



“green
alliance...”

Unemployment and the circular economy in Europe

a study of opportunities in Italy,
Poland and Germany

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Executive summary

An ambitious circular economy strategy for Europe could bring at least 270,000 unemployed people in Italy, Poland, and Germany back into work, saving at least €3 billion in unemployment costs. This is because jobs created in the circular economy can address structural barriers to employment in these economies.

This study outlines how growth in the circular economy could create large numbers of jobs in remanufacturing, repair, recycling, servitisation and the bioeconomy, across all regions and skill levels. Crucially, it departs from similar studies by showing that many of these jobs would address persistent regional and occupational discrepancies in unemployment and would, therefore, be net jobs that bring people out of unemployment, rather than displacing workers from existing jobs. It also shows that over 90 per cent of these jobs would continue to exist after 2025, despite the predicted 'hollowing out' of the labour market, which is characterised by the decline in mid skill level occupations.

The transition to a circular economy will look different in every country. It will be shaped by each country's industrial strengths, history, economic priorities and local politics. To illustrate how the transition might improve labour markets in Italy, Poland and Germany, we show how a set of ambitious circular economy policies could:

- double circular bioeconomy activity in Italy, revitalising its southern agricultural economy and reducing the north-south unemployment divide, with two thirds of all net jobs created in the south and island regions;
- create the conditions to close Poland's productivity gap compared with western Europe through remanufacturing, and lower unemployment in some occupations by more than three per cent;
- help German manufacturers of durable goods to sell services instead of products, creating net jobs in northern and eastern German cities. Doing so could save €177 million in avoided unemployment payments in Chancellor Merkel's constituency of Mecklenburg-Vorpommern alone.

The environmental benefits and cost savings of resource efficiency already provide ample justification for Europe to become more circular. This study shows that circular economy activities create jobs in occupations and regions with persistently high unemployment rates and contribute to reducing structural unemployment. This means that there are major socioeconomic benefits to an ambitious but achievable European circular economy strategy.

1

EU labour market challenges

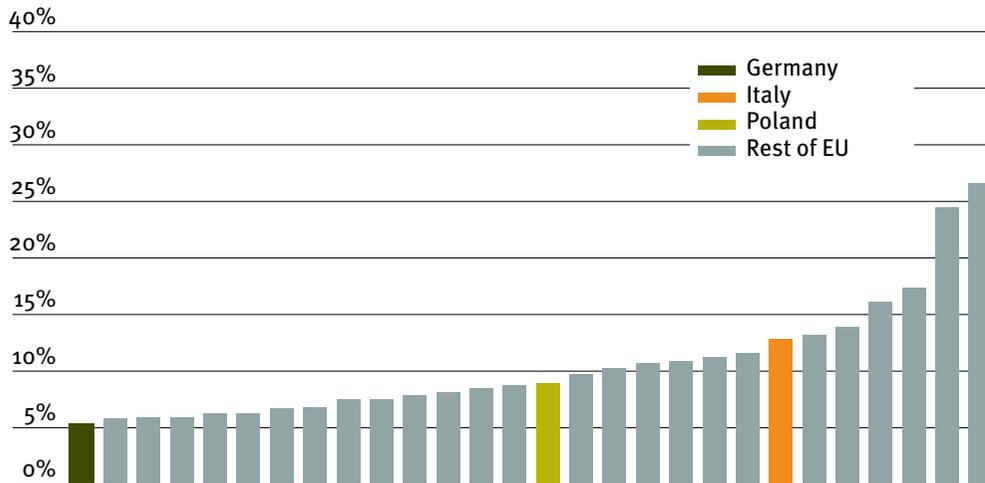
High and uneven unemployment is one of Europe's most pressing socioeconomic issues. Unemployment rates across Europe have averaged ten per cent or more for the past three years, and the imbalance within and between countries is a source of significant political tension: the difference is five-fold between Germany's five per cent and Greece's 26.5 per cent unemployment rates.

But country level analysis masks even more stark discrepancy between regions: Sur in Spain, at 33.5 per cent, is more than ten times higher than Bayern in Germany, at 2.9 per cent.

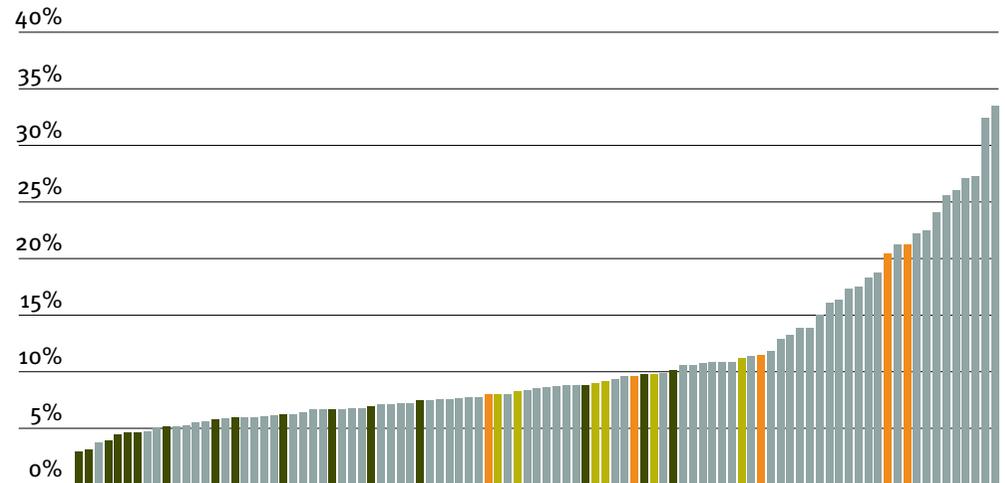
Some of these high rates will fall as European economic conditions improve. However, even if overall unemployment falls, the discrepancies reveal a structural

mismatch in the labour market, which means that high unemployment is likely to persist, even as economic growth returns. Eliminating structural mismatch requires not just boosting the economy or creating more jobs, but aligning job creation with the types and areas of employment where unemployment is highest.

