this is operational, bauxite will still need to be imported, but the reliance on imported alumina will be reduced by 40 per cent.

EGA is also developing a bauxite mine in the Republic of Guinea, West Africa. Bauxite ore from this mine is destined for export to third countries.

As recently as 1980, the primary aluminium industry had no presence in the UAE. But once established, it grew rapidly over the three decades to 2010, and since then has expanded further—with production rising from 1.4 million tonnes in that year to 2.6 million tonnes in 2017 (see Fig. 1). This cumulative increase over the last seven years, of 85 percent, equates to an average annual growth rate of 9.2 percent.

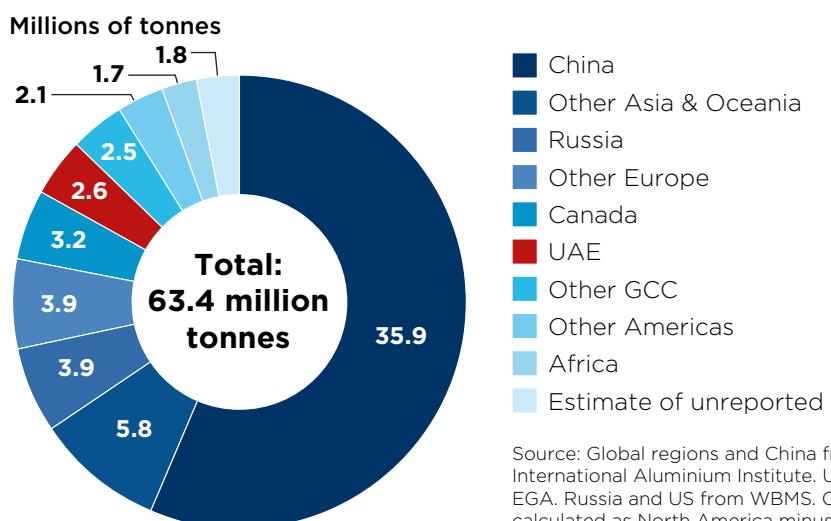
Fig. 1: Production of primary aluminium in the UAE, 1980-2017

Source: EGA

As a result, the UAE is now the fifth-largest aluminium-producing country in the world, by tonnage, after China, Russia, Canada and India, accounting for just over four percent of total global production (see Fig. 2).

Exports of aluminium also make an important contribution to the UAE's international trade performance. For example, for Abu Dhabi alone, exports of aluminium (excluding re-exports) totalled some US

\$570 million (AED 2.1 billion) in the first seven months of 2018, thereby accounting for 15 percent of that Emirate's total non-oil exports.¹ That compares with US \$125 million (AED 458 million) of aluminium imports during the same period.

Fig. 2: Approximate pattern of primary aluminium production in 2017

Source: Global regions and China from the International Aluminium Institute. UAE from EGA. Russia and US from WBMS. Canada calculated as North America minus US.

¹Source: Statistics Centre Abu Dhabi (SCAD).

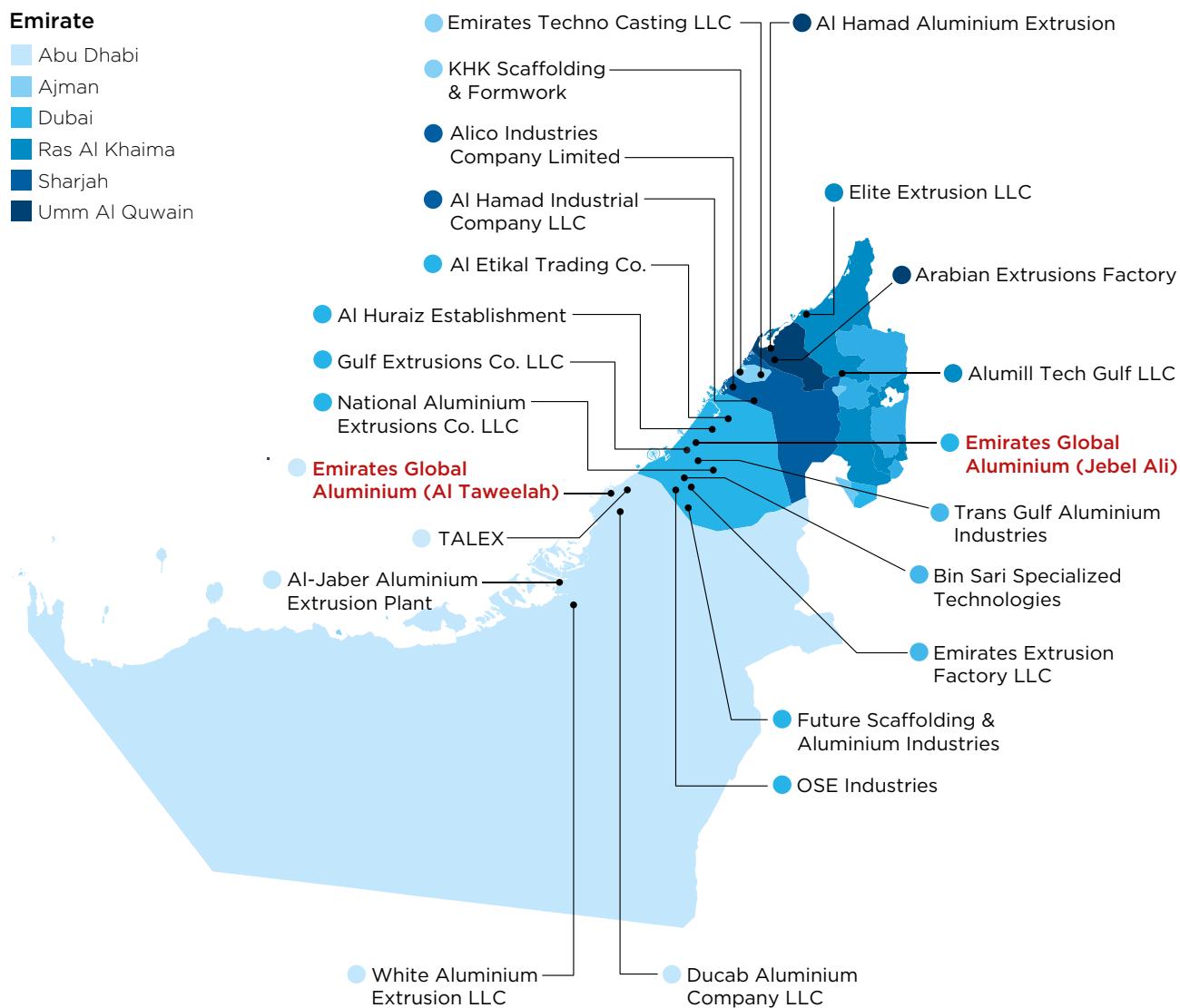
EGA's 26 main local business customers, meanwhile, are spread across the UAE. Fig. 3 shows the location of 21 such customers for which information and data could be supplied. The nine businesses in Dubai accounted for 38 percent of EGA's sales by value to these 21 firms in 2017, the two in Umm Al Quwain

for 22 percent, and the four in Abu Dhabi for 21 percent. In turn, the customers' products are both sold at home and exported, and are used in buildings, motor vehicles, trains and ships, industrial machinery, power supply networks, and street furniture, among other things.

