Dow Moulding the Future Report

Contents

Chapter 1

Executive Summary

This report provides estimates of the potential future demand for workers on the part of the Chemicals and Plastics Products industries in seven European markets.1 This research is part of a study undertaken on behalf of Dow, as part of initiative focused on attracting new talent to the Chemicals industry.

Official labour market statistics confirms that the Chemicals and Plastic Products sectors are already significant employers. Across the seven markets included in this report:

- The Chemicals sector currently employs around 851,000 people, with net workforce growth amounting to 32,000 jobs over the 2015-2019 period

- The Plastic products sector employs nearly 865,000, with growth of over 11,000 since 2015.

However, it is notable that the workforces of both industries are dominated by males. For example, across the seven labour markets, the overall proportion of the Chemicals sector workforce that is male is currently nearly 69%, whereas for Plastic products it is nearly 74%. However, there are significant differences at a country-level: e.g., overall, 42% of the UK Chemicals industry workforce is female.

Younger workers are arguably under-represented in both sectors. For example, in the Netherlands only around 4% of the Chemicals sector workforce is aged up to 25 years, whereas in both Sweden and Germany the proportion is over double this level (i.e., 9.5% in each case).

Future demand for workforce recruitment is driven by a range of factors, including expansion demand and the need to replace workers departing the industry for a range of factors, including retirement. (e.g., nearly 12% of the current Netherlands Chemicals industry workforce is aged 60 years or over). The future composition of the workforce is also driven by a need – linked to technological developments – for a greater proportion of workforce with degree level and trades qualifications.

Future estimates of workforce demand have been developed using econometric models and background research into the likely future composition of workforces based on occupational classifications, qualifications levels, etc. The period of analysis is for the period 2021-2035, with annual estimates also disaggregated by expected age band and gender of the recruits.

Overall future workforce recruitment demand between 2021-2035 across the seven countries amounts to just over 1.72 million, with 47% of this accounted for by the Chemicals sector (i.e., 814,000 recruits needed) and 53% by Plastic Products (i.e., nearly 910,000 recruits needed). The table below sets out the expected overall cumulative demand for industry-level recruitment, with annual results also presented for four ‘snapshot’ years: 2021, 2025, 2030, and 2035.

It may be noted that Germany alone is expected to account for cumulative recruitment demand amounting to just over 690,000 roles, with Chemicals accounting for around 366,000 of these. Germany therefore accounts for 40% of overall expected recruitment demand.

Of the overall demand for just over 1.72 million recruits, nearly half (47%) of all demand – i.e., 800,000 recruits in total – is expected to be for Managerial, Professional and Associate professional roles. However, there is also significant demand for recruits into both Skilled trades roles (around 12% of the total) and Plant & machinery operatives (21%).

Table 1.1: Annual recruitment demand, overall Chemicals and Plastic Products workforce ('000s)

Sector and demand type	2021	2025	2030	2035	Cumulative (2021 -2035)
Belgium total, of which:	4.3	4.5	4.6	4.8	68.4
Chemicals	2.4	2.5	2.6	2.7	38.4
Plastic Products	1.9	1.9	2.0	2.1	30.0
France total, of which:	18.7	18.6	18.4	18.2	276.8
Chemicals	7.7	7.6	7.5	7.4	113.2
Plastic Products	11.0	10.9	10.9	10.8	163.5
Germany total, of which:	44.3	45.3	46.6	47.9	690.8
Chemicals	22.6	23.6	24.9	26.3	365.9
Plastic Products	21.7	21.7	21.7	21.7	324.9
Netherlands' total:	5.4	5.7	6.0	6.3	87.9
Chemicals	2.6	2.7	2.7	2.8	40.7
Plastic Products	2.8	3.0	3.3	3.6	47.2
Spain total, of which:	19.2	21.1	23.8	26.8	342.3
Chemicals	9.5	10.3	11.4	12.6	165.0
Plastic Products	9.7	10.8	12.4	14.2	177.4
Sweden total, of which:	2.4	2.5	2.6	2.7	38.3
Chemicals	0.8	0.9	0.9	0.9	12.8
Plastic Products	1.5	1.6	1.7	1.9	25.5
UK total, of which:	14.0	14.3	14.8	15.4	219.3
Chemicals	4.9	5.0	5.3	5.6	78.0
Plastic Products	9.1	9.3	9.5	9.8	141.2
7 Markets total, of which:	108.3	112.0	116.8	122.1	1,723.8
Chemicals	50.5	52.6	55.3	58.3	814.0
Plastic Products	57.7	59.2	61.5	64.1	909.7

It is also worth noting that of the overall demand for graduates and post-graduates across the seven countries, around 47% is driven by the Chemicals sector and 53% by Plastic products manufacturing. However, these proportions vary significantly from country to country. For example, in Sweden the Chemicals sector is expected to contribute around one-third of the combined demand for graduates (& post-graduates), whilst in Belgium the same sector contributes nearly 57% of combined demand.

Across the seven countries, the combined recruitment demand from the Chemicals and Plastic products industries is expected to typically accounts for around 2% of overall (i.e., economy-wide) national recruitment demand over the 2021-2035 period. However, there is some significant variation in this proportion by country, with the highest share found in Germany (2.9% of the national total) and the lowest share found in the UK (1.1%)

Across the seven markets, overall, around 51% of future economy-wide workforce demand over the 2021-2035 period is expected to be for workers in Managerial, Professional, and Associate professional occupations. However, the proportion of workers of this type required by the Chemicals sector is significantly rather higher than this economy-wide average, at about 58%. On the other hand, demand for workers of this type by the Plastic products segment is lower than the overall average, at around 47%.

Overall, the Chemicals and Plastic Products industries in combination are likely to need to attract over 1.05 million young people (i.e., those aged up to 25 years) between 2021 and 2035. Additionally, there is also likely to be a cumulative need to recruit around 384,000 workers in the 25-39 age range over this period (i.e., 2021-2035).

Table 1.2: Age breakdown of expected future cumulative recruitment demand, 2021-2035 (‘000s)

Age band	Bel.	Fra.	Ger.	Neth.	Spa.	Swe.	UK	Total
Under 25 years	41.8	169.2	422.4	53.7	209.3	23.4	134.0	1,053.9
25-39 years	15.2	61.7	153.9	19.6	76.3	8.5	48.8	384.1
40-59 years	7.7	31.2	77.9	9.9	38.6	4.3	24.7	194.3
60 years and over	3.6	14.7	36.6	4.7	18.1	2.0	11.6	91.3
Overall	68.4	276.8	690.8	87.9	342.3	38.3	219.2	1,723.8

In future, there is an opportunity to increase the diversity of the Chemicals and Plastic products industry workforce by increasing the proportion of the workforce that is female. Based on current and potential increases in female enrolment on STEM degree courses, a reasonable and realistic target could be for females to account for nearly 43% of recruitment by 2035. However, to achieve this level would require an annual increase in the proportion of female recruitment of around 2.7% per annum over the 2021-2035 period.

Chapter 2

Introduction

This report provides estimates of the potential future demand for workers on the part of the Chemicals and Plastics Products industries in seven European markets. This research is part of a study that has been undertaken on behalf of Dow, as part of initiative that is focused on attracting new talent to the Chemicals industry. Dow recognises that society faces threats and challenges relating to climate change and plastics waste that creates an urgent need for the Chemicals sector to encourage more young people to regard the industry as an attractive and fulfilling career destination.

The aim of the campaign, therefore, would be to help the industry attract from among ‘the best and brightest’ to help bring to the sector fresh thinking and bold ideas to address big issues.