Unemployment in Europe by country



Unemployment in Europe by region

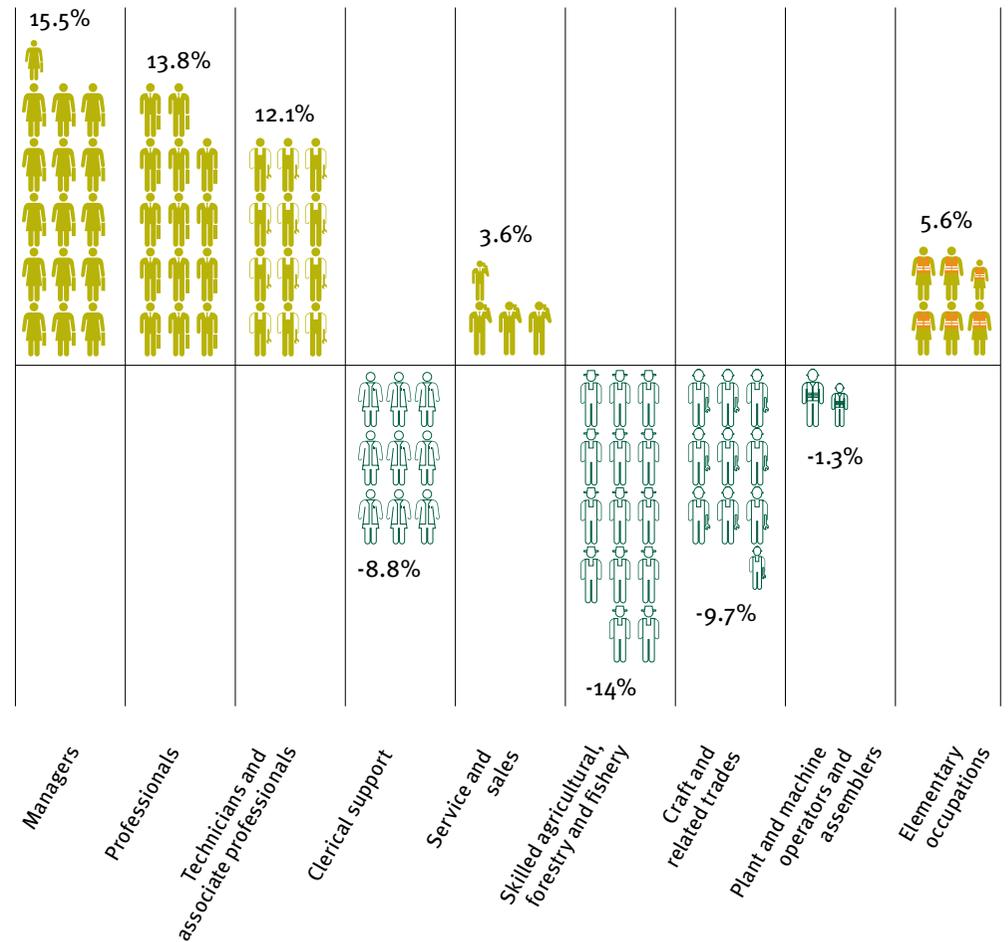


Less visible or discussed, but equally problematic for labour market economics, are differences in unemployment rates between occupations. Across the EU28, ‘managers’ have an unemployment rate of 4.13 per cent while ‘elementary occupations’ have 21.39 per cent unemployment.

A third challenge to the EU’s labour market is the shrinking availability of certain types of jobs, particularly mid level, mid waged jobs. This so-called ‘hollowing out’ effect on the labour market is primarily attributed to advances in technology and the offshoring of these jobs to emerging economies. The decline in middle skill jobs has affected all advanced economies over the past thirty years, and the downward trend is forecast to continue, as technology continues to accelerate. The result will be that, in the absence of policy action, it will be harder for unemployed people in these occupations to find new jobs.

In the following chapters we show how growth in circular economy activities can address both geographic and occupational mismatch. We also demonstrate how most new, circular economy jobs are unaffected by the wider hollowing out of the EU’s labour market.

Projected change in employment in Europe by occupation type, 2015-2025¹



2

The circular economy and job creation

What is the circular economy?

A circular economy keeps products, parts and materials in the economy for as long as possible, using the least amount of resources. Ideally, this means the direct reuse of products, which preserves both the highly engineered character of a product and its useful function. Products can also be made to last longer through servitisation: business models include leasing or moving from providing products to services.

Where a product needs to be repaired or reconditioned before it can be used again, remanufacturing preserves the most value. These are the tightest ‘loops’ within a circular economy.

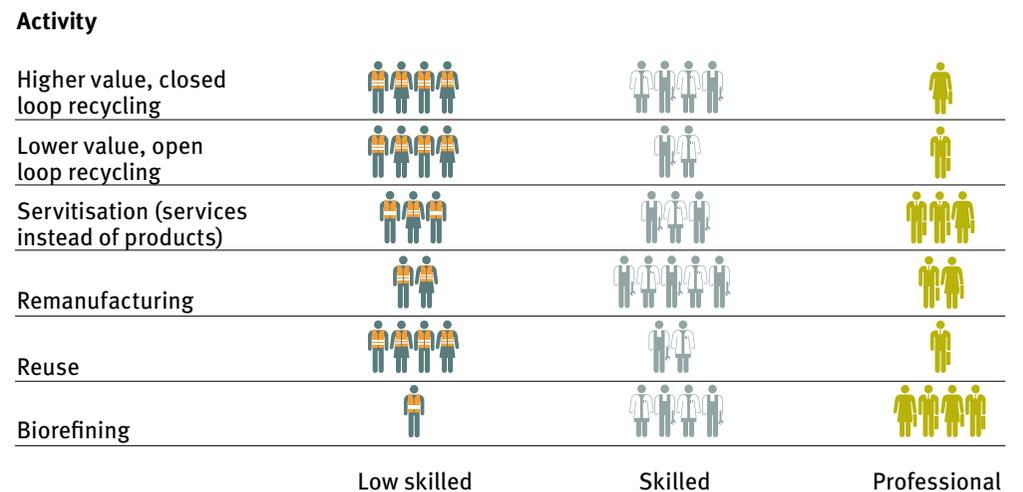
The next best route is recycling: ideally this is closed loop, turning products into materials used to recreate the products they were recovered from; otherwise, open loop recycling, or downcycling, creates material suitable for lower value uses.

A less developed but potentially large part of the future circular economy is the bioeconomy where waste biological products are reused to capture energy or create new products, eg using agricultural waste to create biogas or bioplastics.

The circular economy is already providing jobs at a range of skill levels across Europe, and an array of literature predicts that becoming more circular would add remarkable numbers of jobs.² But the key question, as we outlined in the previous chapter, is not how many jobs are created in total, but how many people can rejoin the workforce.

The distributed nature of circular economy activity lends itself to geographically dispersed job creation. While new servitisation jobs are more likely to be concentrated in cities, repair and recycling jobs are likely to be seen in all parts of the country, and growth in remanufacturing could create new opportunities in former manufacturing areas. Different circular economy activities also offer opportunities at different skill levels.

Job distribution across different skill levels and activities



Our model

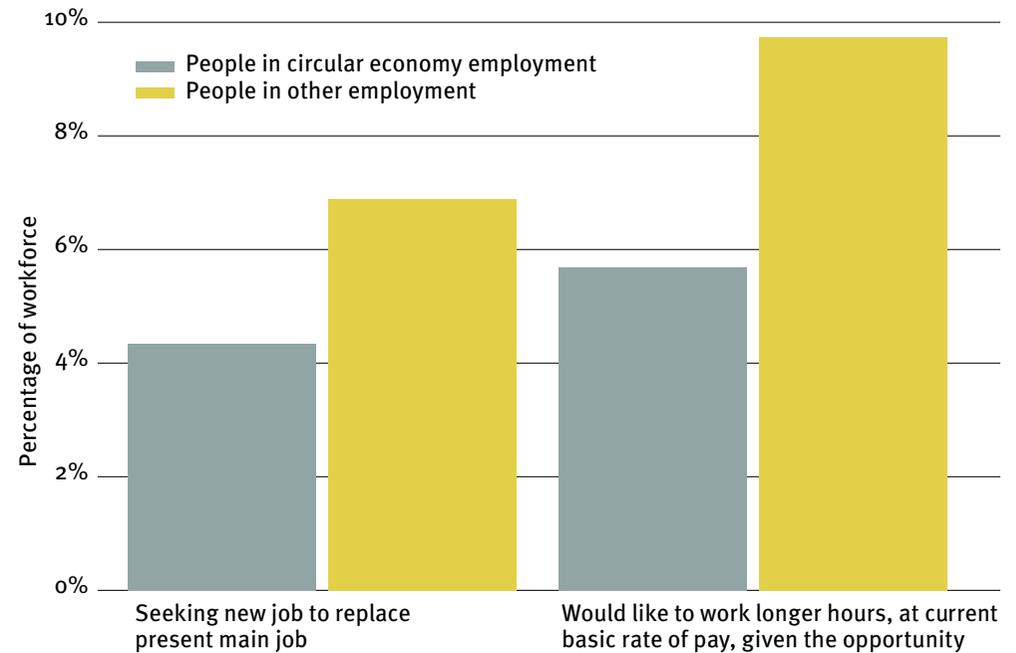
Our methodology incorporates local labour market conditions to estimate the numbers of net jobs that could be created, ie those that take people out of unemployment rather than displacing workers from existing jobs. It then calculates the effect this would have on reducing unemployment. A more detailed explanation of the methodology of net jobs calculations is provided in the annex (see page 26).