Fig. 3: Location of the firms in the aluminium sector in 2017

Emirate

- Abu Dhabi
- Ajman
- Dubai
- Ras Al Khaima
- Sharjah
- Umm Al Quwain



1.2 ECONOMIC IMPACT ASSESSMENT

The analysis in this report examines the impact of the aluminium sector on gross domestic product (GDP) and jobs in the UAE, due to the demand that the businesses support for domestically-produced goods and services of all kinds.² The economic impact assessment used here to estimate the sector's "economic footprint" analyses three different "channels" of impact (see Fig. 4):

- The "direct impact", relating to the economic activity of the UAE aluminium sector itself. The sector is defined as EGA, plus its 26 main business customers located within the UAE.

- The "indirect impact", stimulated by the sector's purchases of goods and services from its UAE-based suppliers.

- The "induced impact", which is the economic activity supported by the payment of wages by the industry and the firms in its direct supply to their staff. This in turn stimulates jobs in the retail, leisure and other sectors, and their supply chains.

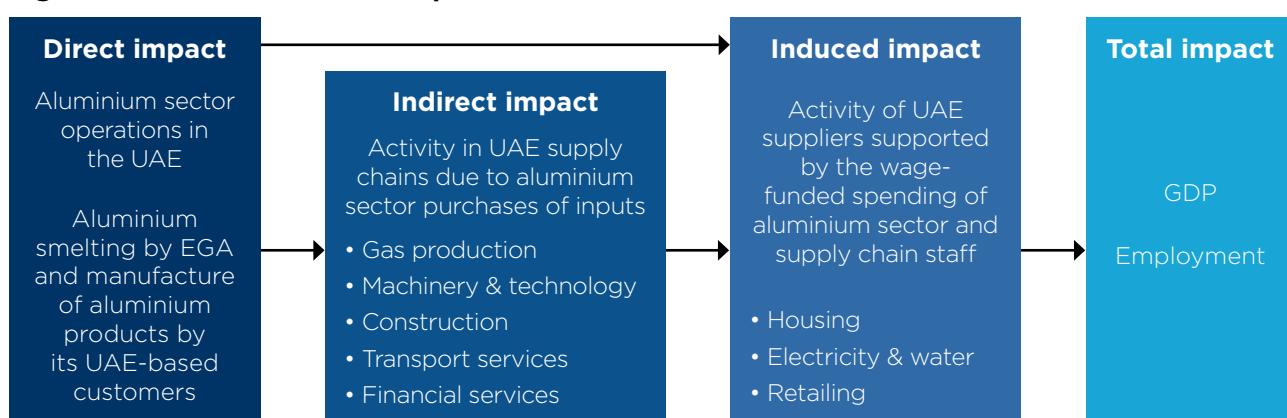
The sector's economic footprint, i.e. its total contribution to domestic GDP and jobs, is the sum of the direct, indirect and induced impacts. In the analysis, each of the metrics is split between the three channels of impact, and between the aluminium sector, other manufacturing, and 17 other sectors of industry.

1.3 REPORT STRUCTURE

This report is structured as follows:

- Chapter 2 describes the size of the aluminium sector itself, including the direct GDP and jobs contributions, as well as the make-up of the workforce, labour productivity, and remuneration per employee.
- Chapter 3 examines the wider economic footprint in the UAE, covering the indirect, induced, and total contributions to UAE GDP and jobs.
- Appendix 1 sets out detailed results tables.
- Appendix 2 describes the methodology used.

Fig. 4: A standard economic impact assessment model



² GDP is a net measure of the output of an economy or industry. It includes the sector's profits, and its capital and employment costs, while excluding the cost of non-capital inputs purchased from other sectors.

2. THE ACTIVITY OF THE ALUMINIUM SECTOR IN THE UAE

The UAE's aluminium sector is defined as including the activities of EGA, at its smelting plants in Dubai and Abu Dhabi, and those of its 26 UAE-based business customers, who manufacture a variety of products out of the aluminium that they purchase.

2.1 SECTOR TURNOVER AND GDP

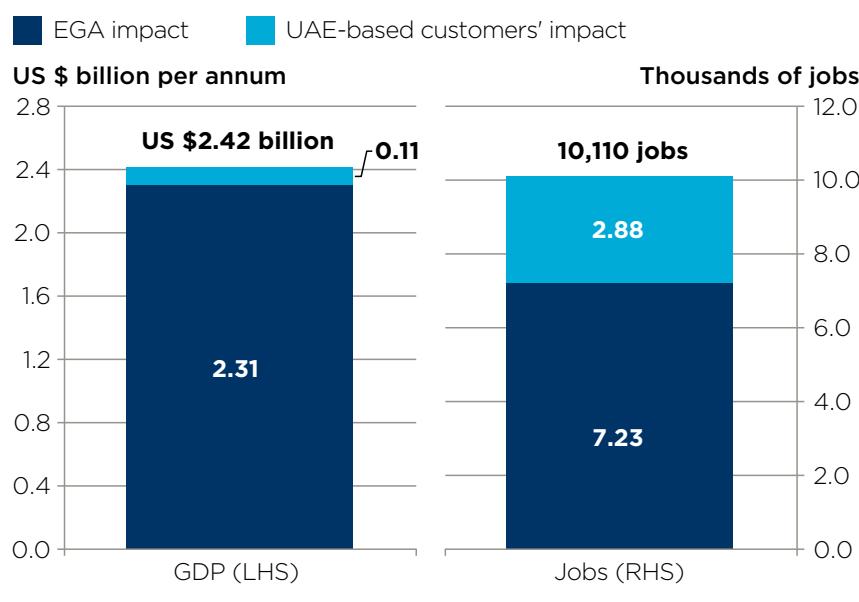
In 2017, EGA had a turnover of US \$5.55 billion (AED 20.38 billion), in relation to its activities in the UAE, while the UAE-based operations of its customers are estimated to have resulted in sales worth US \$0.63 billion (AED 2.31 billion). The sector's total gross revenues therefore amounted to US \$6.18 billion (AED 22.69 billion).

A significant share of these revenues is used to purchase inputs of raw materials, goods and services, including, in EGA's case, imports of alumina. But the sector's direct GDP, which includes employment costs, capital

costs, and net operating profits, while excluding the cost of these inputs, still amounted to US \$2.42 billion (AED 8.88 billion). EGA itself accounted for US \$2.31 billion (AED 8.47 billion) of this, and its UAE-based customers for US \$0.11 billion (AED 0.41 billion), as illustrated in Fig. 5.