This report focuses on future workforce and skills demand in the Chemicals and Plastic Products sectors in seven selected European countries, which are:

- Belgium
- France
- Germany
- the Netherlands
- Spain
- Sweden
- the UK.

The sectors that are the focus of this assessment correspond to Standard Industrial Classification categories 20 (Chemicals) and 22 (Plastic Products). The table below sets out further disaggregation of these sectors using more detailed SIC codes used by Eurostat for EU countries and by the ONS for the UK.

Chemicals (SIC20)	Plastic Products (SIC22)
2011: Manufacture of industrial gases	2221: Manufacture of plastic plates, sheets, tubes, eat.
2012: Manufacture of dyes & pigments	2222: Manufacture of plastic packing goods
2013: Manufacture of other inorganic basic chemicals	2223: Manufacture of builders' ware of plastic
2014: Manufacture of other organic basic chemicals	2229: Manufacture of other Plastic Products
2015: Manufacture of fertilisers	
2016: Manufacture of plastics in primary forms	
2017: Manufacture of synthetic rubber	
2020: Manufacture of pesticides & agrochemicals	
2030: Manufacture of paint, varnish, coatings, inks,	
2041: Manufacture of soap & detergents, act.	
2042: Manufacture of perfumes & toilet preparations	
2051: Manufacture of explosives	
2052: Manufacture of glues	
2053: Manufacture of essential oils	
2059: Manufacture of other chemical products	
2060: Manufacture of man-made fibres	

The types of vocational occupations required by employers operating in these industries is wide-ranging, with the most numerous roles including job types such as the following:

- Production managers and directors in manufacturing
- Chemical scientists
- Biological scientists and biochemists
- Programmers and software development professionals
- Laboratory technicians
- Engineering technicians
- Quality assurance technicians
- Science, engineering, and production technicians
- IT user support technicians
- Buyers and procurement officers
- Chemical and related process operatives
- Metal working machine operatives

The focus of the study is on overall net recruitment needs at an industry level. Therefore, the quantification of future recruitment demand necessarily excludes the effects of the intra-industry movement of workers – i.e., the movement of workers between different businesses within the Chemicals and Plastic Products sectors.

Chapter 3

Broad sectoral overview, 2019

Data concerning the number of jobs supported by businesses and organisations involved in various industrial sectors – including Chemicals and Plastic Products – can be obtained from Eurostat and the ONS. For example, in the case of the UK, the key sources include the annual Business Register and Employment Survey (BRES) and the quarterly Labour Force Survey (LFS).

The table below sets out the estimated employment totals for the Chemicals industry in each of the seven European labour markets assessed in this report. The data shows 2019 levels of employment, and also the change that has occurred since 2015 in both absolute and proportionate terms. It should be noted that whilst 2020 data is also available for most counties, in some cases this is provisional data. Therefore, it was decided to focus on the 2019 because this was available for all countries. In addition, there is a potential benefit in terms of setting aside any short-term disruption to normal levels of employment that may have occurred due to the effects of the Covid-19 pandemic.

Table 3.1: Chemicals sector workforce trends, 2015-2019

Country	2019 employment ('000s)	Change since 2015 ('000s)	Change since 2015 (%)
Belgium	46.2	-5.1	-9.9%
France	162.9	0.8	0.5%
Germany	359.4	20.0	5.9%
Netherlands	44.8	-1.0	-2.2%
Spain	129.4	19.0	17.2%
Sweden	16.1	0.1	0.6%
UK	92.1	-0.1	-0.2%
Total	850.9	32.1	3.9%

It may be noted that overall employment in the Chemicals sector across the seven markets amounts to just over 850,000. Since 2015 there has been net growth in employment of around 32,000, equivalent to just nearly 4% of the 2015 level. However, almost all of this growth has occurred in two of the markets, i.e.:

- Germany (with growth of 20,000 jobs, equivalent to nearly 6% of the 2015 base position); and
- Spain (with growth of 19,000 jobs, representing growth of over 17% compared to 2015).

On the hand, employment located in Belgium has declined by around 5,000 since 2015, equivalent to a drop of around 10%. There was also a reduction in the Netherlands workforce of around 1,000 (i.e., a reduction of just over 2% compared to 2015 levels). On the other hand, the workforces in countries such as France and the UK were nearly unchanged in net terms.

The next table provides the same information, but this time for Plastic Products.

Table 3.1: Plastic products sector workforce trends, 2015-2019

Country	2019 emplo yment ('000s)	Change since 2015 ('000s)	Change since 2015 (%)
Belgium	24.6	-2.3	-8.6%
France	186.6	-2.3	-1.2%
Germany	356.5	-6.6	-1.8%
Netherlands	34.2	-0.7	-2.0%
Spain	104.8	20.3	24.0%
Sweden	19.6	2.2	12.6%
UK	138.5	1.0	0.7%
Total	864.8	11.6	1.4%

It may be noted that the overall level of employment in the Plastic Products sector across the seven labour markets has grown by just over 11,000 jobs over the 2015-2019 period. This is equivalent to an overall increase of 1.4% since 2015. However, there are clear divergences between the markets, with Spain accounting for by far the greatest share of overall job growth but with smaller increases in employment levels also occurring in Sweden and the UK.

However, offsetting these job gains were job losses occurring in other markets, with those in Germany (6,600 jobs lost), Belgium (2,300 losses) and France (also 2,300 losses) particularly significant.

Data from sources such as the ONS can also be used to identify the characteristics of industrial workforces. Some of this data – such as age profile and gender – is particularly relevant to this study, and information on these key characteristics is presented in the remainder of this chapter.

Firstly, in terms of gender splits, there are interesting differences in terms of the characteristics of national workforces, as illustrated in the table below. The table provides information for both the Chemicals and the Plastic Products sectors and utilises the most up-to-date non-provisional annual data for each country (i.e., either 2019 or 2020).

Table 3.3: Composition of workforces by gender, 2019-2020

Country	Chemicals (Male %)	Chemicals (Female %)	Plastic Products (Male %)	Plastic Products (Female %)
Belgium	80.9%	19.1%	80.3%	19.7%
France	65.3%	34.7%	72.7%	27.3%
Germany	71.4%	28.6%	71.8%	28.2%
Netherlands	80.8%	19.2%	79.5%	20.5%
Spain	66.7%	33.3%	73.1%	26.9%
Sweden	61.1%	38.9%	68.1%	31.9%
UK	57.8%	42.2%	78.3%	21.7%
Overall	68.7%	31.3%	73.9%	26.1%

Overall, the Chemicals sector (31.3%) has succeeded in recruiting a higher proportion of females into its workforce compared to Plastic Products (26.1%). However, there are notable differences between countries: for example, Sweden has succeeded in attracting a much higher proportion of females into both sectoral workforces (i.e., 38.9% for Chemicals and 31.9% for Plastic Products).

It is also interesting to note that the proportion of UK Chemicals sector workforce that is female is, at over 42%, over double the proportion for that sector found in both the Netherlands and Belgium (c.19%).

The next table presents similar information for age profile, this time focusing on the Chemicals sector only.

Table 3.4: Composition of workforces by Age Group, Chemicals, 2019-2020

Country	Chemicals (<25 yrs %)	Chemicals (25-39 yrs %)	Chemicals (40-59 yrs %)	Chemicals (≥60 yrs %)
Belgium	5.9%	33.3%	56.4%	4.4%
France	5.4%	30.4%	58.8%	5.4%
Germany	9.5%	31.7%	51.5%	7.3%
Netherlands	4.1%	28.2%	56.0%	11.7%
Spain	3.6%	35.8%	57.3%	3.3%
Sweden	9.5%	26.8%	56.1%	7.6%
UK	5.0%	31.4%	57.1%	6.5%

In terms of age structure there are some notable differences between countries. For example, whereas in Germany and Sweden nearly 10% of the Chemicals sector workforce is comprised of younger people (i.e., those aged under 25 years), in Spain and the Netherlands the proportion is around half of this (i.e., less than 5%).
The next table presents equivalent figures for the Plastic Products sector, where the divergences in age structure between countries is in some cases even more pronounced.