To address the concern that new jobs created will face the same pressures on the labour market causing decline in mid level occupations, we also calculated the proportion of new jobs in vulnerable industries that will withstand this hollowing out effect. We found that the vast majority of these jobs, around 90 per cent, will be future-proof, offering good employment prospects for a group with an otherwise uncertain future.

The circular economy itself is a source of technological innovation. New recycling, remanufacturing and biorefining techniques, as well as business model innovations like servitisation, may see labour market requirements change in the long term, but circular economy industries are likely to provide good quality employment for the foreseeable future.

Finally, evidence from the UK suggests existing circular economy jobs are good quality jobs, providing above average job satisfaction and security, compared to the average job in the UK. It is beyond the scope of this study to analyse the quality of circular economy jobs in other EU countries, but the UK evidence suggests that increasing circular economy employment can contribute to addressing issues of under-employment, insecurity and job dissatisfaction.

Circular economy employees have higher job satisfaction³



3

Three circular economy
scenarios for 2030

This study models three scenarios for 2030, differing in their level of circular economy ambition. We believe that even the 'transformation' scenario is realistic and achievable through a well designed, ambitious European circular economy policy package. A fully circular economy would be even more transformative than our scenarios, and would be likely to have a more dramatic effect on the labour market.

Scenario 1
No new initiatives

Our first scenario sees circular economy development plateau. Existing policies continue but no new initiatives are developed.

Scenario 2
Current development rate

In the second scenario the economy steadily becomes more circular, with new policies being developed at the same rate as has been seen over previous years. This scenario roughly matches the effect that the European Commission's 2014 circular economy package could be expected to have had on circular economy activities.

Scenario 3
Transformation

In the third scenario, progress accelerates. This represents a very ambitious circular economy transition over the next fifteen years.

Core assumptions:

| | Scenario 1 No new initiatives | Scenario 2 Current development rate | Scenario 3 Transformation |
|---|---|---|-------------------------------------|
| Recycling rate | 55% | 70% | 85% |
| Remanufacturing rate in suitable industries | existing | 20% | 50% |
| Increase in reuse | 10% | 15% | 15% |
| Increase in servitisation | 5% | 30% | 100% |
| Increase in circular bioeconomy activities | 5% | 30% | 100% |

In the following chapter, we apply these scenarios to Italy, Poland and Germany. Although these countries have different baseline rates, as far as possible we have used the same scenarios to allow for comparability.

4

Employment scenarios in Italy, Poland and Germany

Summary

Substantial numbers of new circular economy jobs could be created in Italy, Poland and Germany. Across the three countries, around a third of the jobs created – over 270,000 in scenario two – would go to people who are currently unemployed. The majority of these would be in remanufacturing.

In the following sections, we outline in more detail how each country might benefit from a more circular economy.



Italy

Job creation opportunities

| | | Biggest regional unemployment fall | Biggest occupational unemployment fall | Reduction in unemployment costs |
|---|--|------------------------------------|---|--|
| Scenario 1 No new initiatives | Gross jobs 35,000 Net jobs 18,000  | 0.22% (Isole) ↓ | 0.20% (Plant and machine operators and assemblers) ↓ | €0.15bn  |
| Scenario 2 Current development rate | Gross jobs 220,000 Net jobs 89,000  | 0.58% (Sud) ↓ | 1.45% (Craft and related trades) ↓ | €0.75bn  |
| Scenario 3 Transformation | Gross jobs 541,000 Net jobs 199,000  | 1.26% (Sud) ↓ | 3.38% (Craft and related trades) ↓ | €1.69bn  |

| | | |
|--|--|---|
| Percentage of gross jobs that are future-proof 92% | Biggest growth opportunity Bioeconomy  | Biggest labour market benefit Reduce regional inequality  |
|--|--|---|

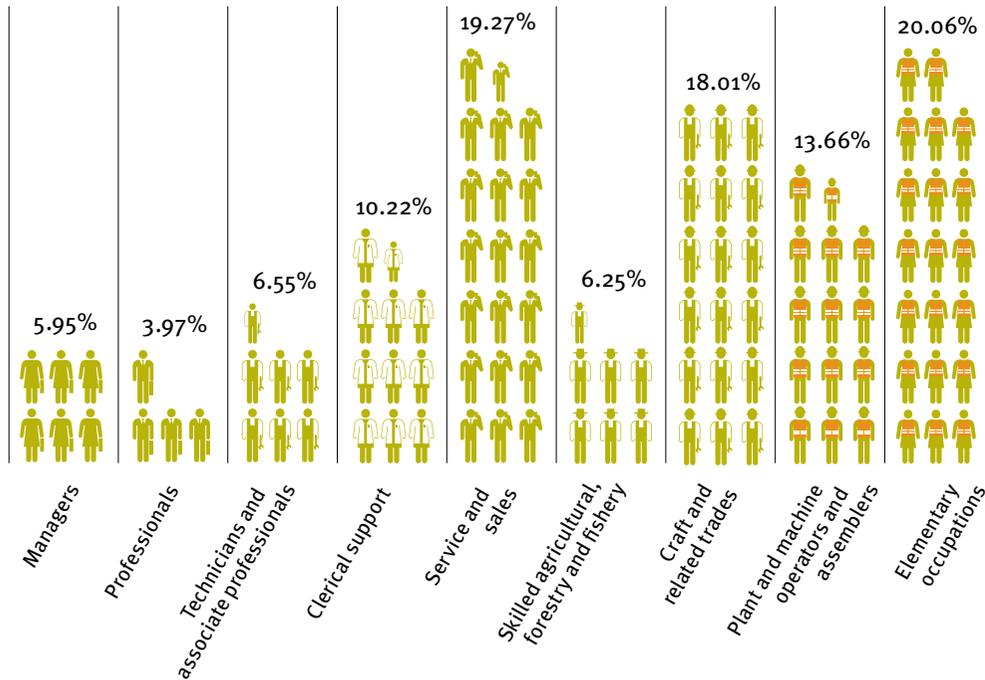
Labour market challenges

Italy's unemployment is above the EU average, at 12.7 per cent, although the spread of unemployment rates between the north and south is vast, with the south having some of the highest in Europe, at 20.4 per cent, and the island