Some 58 percent, or US \$1.39 billion (AED 5.12 billion), of the GDP generated by the sector itself occurs within Abu Dhabi. Another 40 percent (US \$0.98 billion, AED 3.49 billion) occurs in Dubai, and two percent (US\$ 0.05 billion, AED 0.17 billion) in the other five Emirates.

Fig. 5: The direct GDP and jobs impacts of the UAE aluminium sector



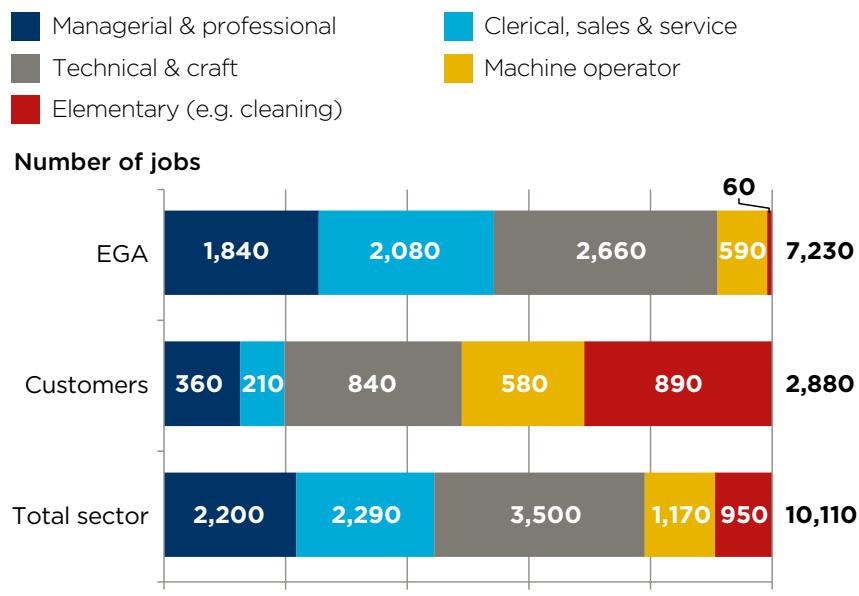
2.2 SECTOR EMPLOYMENT, PRODUCTIVITY, AND STAFF REWARDS

In 2017, 10,110 people were employed by EGA and its customers in the UAE. Some 7,230, or 72 percent, were EGA employees, while 2,880 people (28 percent) were employed by the aluminium fabricators (see Fig. 5). Dubai accounted for 46 percent of the industry's jobs, and Abu Dhabi for 42 percent.

For the sector as a whole, managerial and professional jobs account for 20 percent of the total, technical and craft jobs for 31 percent, clerical, sales and service jobs for 25 percent, machine operating jobs for 15 percent, and elementary jobs for nine percent (see Fig. 6). There are clear differences between the pattern of jobs at EGA and that across its customers, with routine machine operation and elementary occupations (such as cleaning, packing, and security work) accounting for 51 percent of employment amongst EGA's UAE-based clients, but for only 14 percent of posts at EGA itself.

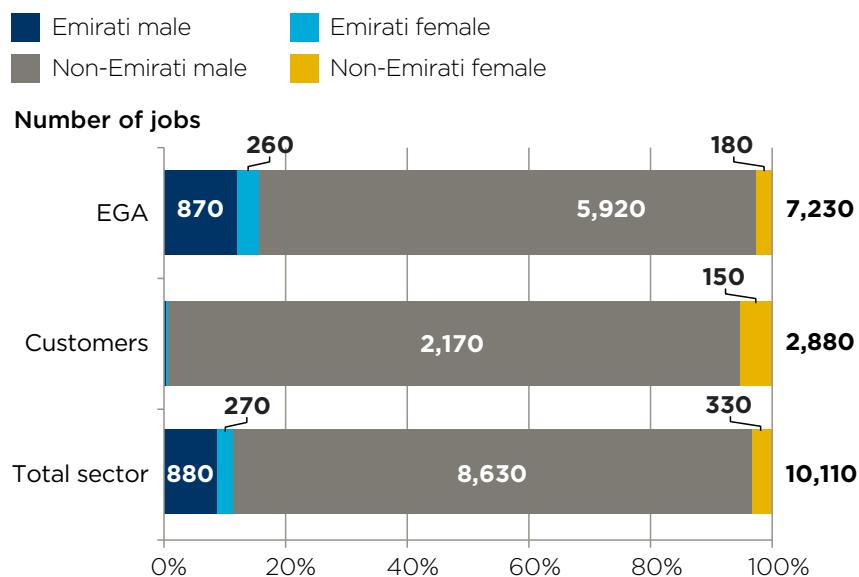
By nationality, non-Emiratis account for a clear majority of employees, in line with the UAE labour market in general (see Fig. 7). However, **the 15.6 percent share of EGA's workforce accounted for by Emiratis is significantly higher than the proportion for the rest of the UAE economy. In Dubai, for example, Emiratis accounted for broadly four percent of the workforce.³**

Fig. 6: Types of job in the UAE aluminium sector



Source: EGA, Oxford Economics

Fig. 7: UAE aluminium sector jobs by nationality and gender



Source: EGA, Oxford Economics

³Based on the pattern of economic activity by nationality in the Dubai Statistics Center's 2017 Labour Force Survey. No up-to-date equivalent figures are available for the other Emirates.

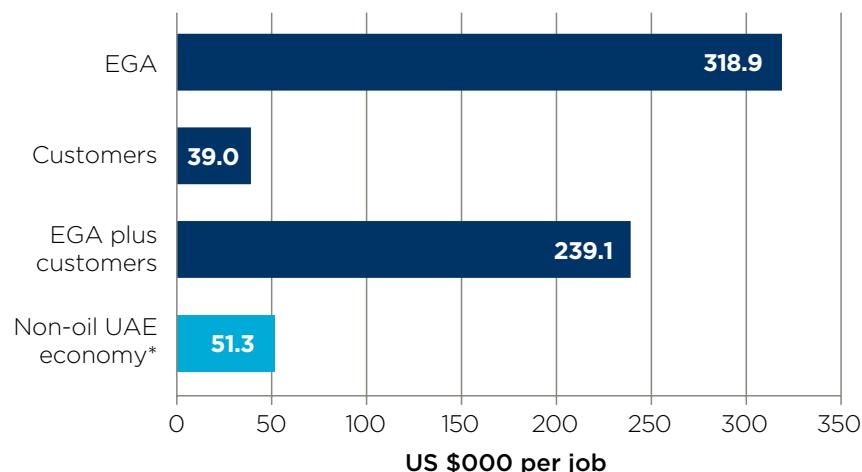
EGA has a long track record of Emiratising 'in-focus' positions – those jobs that can be feasibly Emiratised. Emiratisation of these positions was 37.6 per cent at the start of 2017 and EGA is targeting 40 per cent by 2020.