Table 3.5: Composition of workforces by Age Group, Plastic Products, 2019-2020

Country	Plastic Products (<25 yrs %)	Plastic Products (25-39 yrs %)	Plastic Products (40-59 yrs %)	Plastic Products (≥60 yrs %)
Belgium	6.0%	35.1%	56.2%	2.6%
France	8.7%	26.8%	60.2%	4.3%
Germany	11.8%	29.3%	53.0%	5.9%
Netherlands	7.5%	26.1%	58.4%	8.1%
Spain	1.8%	35.2%	59.3%	3.7%
Sweden	11.8%	22.5%	37.0%	8.8%
UK	10.0%	31.5%	48.4%	10.1%

In Germany and Sweden but also the UK, the proportion of the sectoral workforce that is in the under 25s age band is at least 10%. In Spain, the equivalent figure is a remarkably low 1.8%.
Some of differences between countries may relate to differences in occupational structure. For example, for the UK data is available that provides information on the structure of the workforce disaggregated by occupational type, using the nine '1-digit' Standard Occupational Classifications used by the ONS and European statistical agencies. This data shows that the Chemicals sector is generally much more reliant on people who possess Professional and Associate professional qualifications, whereas the Plastic Products sector is comparatively much more reliant on a workforce that possesses Skilled trades qualifications.

Table 3.6: Sector workforce totals broken down by occupational type, UK, September 2019

Occupation	Chemicals	Plastic Products	Combined
1. Managers	14.5%	14.6%	14.5%
2. Professional occupations	16.5%	4.2%	9.5%
3. Associate professionals	24.5%	15.2%	19.3%
4. Administrative roles	9.1%	7.3%	8.1%
5. Skilled trades	5.0%	17.8%	12.3%
6. Other service occupations	1.6%	0.2%	0.8%
7. Customer service roles	2.4%	5.2%	4.0%
8. Plant and machine operatives	16.9%	26.3%	22.3%
9. Elementary occupations	9.5%	9.2%	9.3%
Overall	100.0%	100.0%	100.0%

Similarly, the qualifications profile of the current UK workforce for both sectors is presented in the table below. This again suggests that the Chemicals industry is much more reliant on a workforce with graduate and post-graduate qualifications compared to the Plastic Products industry.

Chapter 4

Future demand for workforce and skills: Summary of Methodology

With respect to potential future levels of employment demand, it is necessary to recognise two distinct concepts:

- Expansion demand: the number and type of jobs expected to be required to provide additional capacity for an industry.

- Replacement demand: the existing job roles that will need to be filled as a proportion of the current workforce leaves the industry for a variety of reasons, such as: retirement; assumption of caring responsibilities; a return to full time study; emigration; permanent ill-health; or other reasons.

For nearly all stable and long-established industries, the majority of annual recruitment need is usually accounted for by replacement demand rather than expansion demand.

Forecasts of future levels of replacement demand by sector can be obtained from various industry and sector reports. The approach taken here is to develop new estimates of expansion and replacement demand, taking account of the most recent data on the workforce in each of the seven national labour markets. However, to ensure that labour market disruption caused by the Covid-19 pandemic is not disproportionately influential, the main emphasis has been on assessing trends over the period up to and including 2019.

The specific approach taken includes the following:

- Basic expansion demands have been estimated based on the medium-term growth trends as revealed by Eurostat and ONS data over the period 2012-2019/2020. The analysis has also factored in an annual rate of productivity gain based on long term trends revealed by independent econometric projections for the national economies, disaggregated by broad sector.

- Annual replacement demand is estimated based on the sector level research, such as detailed evidence published for the UK by the Science Industry Partnership.

Expansion and replacement demands are then added together to form an estimate of the overall annual recruitment requirement for the two sectors over the time period 2021-2035.

The expected occupational structure of the annual recruitment requirement was estimated using trend data from Eurostat and ONS data series. The data was disaggregated into annual demand into nine sub-categories of occupations, ranging from Managers and Professionals, Skilled Trades, Administrative and Customer service occupations and unskilled manual occupations.

The annual recruitment requirement was also broken down by gender and age band, also based on trend data from the Eurostat and ONS data series. Future labour demand forecasts have been estimated on an annual basis over the 2021-2035 period. The results are presented on a snapshot basis for four years: 2021, 2025, 2030, and 2035 respectively.

Chapter 5

Overall Annual recruitment demand: 2021-2035

Overall Recruitment Demand

The table below sets out the estimates for annual recruitment demand for selected years over the 2021-2035 period. The results are presented individually for each of the 7 countries, as well as the aggregate total across each market. The final column in the table also provides the cumulative estimate for each year over the 15-year period 2021-2035. The estimates are further disaggregated into demand for both the Chemicals and Plastic Products sectors. Note: row and column totals in the table may not sum exactly sue to the rounding of decimals.

Table 5.1: Annual recruitment demand, overall Chemicals and Plastic Products workforce ('000s)

Sector and demand type	2021	2025	2030	2035	Cumulative (2021-2035)
Belgium total, of which:	4.3	4.5	4.6	4.8	68.4
Chemicals	2.4	2.5	2.6	2.7	38.4
Plastic Products	1.9	1.9	2.0	2.1	30.0
France total, of which:	18.7	18.6	18.4	18.2	276.8
Chemicals	7.7	7.6	7.5	7.4	113.2
Plastic Products	11.0	10.9	10.9	10.8	163.5
Germany total, of which:	44.3	45.3	46.6	47.9	690.8
Chemicals	22.6	23.6	24.9	26.3	365.9
Plastic Products	21.7	21.7	21.7	21.7	324.9
Netherlands' total:	5.4	5.7	6.0	6.3	87.9
Chemicals	2.6	2.7	2.7	2.8	40.7
Plastic Products	2.8	3.0	3.3	3.6	47.2
Spain total, of which:	19.2	21.1	23.8	26.8	342.3
Chemicals	9.5	10.3	11.4	12.6	165.0
Plastic Products	9.7	10.8	12.4	14.2	177.4
Sweden total, of which:	2.4	2.5	2.6	2.7	38.3
Chemicals	0.8	0.9	0.9	0.9	12.8
Plastic Products	1.5	1.6	1.7	1.9	25.5
UK total, of which:	14.0	14.3	14.8	15.4	219.3
Chemicals	4.9	5.0	5.3	5.6	78.0
Plastic Products	9.1	9.3	9.5	9.8	141.2
7 Markets total, of which:	108.3	112.0	116.8	122.1	1,723.8
Chemicals	50.5	52.6	55.3	58.3	814.0
Plastic Products	57.7	59.2	61.5	64.1	909.7

Overall future workforce recruitment demand between 2021-2035 across the seven countries amounts to just over 1.72 million, with 47% of this accounted for by the Chemicals sector (i.e., 814,000 recruits needed) and 53% by Plastic Products (nearly 910,000 recruits needed).

Germany alone is expected to account for cumulative recruitment demand amounting to just over 690,000 roles, with Chemicals accounting for around 366,000 of these. Germany therefore accounts for 40% of overall expected recruitment demand. Other major contributors include:

- Spain – 343,000 recruits, around 20% of the total
- France – 277,000 recruits (16%)
- the UK – 219,000 (13%).