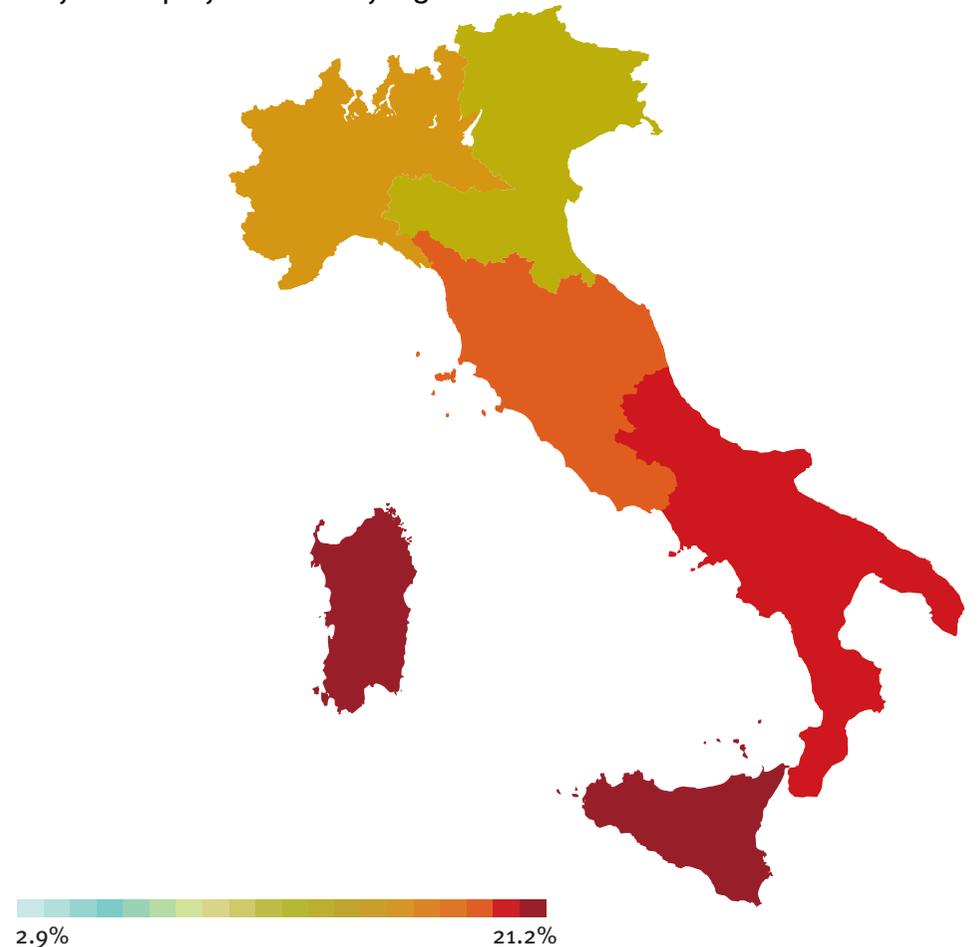
regions on 21.2 per cent, while the north east is at 7.7 per cent.

Occupational mismatch is also significant, spanning 3.97 per cent for professionals to 20.06 per cent in elementary occupations.

Italy: unemployment rate by occupation



Italy: unemployment rate by region



Circular economy opportunities

One of the best opportunities for Italy is in the bioeconomy. Italy could build on its large process manufacturing sector, which is the second largest in Europe after Germany.⁴ This type of manufacturing involves the food, beverage, chemical, pharmaceutical, consumer packaged goods and biotechnology industries.

Italy has a large and successful agricultural sector focusing particularly on grapes, olives and citrus fruits, as well as grains. The sector produces nine million tonnes of waste annually and 20 million tonnes of crop residues, which could find valuable reuse opportunities in composting, anaerobic digestion and, eventually, biorefining.^{5,6} Already, Italy has 240 compost plants and 43 anaerobic digestion plants, together employing more than 2,600 people and processing 5.6 million tonnes of waste annually.^{7,8} By 2030 bioeconomy activity in Italy could grow well above the rate of scenario 3.

Moreover, current circular bioeconomy activity takes place disproportionately in the north of the country: only 22 per cent of anaerobic and composting facilities are located in the south or island regions, even though these regions contain around half of Italy's agricultural land.^{9,10} The imbalance of waste supply suggests additional composting and anaerobic plants are likely to be built in the south.

The high unemployment rates in Italy's south and island regions provide the right conditions for an expansion of this industry to have a positive impact on the labour market, reducing unemployment rather than displacing people from existing jobs.

Even more value can be captured through the opportunities in bioplastics. Italy's bioplastics industry had a turnover of €370 million in 2012 and further growth would provide regionally dispersed jobs in higher skilled occupations.¹²

Composting facilities are located mostly in the north, while half of agricultural land is in the south¹¹



Poland

Job creation opportunities

| | | Biggest regional unemployment fall | Biggest occupational unemployment fall | Reduction in unemployment costs |
|---|--|------------------------------------|--|---------------------------------|
| Scenario 1 No new initiatives | Gross jobs 67,000 Net jobs 27,000 | 0.31% (Region Wschodni) ↓ | 1.25% (Elementary occupations) ↓ | €0.02bn |
| Scenario 2 Current development rate | Gross jobs 180,000 Net jobs 68,000 | 0.72% (Region Wschodni) ↓ | 2.23% (Elementary occupations) ↓ | €0.05bn |
| Scenario 3 Transformation | Gross jobs 361,000 Net jobs 124,000 | 1.29% (Region Wschodni) ↓ | 3.47% (Elementary occupations) ↓ | €0.09bn |

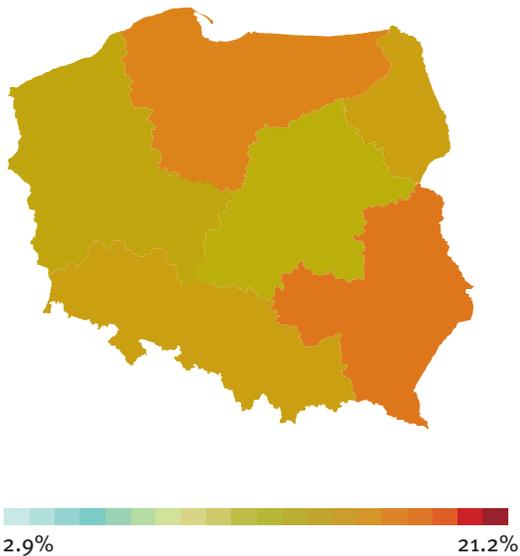
| | | |
|--|---|--|
| Percentage of gross jobs that are future-proof 92% | Biggest growth opportunity Remanufacturing | Biggest labour market benefit Reduce unemployment in elementary and skilled occupations |
|--|---|--|