The capital-intensive nature of EGA's operations, use of advanced technology, workforce skills, and high values achieved by its products in the global marketplace, mean that GDP per job—a crude measure of labour productivity—is extremely high by national and global standards. As Fig. 8 shows, **EGA's performance on this measure boosts the GDP-per-job figure for the aluminium sector as a whole to almost US \$240,000 (AED 880,000) per annum.**

That compares with the average annual GDP per job across the UAE economy of US \$51,000 (AED 188,000), excluding the oil sector (where GDP-per-job is exceptionally high), and excluding work for private households (where GDP-per-job is very modest).

The high GDP-per-job values achieved by EGA allow the company to pay the above-average employee remuneration required to attract and retain a highly-skilled and motivated workforce. As Fig. 9 shows, total employment costs per worker amounted to US \$66,500 (AED 244,300) in 2017, for EGA alone, while the value for the sector as a whole averaged US \$54,800

Fig. 8: GDP per job in context



*Also excludes work for private households

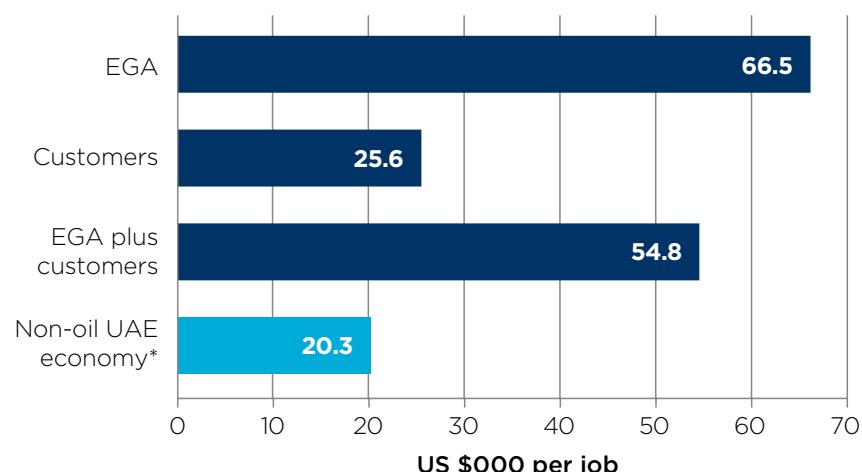
Source: Oxford Economics, Ministry of Economy

(AED 201,300) per staff member. That compares with US \$20,300 (AED 74,600) for the UAE as a whole, excluding oil sector workers and those working for private households.

Basic wages account for only 40 percent of the sector's total employment costs—some 37 percent in the case of EGA,

and 56 percent in the case of its customers. The remainder is made up of allowances to cover employees' living costs (including housing and transport), extra earnings (such as for shift work or from gratuities), and payments towards, for example, education and pensions.

Fig. 9: Employment costs per job in context



*Also excludes work for private households

Source: Oxford Economics, Ministry of Economy



3. THE WIDER ECONOMIC FOOTPRINT OF THE UAE'S ALUMINIUM SECTOR

This chapter examines the impact of the aluminium sector's expenditure on the rest of the UAE economy. This occurs through its purchases of goods and services from local suppliers (known as the indirect impact). It also occurs through the payment of wages by the industry and its supply chain, a proportion of which is spent by staff at local retail, leisure and other outlets. Both impacts stimulate economic activity and jobs around the UAE. The chapter ends by summarising the total impacts, i.e. the direct, indirect and induced impacts aggregated together.

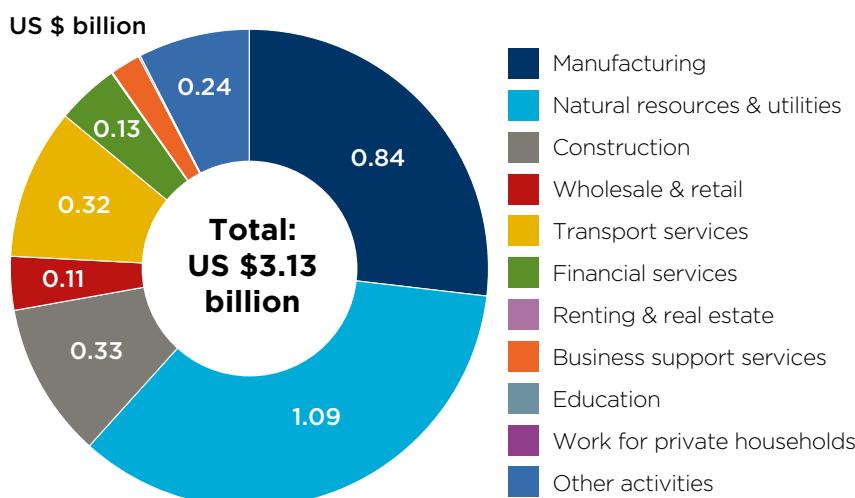
3.1 INDUSTRY PURCHASES AND INDIRECT IMPACTS

In 2017, EGA purchased US \$2.87 billion (AED 10.56 billion) of energy, raw materials, goods and services from other firms in the UAE. In addition, the 26 aluminium fabricators which are its customers purchased US \$0.26 billion (AED 0.94 billion) of supplies from other UAE-based producers—in addition to the US \$0.58 billion (AED 2.14 billion) of aluminium purchased from EGA. So in total, the sector made US \$3.13 billion (AED 11.51 billion) of net purchases from other suppliers in the UAE's industries. These totals include spending on construction work and other capital items, such as machinery, as well as 'day-to-day' procurement of inputs.