It is also notable that the proportion of overall recruitment demand by sector varies significantly from country to country. For example, in Sweden, only 33% of demand is expected to come from Chemicals, and in the UK the proportion is only slightly higher (36%). Whereas in Belgium (56%) and Germany (53%) over half of overall demand is expected to be driven by the Chemicals sector.

It is also worth highlighting that the proportion of demand driven by Replacement demand (versus vs Expansion demand) also varies to some extent across the different countries. For example, the relative contribution of Expansion demand to the overall total is summarised below for each sector (and in combination) for each country.

Table 5.2 Components of cumulative recruitment demand, Chemicals and Plastic Products, 2021-2035

Country	Expansion Demand %	Replacement Demand %
Belgium	11.7%	88.3%
France	-3.8%	103.8%
Germany	9.2%	90.8%
Netherlands	14.9%	85.1%
Spain	29.4%	70.6%
Sweden	14.1%	85.9%
UK	5.8%	94.2%

The country where expansion demand is expected to provide the largest component is Spain, where overall 29% of overall demand is anticipated to be driven by the underlying growth of the industries. On the other hand, in Germany and the UK expansion is expected to contribute less than 10% of the overall recruitment demand stimulus. However, in France expansion demand is actually expected to be slightly negative, with replacement demand expected to contribute around 104% of the overall recruitment demand total there.

Setting Future Recruitment Demand in Context

Although the combined demand from the Chemicals and Plastic Products industries for cumulative recruitment amounting to around 1.72 million workers between 2021 and 2035 is significant, these industries are of course not alone in facing major future recruitment needs. In order to contextualise the expected future demand for recruitment among these two industries, it is useful to also consider the scale of future expected recruitment demand in other parts of the economy. In order to achieve this, it was decided to explore future demand in several other sectors, viz:

- Recruitment demand in the Building Materials sector – i.e., the manufacture of products such as glass, ceramics, refractory products, cement & plaster, bricks and tiles, etc.

- the Production and Distribution of Electricity, particular focusing on low carbon sources.

The rationale for selecting these industries for comparison is that both of these industries are also undergoing transformations, but of different types:

- The Building Materials sector is a relatively stable (i.e., low growth) sector includes activities that are amongst the most energy-intensive of any manufacturing sub-sector (e.g., the manufacture of glass, bricks, tiles, and cement). Companies operating in these sub-sectors may as a consequence have something of an image problem when it comes to the recruitment of young talent. However, the need for technological transformation means that there is likely to be a pronounced need for recruitment of younger workers, especially amongst graduates and those that have professional qualifications and experience.

- The Renewables sector, on the other hand, is fast-growing industry in many countries that is responding to a public policy imperative to reduce reliance on fossil fuels for energy supply. The renewables sector is widely seen as part of the decarbonisation solution and may be regarded as an attractive career destination for many professionals and recent graduates

Apart from a focus on the two nominated industrial sectors across the seven countries, it is also useful to place the estimates of future demand for recruitment in the Chemicals and Plastic Products sectors in the context of the economy-wide demand for future recruitment. The overall economy-wide recruitment need is of course driven by the combined effect of expansion and replacement demand across all of the different activities taking place across the seven labour markets considered in this report.

The table below provides a summary of the expected future cumulative demand and the average annual demand for workforce recruitment across the seven labour markets over the period 2021-2025 for each of the industries introduced above, as well as for the Chemicals and Plastic Products manufacturing sectors, and for the economy of each country as a whole.

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Table 5.3: Annual recruitment demand, selected industries and national totals, 2021-2035 ('000s)

Sector and demand type	Cumulative demand (2021 -2035)	Average annual demand (2021 -2035)	Proportion of overall national total demand
Belgium sub-total, of which:	68.4	4.6	2.4%
Chemicals	38.4	2.6	1.3%
Plastic Products	30.0	2.0	1.0%
Building Products	27.5	1.8	1.0%
Low carbon energy	34.0	2.3	1.0%
Whole economy	2,887.5	192.5	100.0%
France sub-total, of which:	276.8	18.5	2.0%
Chemicals	113.2	7.5	0.8%
Plastic Products	163.5	10.9	1.2%
Building Products	61.1	4.1	0.4%
Low carbon energy	192.6	12.8	1.4%
Whole economy	13,634.8	909.0	100.0%
Germany sub total, of which:	690.8	46.1	2.9%
Chemicals	365.9	24.4	1.5%
Plastic Products	324.9	21.7	1.4%
Building Products	126.1	8.4	0.5%
Low carbon energy	370.0	24.7	1.5%
Whole economy	24,011.6	1,600.8	100.0%
Netherlands' sub-total:	87.9	5.9	1.4%
Chemicals	40.7	2.7	0.6%
Plastic Products	47.2	3.1	0.7%
Building Products	22.3	1.5	0.3%
Low carbon energy	29.8	2.0	0.5%
Whole economy	6,388.0	425.9	100.0%
Spain sub-total, of which:	342.3	22.8	2.4%
Chemicals	165.0	11.0	1.2%
Plastic Products	177.4	11.8	1.3%
Building Products	95.9	6.4	0.7%
Low carbon energy	49.9	3.3	0.4%
Whole economy	13,975.5	931.7	100.0%
Sweden sub-total, of which:	38.3	2.6	2.2%
Chemicals	12.8	0.9	0.7%
Plastic Products	25.5	1.7	1.5%
Building Products	3.5	0.2	0.2%
Low carbon energy	35.6	2.4	2.1%
Whole economy	1,709.3	114.0	100.0%
UK sub-total, of which:	219.3	14.6	1.1%
Chemicals	78.0	5.2	0.4%
Plastic Products	141.2	9.4	0.7%
Building Products	54.1	3.6	0.3%
Low carbon energy	196.7	13.1	0.9%
Whole economy	20,757.7	1,383.8	100.0%

Key messages from the table of results set out above include the following:

- Across the seven countries, the combined recruitment demand from the Chemicals and Plastic products industries is expected to typically accounts for around 2% of national recruitment demand over the 2021-2035 period. However, there is some significant variation in this proportion by country, with the highest share found in Germany (2.9% of the national total) and the lowest share found in the UK (1.1%).

- Chemicals and Plastic products are generally expected to be a much more significant source of future recruitment demand compared to the Building Products sector, with the latter sector typically accounting for around 0.7% of national demand. However, in some countries (such as Sweden and the Netherlands) the Building Products sector only accounts for 0.2-0.3% of average annual national demand. Only in Belgium (1.0%) and Germany (1.5%) does the Building Products sector account for more than 1.0% or more of average annual recruitment demand.

- The low-carbon energy sector, on the other hand, is a much more significant source of annual recruitment demand in countries such as Sweden (2.1%), Germany (1.5%) and the UK (0.9%). However, Sweden is the only country where demand from the low carbon energy sector is expected to approach that of the Chemicals and Plastic Products sectors in combination.

Chapter 6

Future characteristics of expected future recruitment demand

This chapter provides summary details of the expected nature of future recruitment requirements expected to occur in each country. Because of the detail involved, it is necessary to present the expected projections for future workforce demand in a series of detailed tables that are set out in an appendix to this report.

Occupational categories

The first matter to consider is expected future recruitment demand disaggregated by each main type of employment occupation. This analysis is based on the SOC occupational categories introduced in an earlier chapter.

The table below present the estimates of total demand for each occupational type added together for both the Chemicals and Plastic Products sectors. Note: more detailed tables setting out sub-totals for both Chemicals and Plastic Products, and also snapshot totals for each of the years 2021, 2025, 2030, and 2035 are presented in an appended section of this report.