Labour market challenges

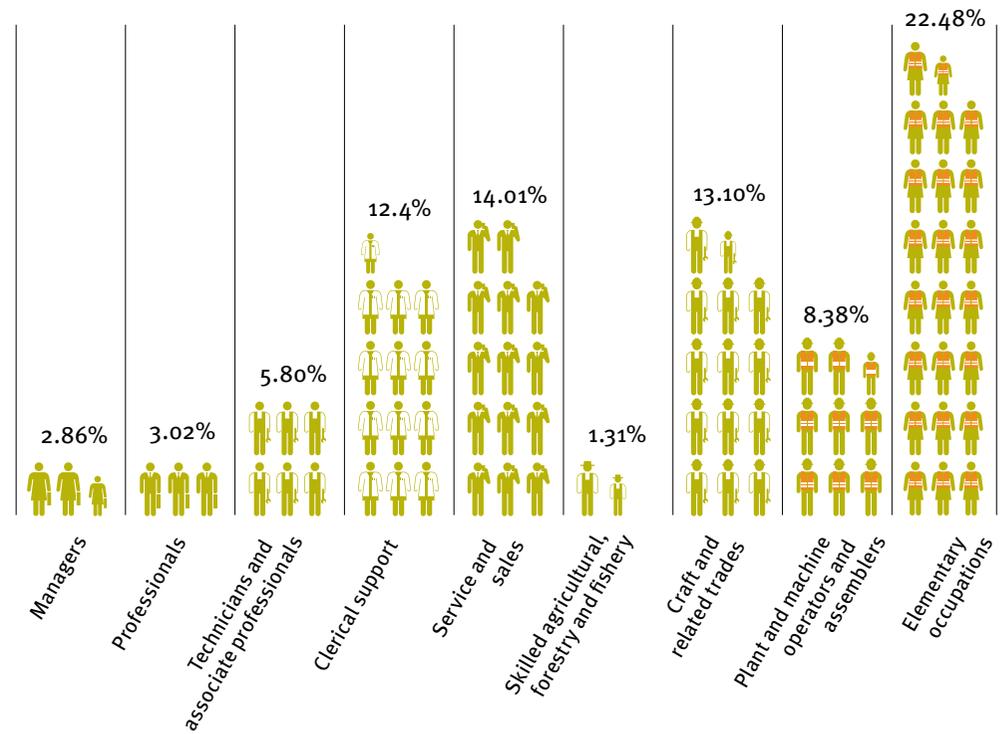
Poland's unemployment rate is nine per cent overall, with a less dramatic regional spread of unemployment rates than some EU countries. The lowest, at 7.7 per cent, is Region Centralny, which includes Warsaw, while the highest is 11.2 per cent in the eastern Region Wschodni.

The gap between highest and lowest unemployment rates is more noteworthy across occupations. Only 1.31 per cent of skilled agricultural, forestry and fishery workers are unemployed compared to 22.48 per cent for those in elementary occupations.

Poland: unemployment rate by region



Poland: unemployment rate by occupation



Poland also faces other labour market challenges: job security is low, the country has twice the EU average proportion of workers on so-called ‘junk’ or temporary contracts.

Because circular economy jobs are likely to be long term jobs there is the opportunity to create permanent, desirable employment. Our modelling suggests 92 per cent of remanufacturing jobs will last at least a decade, despite the move toward greater mechanisation.

Circular economy opportunities

Poland’s economy has experienced remarkable growth in the past 25 years, with GDP more than doubling. This success has been fuelled by low to medium technology sectors paying low wages to a skilled workforce. Unfortunately, the low value of the goods produced by Polish industries means economic productivity is just two thirds of the average level in western Europe. This growth model is also unlikely to be sustainable in the long run, as wages are rising, reducing

Poland’s wage advantage. By adopting more resource productive circular manufacturing models, rising wages can be offset by lower input costs, helping to maintain growth.

McKinsey’s analysis concludes that four sectors: agriculture, manufacturing, mining, and energy, are responsible for 60 per cent of the productivity gap between Poland and countries in western Europe.¹³ Within manufacturing, the areas with greatest potential to bridge the productivity gap are automotive, furniture, textiles, chemicals and advanced electric and electronic devices.

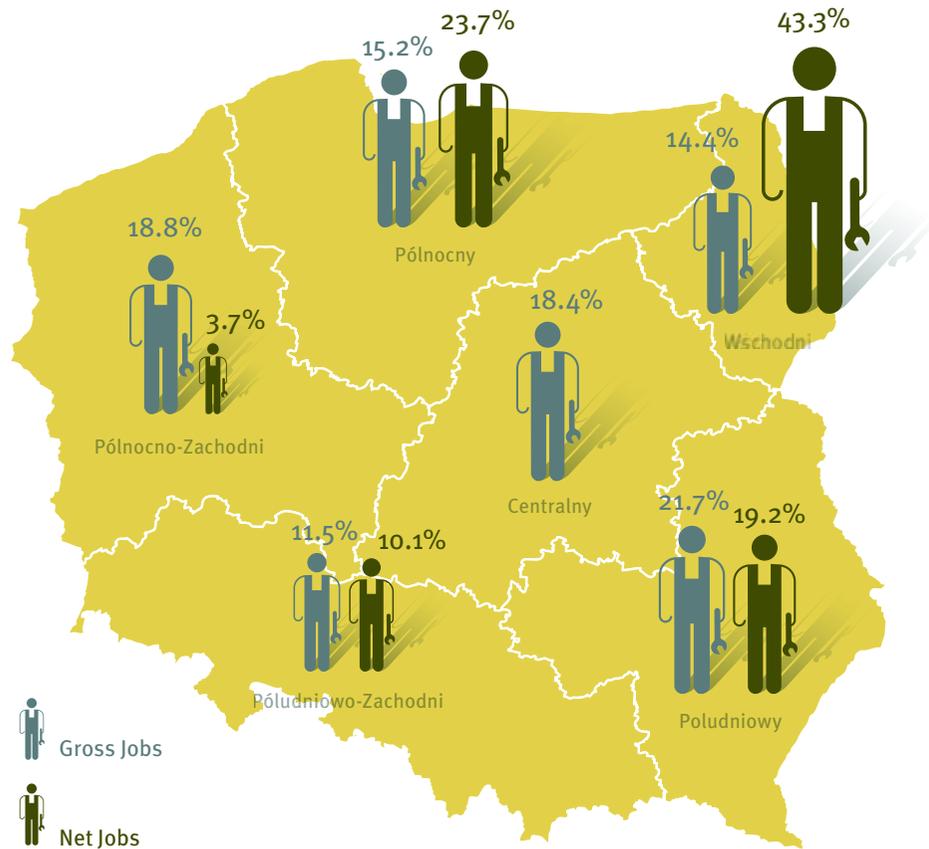
These sectors are almost all well suited to inner loop circular economy activity. As well as directing manufacturing activity towards high value sectors, Poland could start benefiting from these sectors sooner by boosting its repair and remanufacturing capability in the automotive, furniture and electronics sectors.

Under scenario two, assuming a 15 per cent increase in reuse and a rise to 20 per cent remanufacturing in industries suited to it, 74,000 jobs could be created, and 27,000 of those would be net jobs.