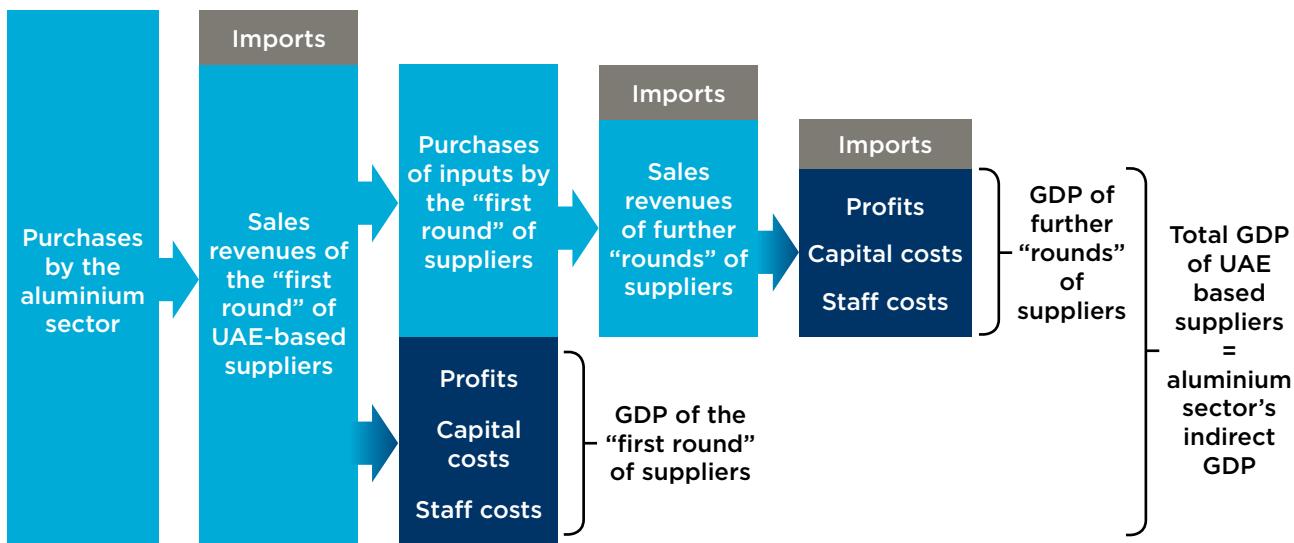
Of this expenditure, suppliers of natural resources and utilities received US \$1.09 billion (AED 4.01 billion) between them, while the non-aluminium manufacturing sector received US \$0.84 billion (AED 3.09 billion) (see Fig. 10). Construction and transport services ranked third and fourth.

These purchases stimulate GDP in the UAE-based supply chain, which is referred to as the aluminium sector's "indirect" GDP. As Fig. 11 illustrates, purchases by the aluminium sector, other than imported supplies, provide revenues to the direct suppliers to the sector, i.e. the "first round" of the supply chain. These are used to fund staff costs, capital costs, and purchases of inputs from further "rounds" of suppliers, with any amount left over constituting these suppliers' profits. The GDP of these direct suppliers to the aluminium sector is the sum of their staff costs, capital costs, and profits.

Fig. 10: The aluminium sector's UAE-sourced supplies, by industry



Source: Oxford Economics

Fig. 11: Derivation of indirect GDP in principle

But their purchases of inputs from the next "round" of UAE-based suppliers will fund the costs and profits of those firms in turn, and so on right along the UAE-based supply chain. Ultimately, the value of the aluminium sector's purchases will be split into two categories: content that is imported, and value added by firms and workers in the UAE—that is, the GDP of the domestic supply chain.

The sector's purchases of US \$3.13 billion (AED 11.51 billion) from UAE suppliers supported an estimated indirect GDP impact of US \$2.59 billion (AED 9.53 billion) in the UAE-based supply chain, with the remaining US \$0.47 billion (AED 1.03 billion) reflecting imported content within those supplies. Some US \$2.40 billion (AED 8.41 billion) of the indirect GDP impact

related to EGA's purchases, and the remaining US \$0.20 billion (AED 0.72 billion) to its customers' purchases from third parties (see Fig. 12).

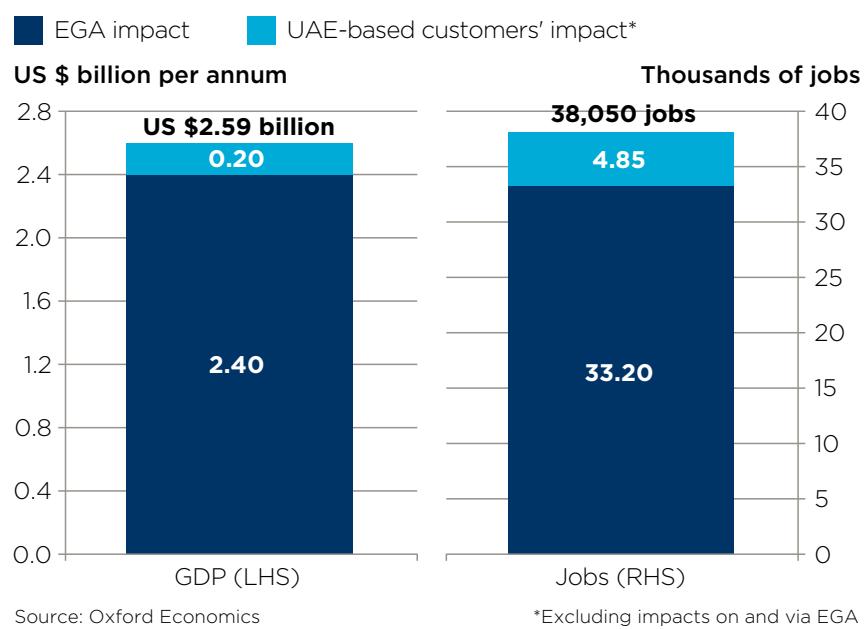
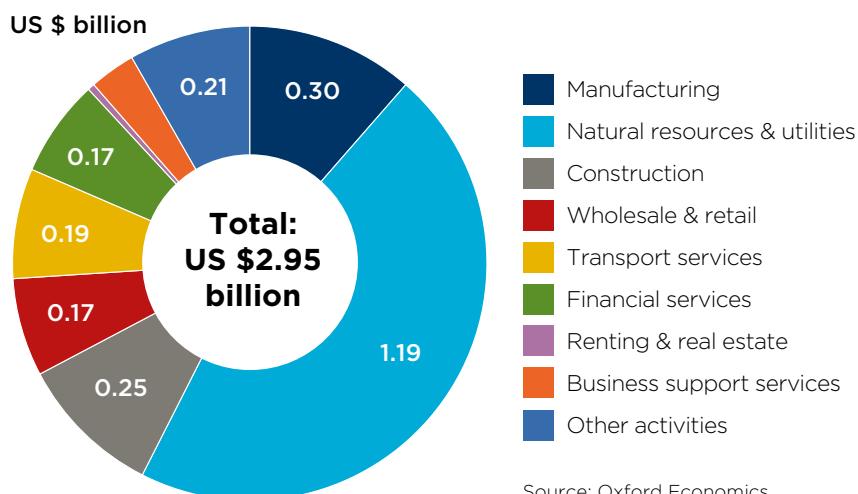
Fig. 12: The UAE aluminium sector's indirect GDP and jobs impacts