Starting with the aggregated cumulative totals, these are set out for each country in the table below. Note: column and row totals may not sum exactly due to the rounding of decimals.

Table 6.1 Occupational breakdown of expected future cumulative recruitment demand, 2021-2035 ('000s)

SOC	Bel.	Fra.	Ger.	Neth.	Spa.	Swe.	UK	Total
1.Managers	10.2	41.4	103.9	13.3	50.7	5.8	33.1	258.4
2.Professional occupations	8.7	29.1	85.0	9.9	38.8	3.8	21.3	196.6
3.Associate professionals	14.5	55.5	146.6	18.1	70.6	7.5	42.7	355.5
4.Administrative roles	5.2	20.3	51.6	6.3	26.0	2.7	16.6	128.7
5.Skilled trades	7.7	36.2	82.1	10.9	42.0	5.4	30.3	214.6
6.Other service occupations	0.6	2.0	5.8	0.7	3.1	0.2	1.5	13.9
7.Customer service roles	2.3	10.1	22.8	3.1	12.4	1.5	8.8	61.0
8.Plant and machine operatives	14.0	60.6	139.6	18.8	72.5	8.7	47.8	362.0
9.Elementary occupations	5.4	21.6	53.4	6.8	26.3	2.9	16.9	133.3
Overall	68.4	276.8	690.8	87.9	342.3	38.3	219.2	1,7238

Nearly half (47%) of all demand – amounting to just over 800,000 recruits in total – is expected to be for Managerial, Professional and Associate professional roles, with the largest category within this group being for the Associate professional positions (i.e., c.20% of overall demand).

However, there is also significant demand for recruits into both Skilled trades roles (around 12% of the total) and Plant & machinery operatives (21%).

The overall pattern of demand is not expected to differ significantly across the different countries, but there are some relatively minor differences that are worth noting. In particular:

- **Belgium:** here there is expected to be a slightly higher contribution to overall demand from Professional occupations (12.7%) compared to the overall 7-country average (11.4%). The proportionate contribution from Skilled trades is conversely lower (13.1% compared to the overall average of 12.4%)

- **France:** here demand for Professional occupations (10.5%) is expected to be around 1 percentage point lower than the overall average (11.4%). The demand for Skilled trades and Plant & machinery operatives are both slightly higher (by around 1%) than the overall averages.

- **Germany:** a similar pattern to Belgium, with slightly higher demand for Professionals and lower proportionate demand for Skilled trades

- **Sweden:** is expected to generate the highest proportionate demand for Plant & machinery operatives (nearly 23% of the total demand there) compared to the overall average (c.21%).

- **United Kingdom:** the UK is expected to have a slightly lower contribution to demand from Professional occupations (9.7%) compared to the overall average across the seven countries (11.4%).

Across the seven markets, overall, around 51% of future economy-wide workforce demand over the 2021-2035 period is expected to be for workers in Managerial, Professional, and Associate professional occupations. However, the proportion of workers of this type required by the Chemicals sector is significantly rather higher than this economy-wide average, at about 58%. On the other hand, demand for workers of this type by the Plastic products segment is lower than the overall average, at around 47%.

The occupational profile of future workforce demand by the Chemicals sector is very similar to that expected to be needed for the Low carbon energy sector: in the latter, around 55% of the future workforce is expected to be in Managerial, Professional, and Associate professional categories.

The future profile of workforce in the Plastic products segment is somewhat similar to that expected for Building products, where around 43% of future recruits are expected to be in the Managerial, Professional, and Associate professional categories.

Qualifications levels

The expected pattern of demand for a workforce of slightly differing occupational types has associated implications for recruitment demand for workers with different levels of qualifications. Two qualification types of particular interest are:

- recruits with degree level qualifications or higher (i.e., post-graduate qualifications); and
- trades qualifications, such as those gained through apprenticeship programmes and similar vocational routes.

The table below presents the estimated total cumulative demand for recruitment of entrants to the Chemicals and Plastic products industries of newly recruited workers with these two types of qualifications.

Table 6.2: Qualifications of expected future cumulative recruitment demand, 2021-2035

Country	Degree level or higher ('000s)	Degree level or higher (% of total demand)	Trades qualifications ('000s)	Trades qualifications (% of total demand)
Belgium	35.1	51.3%	8.5	12.4%
France	132.3	47.8%	39.8	14.4%
Germany	352.3	51.0%	90.3	13.1%
Netherlands	43.4	49.3%	12.0	13.6%
Spain	168.1	49.1%	46.2	13.5%
Sweden	18.0	46.9%	5.9	15.5%
UK	102.0	46.5%	33.3	15.2%
Total	851.0	49.4%	236.1	13.7%

It is worth noting that of the overall demand for graduates and post-graduates across the seven countries, around 47% is driven by the Chemicals sector and 53% by Plastic products manufacturing. However, these proportions vary significantly from country to country, as summarised in the table

Table 6.3: Sector source of demand for Recruits who are Graduates and Post-graduates, 2021-2035

Country	Chemicals ('000s)	Chemicals (% of total demand in that area)	Plastic Products ('000s)	Plastic Products (% of total demand in that area)
Belgium	20.0	56.9%	15.1	43.1%
France	54.1	40.9%	78.2	59.1%
Germany	186.8	53.0%	165.5	47.0%
Netherlands	20.1	46.3%	23.3	53.7%
Spain	80.9	48.2%	87.2	51.8%
Sweden	5.9	33.1%	12.0	66.9%
UK	36.3	35.6%	65.6	64.4%
Total	402.3	47.3%	448.7	52.7%

For example, in Sweden the Chemicals sector contributes 33.1% of the combined demand for graduates (& post-graduates), whilst in Belgium the Chemicals sector contributes nearly 57% of combined demand. Similarly, the Plastic Products sector in the UK contributes 64% of demand, a level only slightly than that found in Sweden.

The geographical spread of expected future demand for recruits with graduate and post-graduate qualifications (or equivalent) mainly reflects the underlying size and expected future growth trajectory of the sectors in each country. Therefore, Germany alone accounts for 41% of the overall demand for graduates and post-graduates. Similarly, Germany also accounts of 38% of the overall expected future demand (over the 2021-2035 period) for recruits with trade qualifications (and/or recruits who complete trades apprenticeship programmes within the industry).

As with the occupational categories, the future pattern of workforce recruitment for the Chemicals sector is expected to be weighted towards recruits with graduate and postgraduate level qualifications. For example, by 2035 it is expected that around 48% of recruits would have these types of qualifications, compared to around 39% for the economy as a whole. As previously noted, the recruitment requirements of the Chemicals sector in occupational terms is expected to be very similar to that exhibited by the Low carbon energy sector, whilst that for the Plastic Products industry is expected to be more similar to that for Manufacturing as a whole, and the Building products sub-sector in particular.

Age structure of anticipated recruitment into the industry

The next aspect to consider is the pattern of expected future workforce recruitment requirement by age group. This analysis has been informed by data from the UK – sourced from the Annual Survey of Hours and Earnings (ASHE) – which can be utilised to provide an assessment of the propensity of workers within different age groups to stay with their current industry or to leave for a different sector (or to leave the workforce entirely). Similar data is not available for other European markets, so a working assumption has been deployed that assumes that the UK propensities also operate in other European countries.

Given that this should be regarded as a tentative assumption, the results presented in this sub-section should be regarded as indicative only.

Unsurprisingly, the UK Labour Force Survey evidence suggests that the majority of new recruits into any industry comprises workers in younger age groups. Overall, around 60% of new recruits are aged under 25, with around 80% aged up to 34 years.

Apart from the assumptions about workforce entry/exist propensities, the analysis in this section is based on data on current workforce demographics and future population projections published by Eurostat (and the ONS for the UK).