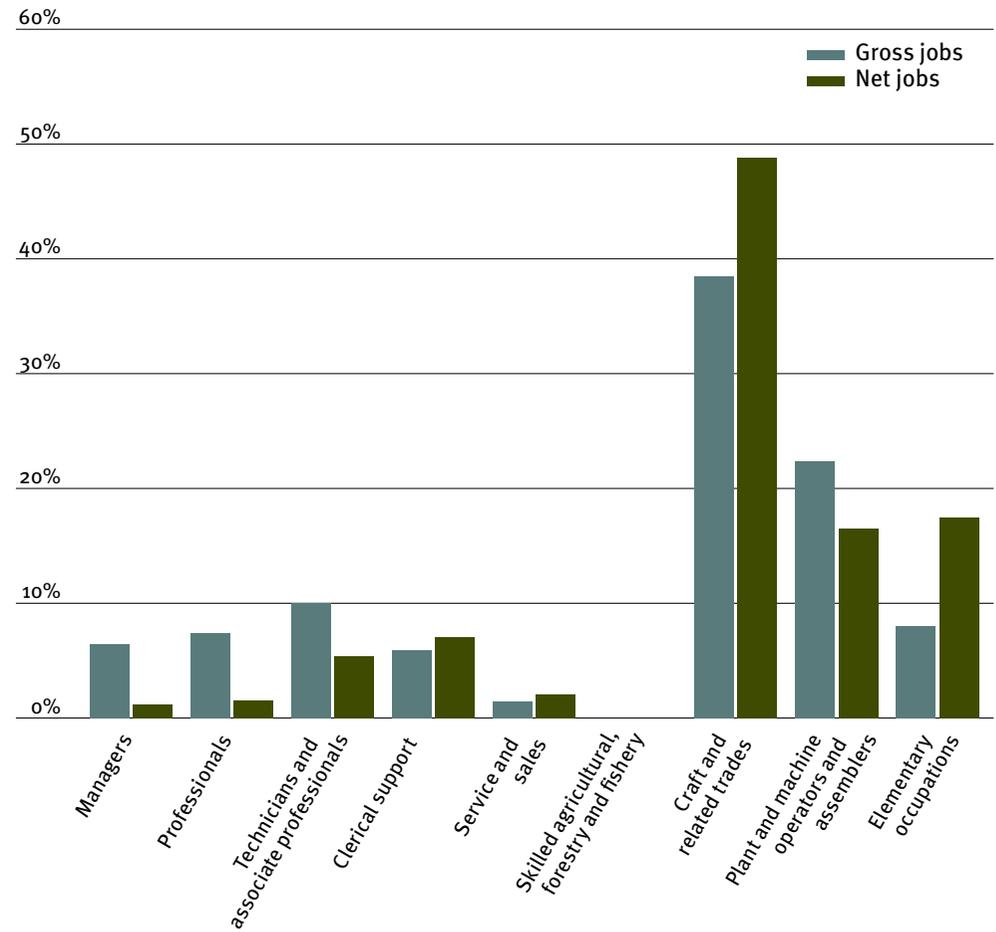
According to our analysis, the regions most likely to benefit are Region Poludniowy, which would see the most gross jobs, and Region Wschodni, which would see the most net jobs.

Remanufacturing creates many job opportunities in skilled and semi-skilled trades, especially craft and related trades, which would suit Poland’s strengths. However, it would also provide jobs in lower skilled occupations where they are currently needed: eg 6,000 gross jobs in elementary occupations are required in scenario two, 95 per cent of which would be net jobs.

Poland: distribution of remanufacturing jobs by region



Poland: distribution of remanufacturing jobs by occupation



Germany

Job creation opportunities

| | | | | |
|--|--|--|---|--|
| Scenario 1 No new initiatives | Gross jobs 43,000 Net jobs 13,000 | Biggest regional unemployment fall 0.08% (Hamburg) ↓ | Biggest occupational unemployment fall 0.12% (Craft and related trades workers) ↓ | Reduction in unemployment costs €0.20bn |
| Scenario 2 Current development rate | Gross jobs 482,000 Net jobs 122,000 | 0.68% (Sachsen-Anhalt) ↓ | 0.95% (Elementary occupations) ↓ | €1.89bn |
| Scenario 3 Transformation | Gross jobs 1,296,000 Net jobs 287,000 | 1.69% (Sachsen-Anhalt) ↓ | 2.33% (Elementary occupations) ↓ | €4.44bn |
| Percentage of gross jobs that are future-proof 92% | Biggest growth opportunity Servitisation and repair | Biggest labour market benefit Reduce regional inequality in north and eastern Germany | | |

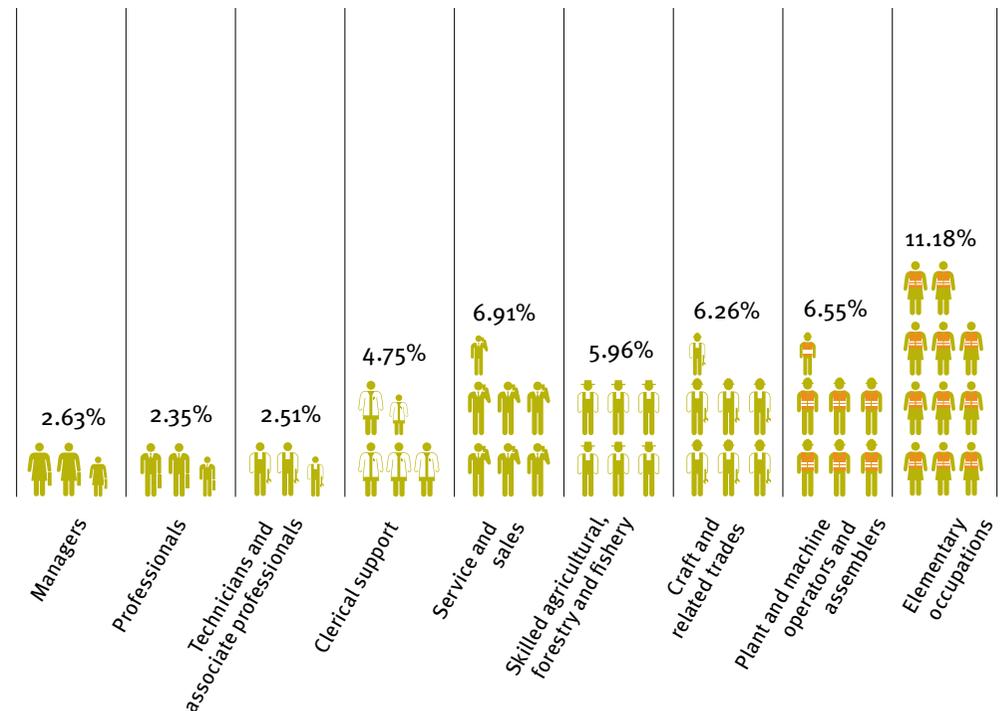
Labour market challenges

In stark contrast to Italy and Poland, Germany's unemployment rate has fallen from 7.7 per cent in 2009 to five per cent in 2015. At the regional level, seven out of the ten lowest regional unemployment rates in the EU are in Germany, including Europe's two lowest, Bayern at 2.9 per cent and Baden-Württemberg at 3.1 per cent.

But even in a country with such a successful unemployment story as Germany, regional inequality exists. Regions of former East Germany lag behind the west in wealth, employment and technology, with unemployment rates over three times higher: 9.8 per

cent in Berlin and 9.6 per cent in Mecklenburg-Vorpommern. A July 2015 report from the Berlin Institute notes that workers in the east of the country earn on average about €800 less per month than equivalents in the west and that productivity is 27 per cent lower, a gap that has barely closed since 1991.¹⁴ Jobs in the east tend towards agriculture, healthcare or tourism, rather than higher value industries.¹⁵ Unemployment also varies across occupations, though not as dramatically as in Italy and Poland.