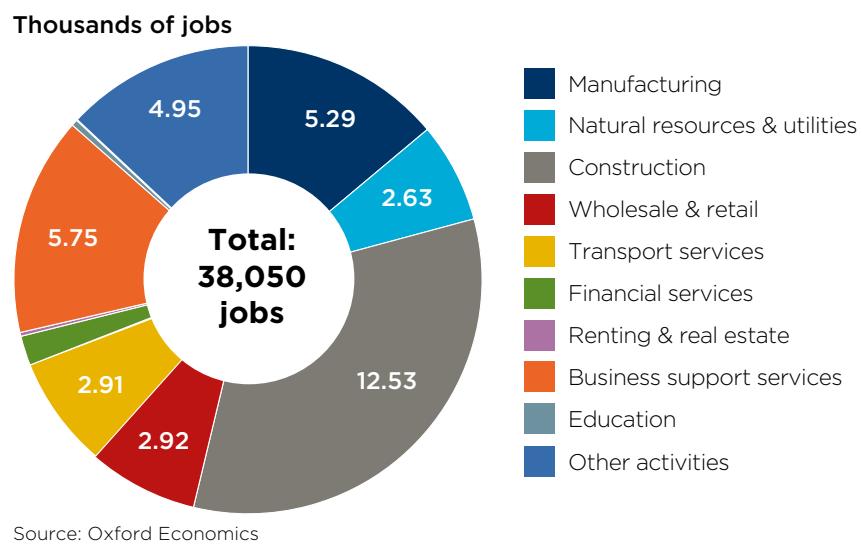
Fig. 13: Indirect GDP impact by sector of supplier


By industry of supplier, the pattern of indirect GDP is fairly similar to the pattern of domestic purchases (see Fig. 13). However, the indirect GDP of the local manufacturing sector is modest compared with the value of the aluminium sector's spending on UAE-sourced non-aluminium manufacturing. This reflects the comparatively high share of manufacturers' revenues used to pay for inputs purchased from other sectors, including energy supplies for example.

This activity in the local supply chain will support additional jobs in those industries. Taking into account jobs-to-GDP ratios by industry, it is estimated that 38,050 jobs were supported in the indirect channel (see Fig. 12). Some 33,200 of those indirect jobs were ultimately supported by EGA's expenditure, while the remaining 4,850 were supported by EGA's customers' purchases from third party firms.

The pattern of indirect jobs by industry is noticeably different to the pattern of indirect GDP (see Fig. 14). Natural resources and utilities make only a comparatively modest contribution to indirect employment at 2,630

jobs, while construction at 12,530 jobs, and business support services (such as cleaning of buildings and security) at 5,750 jobs, are much more significant in terms of indirect jobs than indirect GDP.

Fig. 14: Indirect jobs impact by sector of employer


3.2 INDUCED IMPACTS

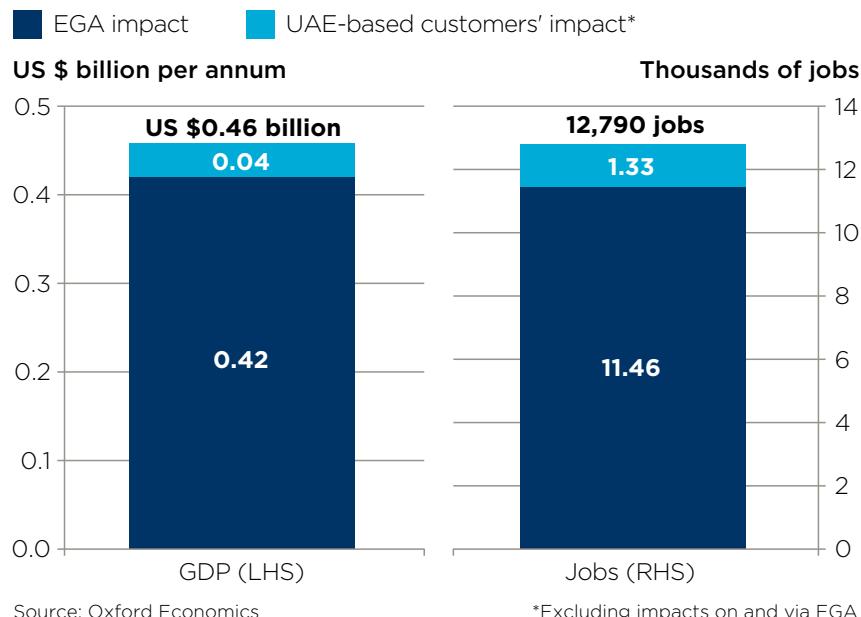
Induced impacts reflect the economic activity in the UAE that is supported by the wage-funded expenditure of workers in the aluminium sector—and in its supply chain, to the extent that those employees' wages are ultimately financed by the aluminium sector's purchases of goods and services.

The UAE aluminium sector's total induced GDP impact amounted to US \$0.46 billion (AED 1.68 billion) in 2017 (see Fig. 15). The vast majority of this—US \$0.42 billion (AED 1.54 billion)—was driven by the activities of EGA.

As the induced impacts are driven by household rather than business spending, the pattern of induced GDP by industrial sector differs significantly to that of the indirect GDP impact (see Fig. 16). The induced GDP impact is spread across a wide range of sectors, with the most important contributions made by renting & real estate (13 percent of the total), utilities (12 percent), wholesale & retail services (12 percent), and financial services (10 percent).

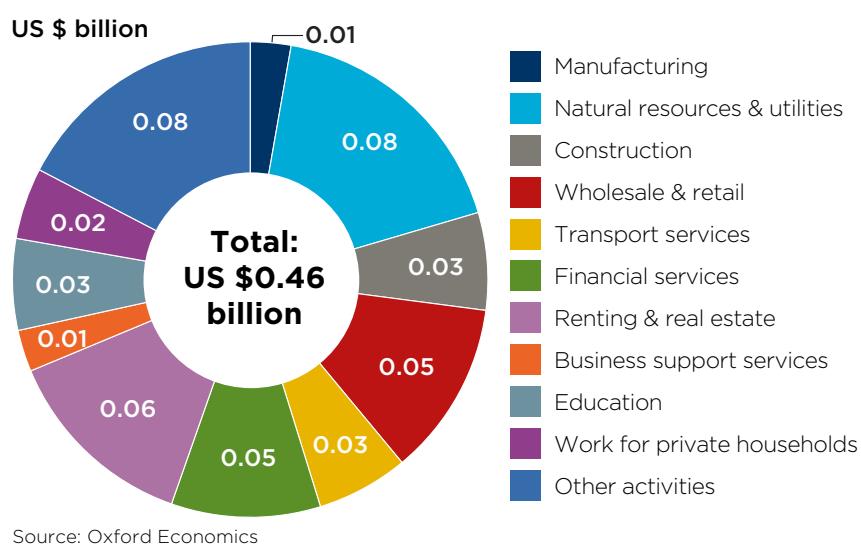
The induced channel of impact also supported some 12,790 jobs in 2017, with 11,460 of these ultimately supported by EGA's wage, procurement and capital expenditure, and 1,330 by the unrelated expenditure of its customers (see Fig. 15).