Based on findings from this source, the expected future pattern of recruitment into the Chemicals and Plastic Products industries viewed through the prism of workforce age would be expected to follow the pattern set out in the table below across the different labour markets considered in this report. Note: the age bands used in the table reflect those used by Eurostat to define the age structure of industrial workforces in EU countries.

Table 6.4 Indicative age breakdown of future cumulative recruitment demand, 2021-2035 ('000s)

Age band	Bel.	Fra.	Ger.	Neth.	Spa.	Swe.	UK	Total
Under 25 years	41.8	169.2	422.4	53.7	209.3	23.4	134.0	1,053.9
25-39 years	15.2	61.7	153.9	19.6	76.3	8.5	48.8	384.1
40-59 years	7.7	31.2	77.9	9.9	38.6	4.3	24.7	194.3
60 years and over	3.6	14.7	36.6	4.7	18.1	2.0	11.6	91.3
Overall	68.4	276.8	690.8	87.9	342.3	38.3	219.2	1,723.8

Overall, the Chemicals and Plastic Products industries in combination are likely to need to attract over 1.05 million young people (i.e., those aged up to 25 years) between 2021 and 2035. Additionally, there is also likely to be a cumulative need to recruit around 384,000 workers in the 25-39 age range over this period (i.e., 2021-2035).

Gender structure of the future workforce

Future demand for workers defined by occupational type and qualification level is primarily influenced by the existing and expected future technologies prevalent in any industry. Generally, over time the 'knowledge content' of industrial processes is deepening over time, requiring an increasing proportion of the workforce that has the technical and other skills required to operate more sophisticated equipment and industrial processes.

Recruitment by gender is slightly different, in that it is influenced by employers' recruitment policy as well as the availability of workers with the required skills. One factor that has historically limited the recruitment of a greater proportion of females into the Chemicals and Plastic Products industries has been a smaller proportion of females that have been recruited onto University courses that provide typical routeways into professional and managerial occupations in the Chemicals sector. Similarly, females have historically provided a minority of recruits into trades apprenticeships that are relevant to the Chemicals and Plastic Products industries.

However, there is evidence that there is increasing interest among young women in STEM subjects, as evidenced by the increasing proportion of females choosing maths and science subjects in their final years of secondary education. On this basis, it may be expected that the underlying trend would be for a greater proportion of future recruitment to be female compared to the recent past.

Given that future recruitment patterns by gender are likely to be influenced by factors such as Government policy, national education strategies and the implementation of corporate strategies, the figures presented in this sub-section should be regarded as indicative and aspirational.

Notwithstanding these caveats, an aspirational (but realistic and achievable) potential pattern of future recruitment disaggregated by gender is set out in the table below.

Table 6.5: Potential future recruitment by gender, 2021-2035, ('000s)

Sector and demand type	2021	2025	2030	2035	Cumulative (2021 -2035)
Belgium total, of which:	4.3	4.5	4.6	4.8	68.4
Male	3.4	3.3	3.1	2.9	47.4
Female	0.9	1.2	1.5	1.9	21.0
France total, of which:	18.7	18.6	18.4	18.2	276.8
Male	12.9	12.1	11.1	10.3	172.8
Female	5.8	6.5	7.2	7.9	104.0
Germany total, of which:	44.3	45.3	46.6	47.9	690.8
Male	31.3	30.3	29.2	28.1	444.5
Female	13.0	14.9	17.4	19.9	246.3
Netherlands' total:	5.4	5.7	6.0	6.3	87.9
Male	4.3	4.1	4.0	3.8	60.4
Female	1.2	1.5	2.0	2.5	27.3
Spain total, of which:	19.2	21.1	23.8	26.8	342.3
Male	13.2	13.6	14.0	14.5	207.8
Female	6.0	7.6	9.8	12.3	134.5
Sweden total, of which:	2.4	2.5	2.6	2.7	38.3
Male	1.5	1.5	1.5	1.5	22.5
Female	0.8	1.0	1.1	1.3	15.8
UK total, of which:	14.0	14.3	14.8	15.4	219.3
Male	9.9	9.6	9.2	8.9	140.8
Female	4.1	4.7	5.6	6.4	78.5
7 Markets total, of which:	108.3	112.0	116.8	122.1	1,723.8
Male	76.5	74.5	72.1	70.0	1,096.2
Female	31.8	37.4	44.6	52.2	627.4

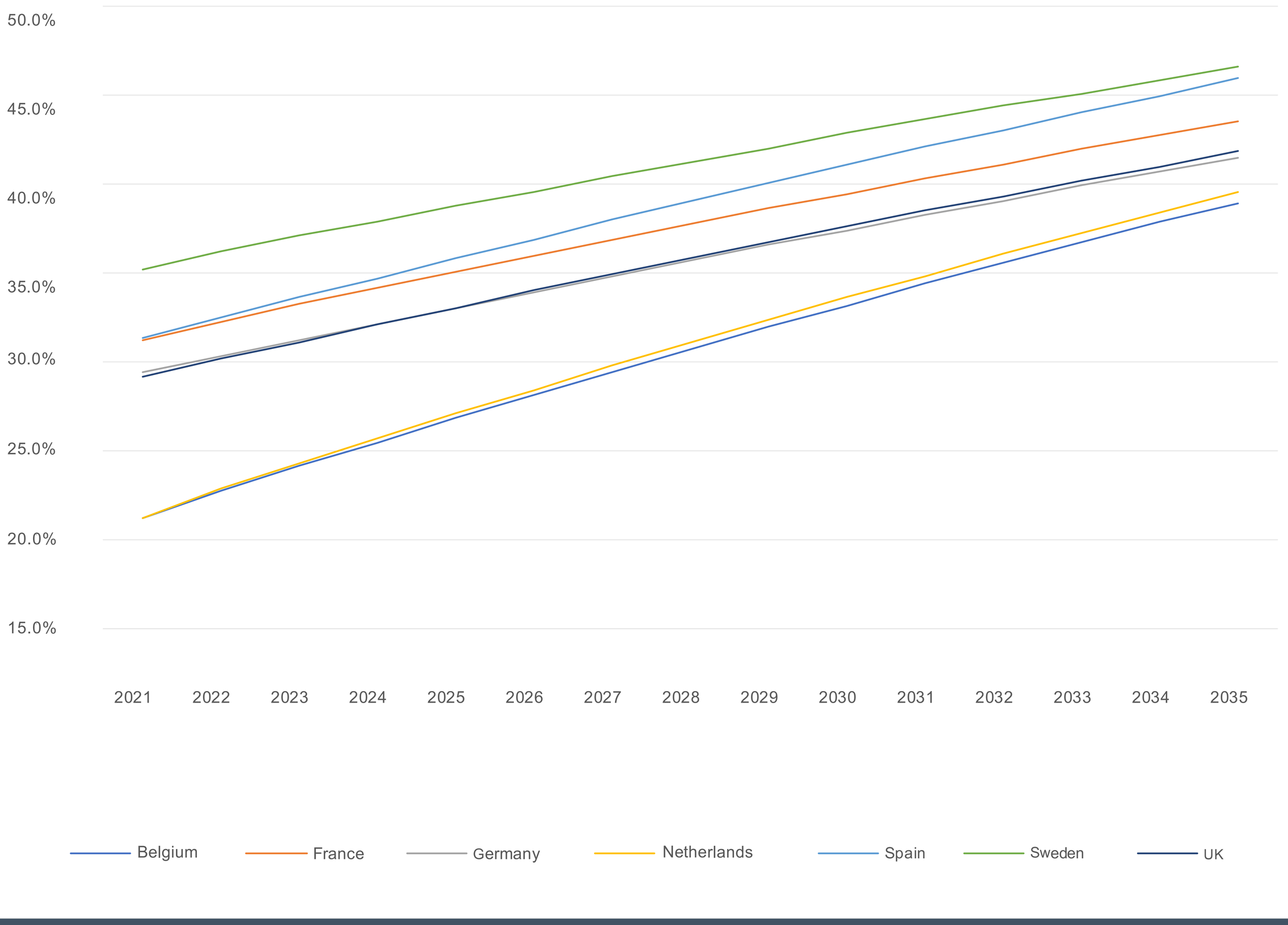
Under this aspirational scenario, the proportion of industry-level recruitment of females would need to increase from around 32,000 in total (i.e., across the seven markets) in 2021 to just over 52,000 p.a. by 2035.