Germany: unemployment rate by occupation



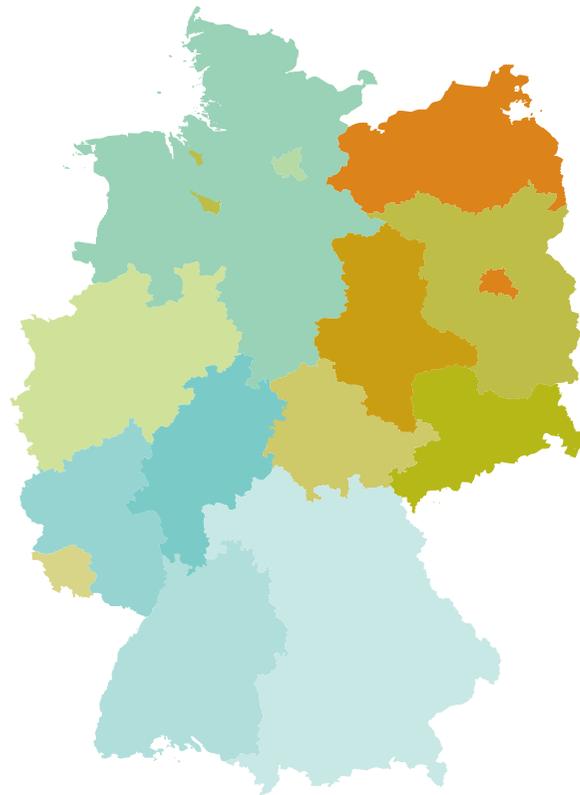
Circular economy opportunities

On the face of it, Germany is least well placed to reap labour market benefits from the circular economy because its economy is strong and unemployment is low. While our modelling shows that circular economy jobs created in Germany are, on average, less likely to reduce unemployment overall than in Italy and Poland, significant circular economy opportunities still exist to tackle regional unemployment issues between east and west and exploit existing German manufacturing advantages.

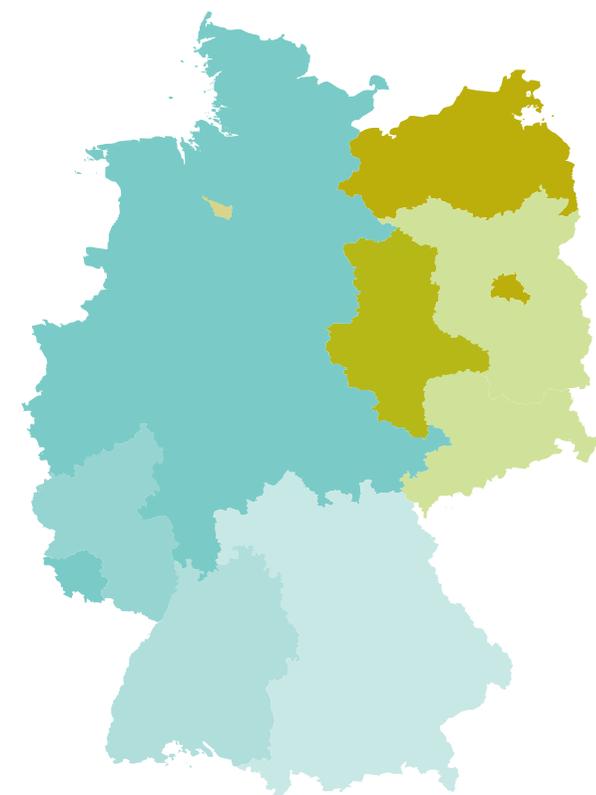
First, increased circular economy activity would produce big gains in east Germany, including in Chancellor Merkel's constituency, Mecklenburg-Vorpommern. In scenario three, this region could see 11,000 net jobs across the circular industries, unemployment lowered by 1.4 per cent, and €177 million saved on unemployment costs.

Germany: change in unemployment rate by region

Unemployment in 2014



Unemployment under scenario three

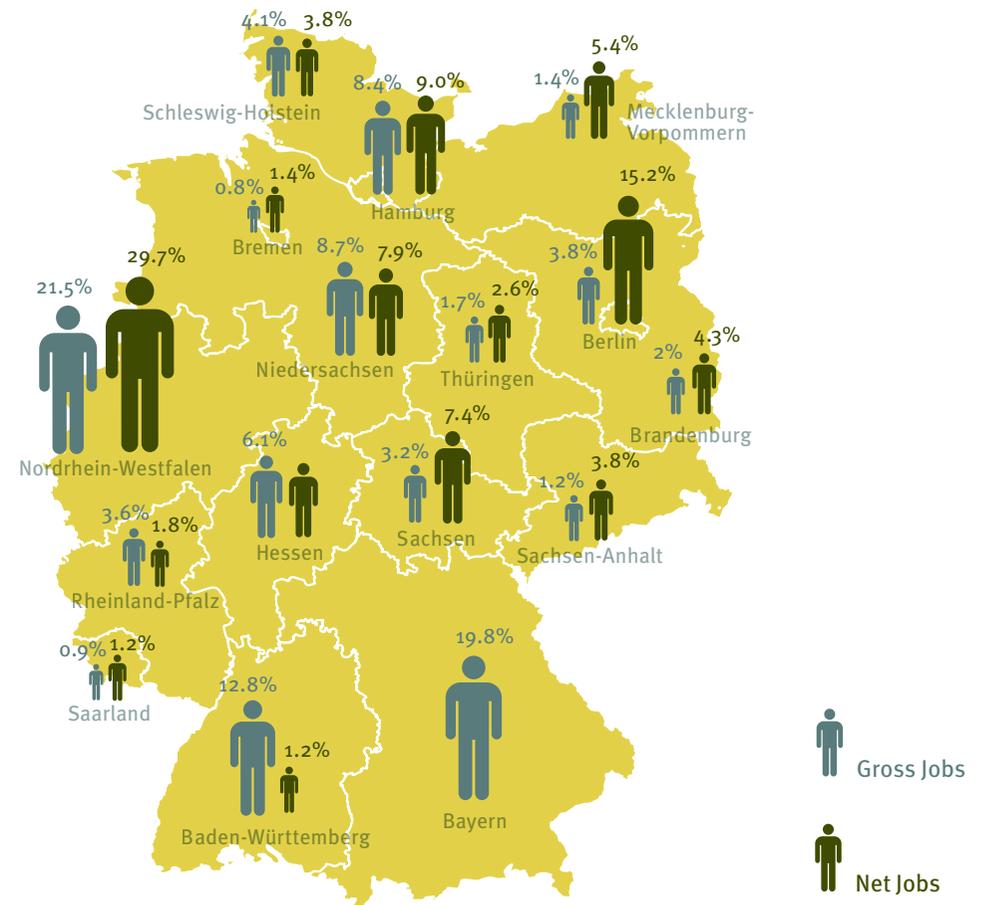


Second, because German manufacturers already produce high quality, durable and repairable goods, they have an opportunity to move towards servitisation and leasing. By leasing goods, the manufacturer, rather than the customer, bears the cost of replacing products when they break, but also gains the benefits of products that are repairable and built to last. Leading German companies are already exploring this space: for example, BMW's Drive Now is an electric car club, providing short term electric vehicle hire via smartphone app across five northern European countries.¹⁶

An increase in the repair and servitisation industries would provide jobs across Germany and at a range of skill levels. Repair jobs would be more decentralised, addressing mid level, mid skill unemployment around the country.

Servitisation jobs would be more likely to produce professional jobs aggregated in cities. These jobs would be created across Germany, but the industrial powerhouses of Bayern and Baden-Württemberg would see comparatively little reduction in unemployment. However, significant reductions in unemployment would occur in Berlin in the east, Nordrhein-Westfalen in the reindustrialising north west and Hamburg in the north.