Fig. 15: The UAE aluminium sector's induced GDP and jobs impacts



*Excluding impacts on and via EGA

Fig. 16: Induced GDP impact by sector of supplier



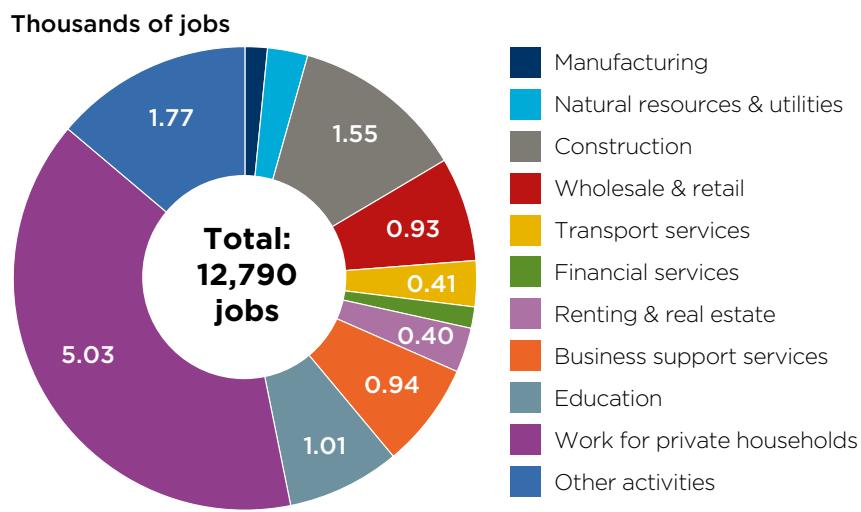
The pattern of induced employment by sector differs significantly from the pattern of induced GDP (see Fig. 17). Most markedly, work for private households accounts for 39 percent of induced jobs. Construction, education, and wholesale & retail services also make important contributions to this total. Induced employment includes work for suppliers to consumer-facing businesses, as well as work for the consumer-facing firms themselves. Here, business support services provide a significant number of induced jobs, despite their modest contribution to induced GDP.

3.3 TOTAL ECONOMIC FOOTPRINT

Taking all three channels of impact together, the UAE aluminium sector's total GDP contribution is calculated to have been US \$5.47 billion (AED 20.09 billion) in 2017 (see Fig. 18). This is equivalent to 1.4 percent of the UAE's total GDP that year, or 1.8 percent of the country's non-oil economy.

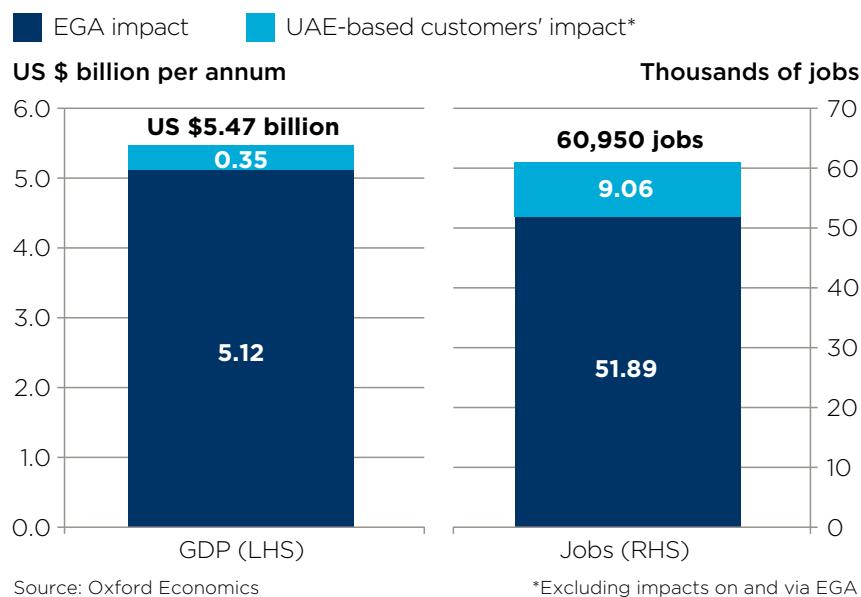
The aluminium sector itself accounted for 44 percent of the total GDP impact, or US \$2.42 billion (AED 8.88 billion), as described in Chapter 2. This value was supplemented by an indirect (supply chain) GDP impact of US \$2.59 billion (AED 9.53 billion), and an induced (employee spending) impact of US \$0.46 billion (AED 1.68 billion). This means that for every US \$1 of GDP generated

Fig. 17: Induced jobs impact by sector of employer



directly by the sector, an additional US \$1.26 of activity is supported elsewhere in the UAE economy.

Fig. 18: The UAE aluminium sector's total GDP and jobs impacts



After the aluminium sector itself, the industry that benefits the most from its expenditure is natural resources and utilities, where 23 percent of the total contribution to UAE GDP is stimulated (see Fig. 19). The next most important sectors are non-aluminium manufacturing, construction, wholesale & retail services, transport services, and financial services. But all 12 remaining industrial sectors also benefit from the UAE aluminium sector's activities, to some degree.

The aluminium sector supported 60,950 jobs in the UAE in 2017 (see Fig. 18). This is 1.0 percent of all UAE jobs. The sector's own employment of 10,110 was supplemented by 38,050 indirect jobs, and 12,770 induced jobs. This means that for every individual working in the aluminium sector, a further five jobs were supported elsewhere in the UAE in 2017.

The aluminium sector creates its biggest labour market benefit for the construction industry. Of the jobs it supports, some 23 percent are in construction, which is higher than the 17 percent contribution of the aluminium sector itself (see Fig. 20). Business support services account for 11 percent of the jobs, non-aluminium manufacturing for nine percent, private households for eight percent, and wholesale & retail services for six percent.

For every 10 jobs in the aluminium sector itself, a further 14 construction workers are supported, along with five non-aluminium manufacturing workers, four shop and wholesale sector workers, and one worker in the education sector, alongside many others.

On top of this, from 2018 onwards, VAT payments associated with aluminium products, and with spending by employees, will help to fund the employment of vital public services workers.