The trajectories of change that are implicit in the table above are more clearly seen by use of a chart. The figure below shows the assumed proportion of recruitment of females into the combined Chemicals and Plastic Products sectors in each country over the period 2021-2035.

In future, therefore, there is an opportunity to increase thew diversity of the Chemicals and Plastic products industry workforce by increasing the proportion of the workforce that is female. Based on current and potential increases in female enrolment on STEM degree courses, a reasonable and realistic target could be for females to account for nearly 43% of recruitment by 2035.

However, to achieve this level of female recruitment would require an annual increase in the proportion of female recruitment of around 2.7% per annum over the 2021-2035 period.

Figure 6.1: Indicative proportion of overall recruitment accounted for by females, 2021-2035



Appendices

Detailed Tables showing expected future recruitment by Standard Occupational Categories

Table A.1: Belgium: Future sector workforce demand broken down by occupational type, 2021-2035 ('000s)

Occupation	2021			2025			2030			2035			Cumulative 2021-2035		
	Chem.	Plastic Prod.	Total	Chem.	Plastic Prod.	Total	Chem.	Plastic Prod.	Total	Chem.	Plastic Prod.	Total	Chem.	Plastic Prod.	Total
1. Managers	0.4	0.3	0.6	0.4	0.3	0.7	0.4	0.3	0.7	0.4	0.3	0.7	5.7	4.5	10.2
2. Professional occupations	0.4	0.1	0.5	0.4	0.1	0.5	0.5	0.1	0.6	0.5	0.1	0.7	7.0	1.7	8.7
3. Associate professionals	0.6	0.3	0.9	0.6	0.3	0.9	0.7	0.3	1.0	0.7	0.4	1.0	9.6	4.9	14.5
4. Administrative roles	0.2	0.1	0.4	0.2	0.1	0.4	0.2	0.1	0.3	0.2	0.1	0.3	3.1	2.1	5.2
5. Skilled trades	0.1	0.3	0.5	0.1	0.4	0.5	0.1	0.4	0.5	0.2	0.4	0.6	2.1	5.5	7.7
6. Other service occupation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.1	0.6
7. Customer service roles	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.8	1.4	2.3
8.Plant & machine operators	0.4	0.5	0.9	0.4	0.5	0.9	0.4	0.5	1.0	0.4	0.5	1.0	6.4	7.6	14.0
9. Elementary occupations	0.2	0.2	0.4	0.2	0.2	0.4	0.2	0.1	0.3	0.2	0.1	0.3	3.2	2.1	5.4
Overall	2.5	1.9	4.3	2.5	1.9	4.5	2.6	2.0	4.6	2.7	2.1	4.8	38.4	30.0	68.4

Table A.2: France: Future sector workforce demand broken down by occupational type, 2021-2035 ('000s)

Occupation	2021			2025			2030			2035			Cumulative 2021-2035		
	Chem.	Plastic Prod.	Total	Chem.	Plastic Prod.	Total	Chem.	Plastic Prod.	Total	Chem.	Plastic Prod.	Total	Chem.	Plastic Prod.	Total
1. Managers	1.1	1.6	2.7	1.1	1.6	2.8	1.1	1.6	2.8	1.1	1.6	2.8	17.0	24.4	41.4
2. Professional occupations	1.3	0.5	1.8	1.3	0.5	1.9	1.4	0.6	2.0	1.4	0.7	2.1	20.1	9.0	29.1
3. Associate professionals	1.9	1.7	3.6	1.9	1.8	3.7	1.9	1.8	3.7	1.9	1.9	3.8	28.6	26.5	55.5
4. Administrative roles	0.7	0.8	1.5	0.6	0.8	1.4	0.6	0.7	1.3	0.6	0.7	1.2	9.4	10.9	20.3
5. Skilled trades	0.4	2.0	2.4	0.4	2.0	2.4	0.4	2.0	2.4	0.5	2.0	2.5	6.5	29.7	36.2
6. Other service occupations	0.1	0.0	0.2	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.1	1.5	0.6	2.0
7. Customer service roles	0.2	0.6	0.7	0.2	0.5	0.7	0.1	0.5	0.7	0.1	0.5	0.6	2.1	8.0	10.1
8. Plant & machine operators	1.3	2.9	4.2	1.2	2.8	4.1	1.2	2.8	4.0	1.2	2.8	3.9	18.3	42.3	60.6
9. Elementary occupations	0.7	1.0	1.7	0.7	0.0	1.6	0.6	0.7	1.4	0.6	0.6	1.2	9.7	11.8	21.6
Overall	7.7	11.0	18.7	7.6	10.9	18.6	7.5	10.9	18.4	7.4	10.8	18.2	113.3	163.5	276.8

Table A.3: Germany: Future sector workforce demand broken down by occupational type, 2021-2035 ('000s)

Occupation	2021			2025			2030			2035			Cumulative 2021-2035		
	Chem.	Plastic Prod.	Total	Chem.	Plastic Prod.	Total	Chem.	Plastic Prod.	Total	Chem.	Plastic Prod.	Total	Chem.	Plastic Prod.	Total
1. Managers	3.3	3.2	6.5	3.5	3.2	6.7	3.8	3.3	7.1	4.1	3.3	7.4	55.1	48.8	103.9
2. Professional occupations	3.8	1.0	4.8	4.1	1.1	5.2	4.6	1.3	5.9	5.1	1.5	6.7	66.6	18.5	85.0
3. Associate professionals	5.6	3.4	8.9	5.9	3.5	9.4	6.4	3.6	10.0	6.8	3.8	10.6	92.8	53.7	146.6
4. Administrative roles	2.0	1.5	3.5	2.0	1.5	3.5	2.0	1.4	3.4	2.0	1.4	3.3	29.8	21.8	51.6
5. Skilled trades	1.2	3.9	5.1	1.3	3.9	5.3	1.6	4.0	5.6	1.8	4.1	5.9	22.3	59.8	82.1
6. Other service occupations	0.3	0.1	0.4	0.3	0.1	0.4	0.3	0.1	0.4	0.3	0.1	0.4	4.7	1.1	5.8
7. Customer service roles	0.5	1.1	1.6	0.5	1.0	1.6	0.5	1.0	1.5	0.5	0.9	1.4	7.7	15.1	22.8
8. Plant & machine operators	3.8	5.6	9.4	3.8	5.5	9.4	3.9	5.4	9.3	3.9	5.3	9.2	57.8	81.8	139.6
9. Elementary occupations	2.1	1.9	4.0	2.0	1.8	3.8	1.9	1.5	3.5	1.7	1.3	3.0	29.1	24.2	53.4
Overall	22.6	21.7	44.3	23.6	21.7	45.3	24.9	21.7	46.6	26.3	21.7	47.9	365.9	324.9	690.8

Table A.4: Netherlands: Future sector workforce demand broken down by occupational type, 2021-2035 ('000s)