Germany: distribution of servitisation jobs by region



Conclusion

The environmental benefits and cost savings of a resource efficient economy already provide ample justification for Europe to become more circular. But, in this study, we have shown that there are social benefits too. Circular industries are well positioned to create jobs in occupations and regions with persistently high unemployment rates, and to contribute to cutting structural unemployment.

The transition to a circular economy will look different in every country. In Italy, the clearest opportunity lies in the bioeconomy, which has an excellent opportunity to develop its biorefining sector using agricultural byproduct and waste feedstocks from the south. Poland's productivity can be boosted through remanufacturing, which would maintain economic growth while providing opportunities to create lasting, good quality jobs. And, even in Germany, the circular economy can help to lower unemployment in eastern cities and provide a new, less resource intensive

source of growth for its high quality manufacturing sector.

The extent of these labour market benefits will depend on how much more circular Europe's economy becomes. None of the scenarios presented in this study are impossible to achieve by 2030, but ambitious results will require effective policy at both European and national level.

Methodology

For the most part, this study closely follows methodology developed for a similar study of the UK labour market, *Opportunities to tackle Britain's labour market challenges through growth in the circular economy* published in January 2015 by Green Alliance and WRAP.¹⁷ The methodology is summarised below, describing in turn the assumptions for inputs on circular economy activity, unemployment and scenarios, followed by the calculations of gross jobs, net jobs, the percentage of jobs which are future-proof and unemployment cost savings. Further detail can be found in the Green Alliance and WRAP report.

Baseline circular economy activity and jobs

Some of the more established circular economy industries, such as repair, have obvious representations in the *Statistical classification of economic activities in the European Community (NACE) Rev 2* four digit industry codes.¹⁸ In such cases, we have found data for numbers of jobs in each

country and, where possible, within each region. Where the regional distribution of jobs is unavailable, we have approximated, based on the regional distribution of jobs in higher level NACE levels: eg waste management jobs data is available at a regional level and can be used to approximate the spread of recycling jobs, which is only available at national level. However, this approach has its limits, as it is unlikely to capture the full extent of jobs created. Other estimates were used for those industries not recognised at all in the NACE codes. For example, in some cases the number of anaerobic digestion facilities is known and jobs are estimated from other studies reporting the average number of people employed per facility. To estimate the occupational distribution of jobs in circular economy activities, we approximated according to the spread in the UK.

Data on current recycling rates for all waste streams at regional level was not available and so municipal rates were used as the best approximation. In the absence

of empirical data, we assume that job creation rates in municipal and other recycling activities would be similar. Remanufacturing rates refer only to suitable industries, which varies between 21 per cent in Poland and 36 per cent in Germany. Baseline remanufacturing rates were estimated to be equivalent to the UK rate, of four per cent in suitable industries. This is likely to underestimate the job creation potential, given current remanufacturing rates are likely to be lower in other parts of the EU.¹⁹

EU employment and unemployment data

Mostly, this data is available from Eurostat. We have used the *EU Labour Force Survey* as the more accurate measure of total unemployment and the *Structural Business Survey* for distribution between industries, as per the Eurostat guidance on data coherence.²⁰ Where there are discrepancies between the national totals listed and the sums from the regional or occupational observations, we have deferred to the higher aggregates, as recommended.²¹

Our scenarios

The scenarios were developed for the Green Alliance and WRAP study described above. For recycling, the rates refer to all waste streams. Remanufacturing rates refer only to those sectors that we assess to be suited to remanufacturing and are calculated as the revenue from remanufacturing activities in these sectors, divided by the revenue from all manufacturing in these sectors. Suitable sectors include electrical, electronic, industrial equipment and automotive.

The recycling and remanufacturing rates we have given are absolute rates. Servitisation, reuse and biorefining activities are less easily quantified as an absolute percentage and, instead, the scenarios set out their change relative to our base year.

Gross jobs

For the job growth projections we took, as a starting point, the existing regional and occupational distribution of jobs, and each circular activity is modelled

slightly differently based on the most reasonable assumptions. For example, recycling jobs are projected to increase more in areas with lower recycling rates, while jobs in remanufacturing are modelled at a national level based on the size of the existing manufacturing industry, the prominence of those sectors suitable for remanufacturing and the assumption that remanufacturing is twice as labour intensive as original manufacturing.²² Remanufacturing jobs are apportioned to regions according to the distribution of existing manufacturing jobs.

Where appropriate, job losses are also factored in, eg new recycling jobs will displace a small number of jobs in landfill, and in virgin paper and glass industries, and repair jobs will displace a small number of original manufacturing jobs.

Net jobs

Whether a job created by the circular economy will be a net job, and take a person out of unemployment, is a

critical element of the study. The first step we took was to subtract the proportion of jobs that could go to people who move to the region from elsewhere to take up a job, which we approximated as the country's level of immigration.

We then determined the level to which unemployment rates could reasonably drop, known as the non-accelerating inflation rate of unemployment (NAIRU). It is agreed by most economists that unemployment rates could never reach zero, as there will always be people changing jobs, and because low levels of unemployment put pressure on inflation. In assessing the potential for net job creation, we assumed instead that, within any country, all regions could theoretically reduce their unemployment rates down to the lowest observed rate for a region in that country.

In the region with the lowest unemployment, we assumed a zero probability that a given job created by the circular economy will be a net job

while, on the other end of the spectrum, in the region with the highest unemployment rate, we assumed the probability of a job created being a net job to be 100 per cent. Other regions are given a probability relative to their position on the spectrum of unemployment rates of all regions in the country. As net jobs are created, the unemployment rate then decreases, changing the probability that the next gross job in that region will be a net job.

We repeated exactly the same methodology for occupations, and then averaged the figures to give total net jobs results.

Future-proof jobs

The percentage of jobs that are future-proof relates only to those occupations expected to decline in absolute employment numbers by 2025 in each country, according to Cedefop.²³ We aggregated the number of gross jobs created by circular activities in these vulnerable occupations and then calculated how many would be lost,

assuming such occupational trends apply equally to circular industry jobs. The number remaining are said to be future-proof.

Savings on unemployment costs

Cost savings are based on Eurostat figures for country spending on unemployment benefits, divided by the number of unemployed to determine an approximate spend per unemployed person.²⁴ Savings are calculated as the number of net jobs multiplied by the amount spent per person.

Endnotes

- 1 CEDEFOP, 2015, 'Employment trends: 2015 skills forecast', www.cedefop.europa.eu/en/publications-and-resources/data-visualisations/employment-trends
- 2 See, for example: A Wijkman, K Skånberg and M Berglund, 2015, *The circular economy and benefits for society*, The Club of Rome
- 3 *Labour force survey July-September 2014*, available from www.nomisweb.co.uk, accessed February 2015; Green Alliance calculations
- 4 W Bogdan, D Boniecki, E Labaye, T Marciniak and M Nowacki, 2015, *Poland 2025: Europe's new growth engine*, p 46, McKinsey & Company, www.mckinsey.com/insights/economic_studies/how_poland_can_become_a_european_growth_engine
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Green Alliance

Green Alliance is a charity and independent think tank focused on ambitious leadership for the environment. We have a track record of 35 years, working with the most influential leaders from the NGO, business, and political communities. Our work generates new thinking and dialogue, and has increased political action and support for environmental solutions in the UK.

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