Fig. 19: Total GDP impact by sector of supplier

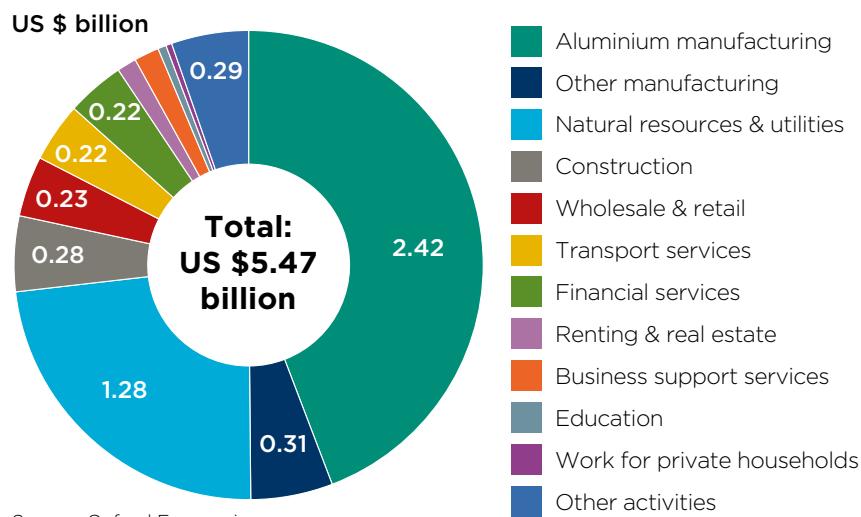
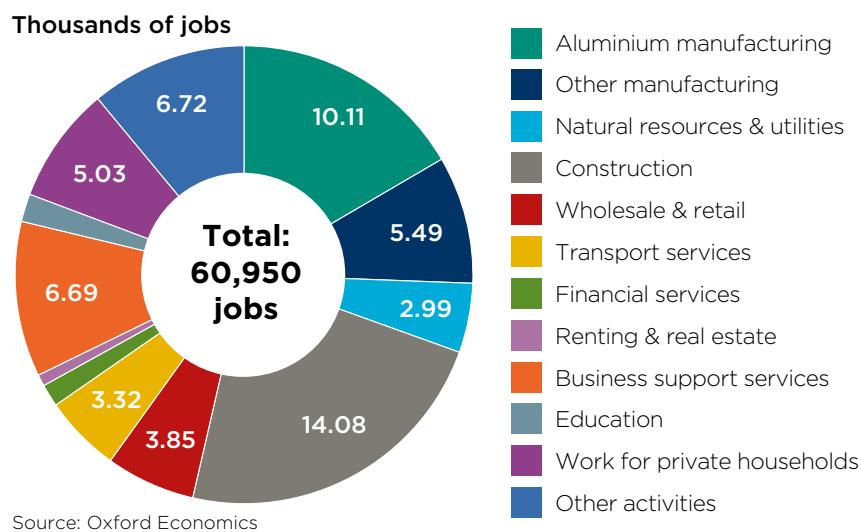


Fig. 20: Total jobs impact by sector of employer



APPENDIX 1: RESULTS TABLES

Fig. 21: GDP impacts across the UAE, by channel and industry

US \$ billion, 2017	Direct	Indirect	Induced	Total
Aluminium manufacturing	2.42	-	-	2.42
Other manufacturing	-	0.30	0.01	0.31
Natural resources & utilities	-	1.19	0.08	1.28
Construction	-	0.25	0.03	0.28
Wholesale & retail	-	0.17	0.05	0.23
Transport services	-	0.19	0.03	0.22
Financial services	-	0.17	0.05	0.22
Renting & real estate	-	0.01	0.06	0.07
Business support services	-	0.08	0.01	0.09
Education	-	0.00	0.03	0.03
Work for private households	-	0.00	0.02	0.02
Other activities	-	0.21	0.08	0.29
Total	2.42	2.59	0.46	5.47
<i>Of which:</i>				
Supported by EGA	2.31	2.40	0.42	5.12
Supported by EGA's UAE-based customers ¹	0.11	0.20	0.04	0.35
<i>Breakdown of other activities:</i>				
Agriculture	-	0.00	0.00	0.01
Hotels & catering	-	0.01	0.01	0.02
Information & communication	-	0.05	0.03	0.07
Professional services	-	0.10	0.02	0.12
Public administration	-	0.01	0.01	0.01
Health & social work	-	0.01	0.00	0.01
Recreation & other services	-	0.03	0.01	0.05

¹ The indirect and induced contributions exclude impacts on and via EGA.

Source: Oxford Economics

Fig. 22: Jobs impacts across the UAE, by channel and industry

Average number of jobs in 2017	Direct	Indirect	Induced	Total
Aluminium manufacturing	10,110	-	-	10,110
Other manufacturing	-	5,290	200	5,490
Natural resources & utilities	-	2,630	360	2,990
Construction	-	12,530	1,550	14,080
Wholesale & retail	-	2,920	930	3,850
Transport services	-	2,910	410	3,320
Financial services	-	780	190	970
Renting & real estate	-	100	400	500
Business support services	-	5,750	940	6,690
Education	-	190	1,010	1,200
Work for private households	-	0	5,030	5,030
Other activities	-	4,950	1,770	6,720
Total	10,110	38,050	12,790	60,950
<i>Of which:</i>				
Supported by EGA	7,230	33,200	11,460	51,890
Supported by EGA's UAE-based customers ¹	2,880	4,850	1,330	9,060
<i>Breakdown of other activities:</i>				
Agriculture	-	30	10	40
Hotels & catering	-	410	430	840
Information & communication	-	760	240	1,000
Professional services	-	1,810	270	2,080
Public administration	-	120	60	180
Health & social work	-	70	60	130
Recreation & other services	-	1,750	700	2,450

¹ The indirect and induced contributions exclude impacts on and via EGA.

Source: Oxford Economics

APPENDIX 2: METHODOLOGY

Emirates Global Aluminium provided information on employment headcount, employment costs, profits before capital depreciation, and total sales revenues, by the location of their operations, and purchases of goods and services by individual supplier, and capital purchases, by location of supplier. The same information was provided by some of EGA's UAE-based customers, except that the value of supplies was split by industry and location of supplier. The data provided by the sub-set of EGA customers was scaled up, separately for Abu Dhabi, Dubai, and the rest of the UAE, based on their share of EGA's sales.

Direct GDP was taken to be the sum of profits before depreciation, and total employment costs, for EGA and its customers combined.

The value of purchases from UAE-based suppliers, including capital outlays as well as day-to-day procurement, was allocated across 18 broad sectors of UAE industry, separately for Abu Dhabi, Dubai, and the rest of the UAE, by location of supplier. Customer purchases from EGA were excluded, in order to avoid 'double counting' of activity.

This expenditure data was fed into a model of the UAE economy, developed by Oxford Economics, incorporating information on transactions between the different industries within each Emirate, between Emirates, and across national boundaries. This allowed the indirect GDP contribution to be estimated, on an industry-by-industry basis. The indirect jobs contribution was worked out from there, within the model, based on GDP-to-jobs ratios for each industry in each location.

Information on employment costs in the aluminium sector was also fed into the model. Together with information on the share of employee compensation in GDP for each of the supply chain industries, the share of employee compensation available to be spent by workers in each industry, and the pattern of household spending by product type, in each of the three regions, this allowed the induced GDP impact to be estimated. This includes the impact of spending by the direct employees, and that of spending by supply chain employees, funded by their share of the aluminium sector's indirect GDP. The induced jobs contribution was worked out from the induced GDP impact using the industry-by-industry GDP-to-jobs ratios.

The total GDP and jobs contributions simply sum up over the direct, indirect and induced impacts. Activities outside of the UAE are excluded from all of the estimates in this report.

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The modelling and results presented here are based on information provided by third parties, upon which Oxford Economics has relied in producing its report and forecasts in good faith. Any subsequent revision or update of those data will affect the assessments and projections shown.

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