Occupation	2021			2025			2030			2035			Cumulative 2021-2035		
	Chem.	Plastic Prod.	Total	Chem.	Plastic Prod.	Total	Chem.	Plastic Prod.	Total	Chem.	Plastic Prod.	Total	Chem.	Plastic Prod.	Total
1. Managers	0.4	0.4	0.8	0.4	0.4	0.8	0.4	0.5	0.9	0.4	0.6	1.0	6.2	7.1	13.3
2. Professional occupations	0.4	0.1	0.6	0.5	0.1	0.6	0.5	0.2	0.7	0.5	0.2	0.8	7.3	2.6	9.9
3. Associate professionals	0.7	0.4	1.1	0.7	0.5	1.2	0.7	0.5	1.2	0.7	0.6	1.3	10.7	7.8	18.1
4. Administrative roles	0.2	0.2	0.4	0.2	0.2	0.4	0.2	0.2	0.4	0.2	0.2	0.4	3.2	3.1	6.3
5. Skilled trades	0.1	0.5	0.6	0.1	0.5	0.7	0.2	0.6	0.8	0.2	0.7	0.8	2.3	8.6	10.9
6. Other service occupations	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.2	0.7
7. Customer service roles	0.1	0.1	0.2	0.1	0.2	0.2	0.1	0.2	0.2	0.0	0.2	0.2	0.8	2.3	3.1
8. Plant & machine operators	0.4	0.7	1.2	0.4	0.8	1.2	0.4	0.8	1.3	0.5	0.9	1.3	6.7	12.1	18.8
9. Elementary occupations	0.2	0.2	0.5	0.2	0.2	0.5	0.2	0.2	0.4	0.2	0.2	0.4	3.4	3.4	6.8
Overall	2.7	2.8	5.4	2.7	3.0	5.7	2.7	3.3	6.0	2.8	3.6	6.3	40.7	47.2	87.9

Table A.5: Spain: Future sector workforce demand broken down by occupational type, 2021-2035 ('000s)

Occupation	2021			2025			2030			2035			Cumulative 2021-2035		
	Chem.	Plastic Prod.	Total	Chem.	Plastic Prod.	Total	Chem.	Plastic Prod.	Total	Chem.	Plastic Prod.	Total	Chem.	Plastic Prod.	Total
1. Managers	1.4	1.4	2.8	1.5	1.6	3.1	1.7	1.8	3.5	1.9	2.1	4.0	24.4	26.3	50.7
2. Professional occupations	1.6	0.4	2.0	1.8	0.5	2.3	2.0	0.7	2.7	2.3	0.9	3.3	29.1	9.7	38.8
3. Associate professionals	2.3	1.5	3.9	2.6	1.7	4.3	2.9	2.1	4.9	3.2	2.5	5.7	41.4	29.2	70.6
4. Administrative roles	0.9	0.7	1.5	0.9	0.8	1.6	0.9	0.8	1.8	1.0	0.9	1.9	13.9	12.1	26.0
5. Skilled trades	0.5	1.7	2.2	0.6	2.0	2.5	0.7	2.3	3.0	0.8	2.6	3.4	9.6	32.3	42.0
6. Other service occupations	0.1	0.0	0.2	0.2	0.0	0.2	0.2	0.1	0.2	0.2	0.1	0.2	2.4	0.7	3.1
7. Customer service roles	0.2	0.5	0.7	0.2	0.5	0.8	0.2	0.6	0.9	0.3	0.7	0.9	3.6	8.8	12.4
8. Plant & machine operators	1.6	2.5	4.1	1.7	2.8	4.5	1.8	3.2	5.0	2.0	3.6	5.6	26.8	45.7	72.5
9. Elementary occupations	0.9	0.8	1.7	0.9	0.9	1.8	0.9	0.8	1.8	0.9	0.8	1.7	13.7	12.6	26.3
Overall	9.5	9.7	19.2	10.3	10.8	21.1	11.4	12.4	23.8	12.6	14.2	26.8	165.0	26.3	342.3

Table A.6: Sweden: Future sector workforce demand broken down by occupational type, 2021-2035 ('000s)

Occupation	2021			2025			2030			2035			Cumulative 2021-2035		
	Chem.	Plastic Prod.	Total	Chem.	Plastic Prod.	Total	Chem.	Plastic Prod.	Total	Chem.	Plastic Prod.	Total	Chem.	Plastic Prod.	Total
1. Managers	0.1	0.2	0.3	0.1	0.2	0.4	0.1	0.3	0.4	0.1	0.3	0.4	2.0	3.9	5.8
2. Professional occupations	0.1	0.1	0.2	0.1	0.1	0.2	0.2	0.1	0.3	0.2	0.1	0.3	2.3	1.4	3.8
3. Associate professionals	0.2	0.2	0.4	0.2	0.3	0.5	0.2	0.3	0.5	0.2	0.3	0.6	3.2	4.2	7.5
4. Administrative roles	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.2	1.0	1.6	2.7
5. Skilled trades	0.0	0.3	0.3	0.0	0.3	0.3	0.1	0.3	0.4	0.1	0.3	0.4	0.7	4.6	5.4
6. Other service occupations	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.2	0.1	0.2
7. Customer service roles	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.2	1.2	1.5
8. Plant & machine operators	0.1	0.4	0.5	0.1	0.4	0.6	0.1	0.4	0.6	0.1	0.5	0.6	2.1	6.5	8.7
9. Elementary occupations	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.2	1.1	1.8	2.9
Overall	0.8	1.5	2.4	0.9	1.6	2.5	0.9	1.7	2.6	0.9	1.9	2.8	12.8	25.5	38.3

Table A.7: United Kingdom: Future sector workforce demand broken down by occupational type, 2021-2035 ('000s)

Occupation	2021			2025			2030			2035			Cumulative 2021-2035		
	Chem.	Plastic Prod.	Total	Chem.	Plastic Prod.	Total	Chem.	Plastic Prod.	Total	Chem.	Plastic Prod.	Total	Chem.	Plastic Prod.	Total
1. Managers	0.7	1.3	2.1	0.8	1.4	2.1	0.8	1.5	2.3	0.9	1.5	2.4	11.8	21.4	33.1
2. Professional occupations	0.8	0.4	1.2	0.8	0.5	1.3	0.9	0.6	1.5	1.0	0.7	1.7	13.5	7.8	21.3
3. Associate professionals	1.2	1.4	2.6	1.3	1.5	2.7	1.4	1.6	2.9	1.5	1.7	3.1	19.8	22.9	42.7
4. Administrative roles	0.4	0.7	1.1	0.4	0.7	1.1	0.4	0.7	1.1	0.4	0.7	1.1	6.6	10.1	16.6
5. Skilled trades	0.3	1.6	1.9	0.3	1.7	1.9	0.3	1.7	2.1	0.4	1.8	2.2	4.6	25.8	30.3
6. Other service occupations	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.1	1.1	0.5	1.5
7. Customer service roles	0.1	0.5	0.6	0.1	0.5	0.6	0.1	0.5	0.6	0.1	0.5	0.6	1.7	7.0	8.8
8. Plant & machine operators	0.8	2.4	3.2	0.8	2.4	3.2	0.8	2.4	3.2	0.9	2.4	3.2	12.6	35.3	47.9
9. Elementary occupations	0.5	0.8	1.2	0.4	0.8	1.2	0.4	0.7	1.1	0.4	0.6	1.0	6.5	10.5	17.0
Overall	4.9	9.1	14.0	5.0	9.3	14.3	5.3	9.5	14.8	5.6	9.8	15.4	78.0	141.2	219.2