

Jobs and the circular economy: three scenarios for Scotland



“green
alliance...”

Executive summary

Scotland has been making its economy more circular, by developing its reuse, remanufacturing and recycling industries to save resources and reduce waste.

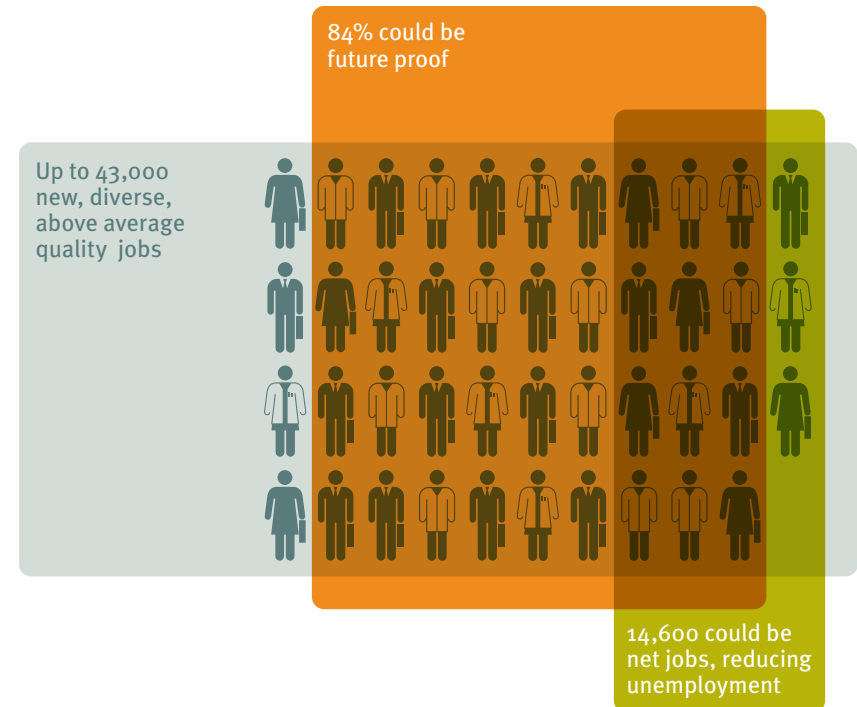
But a circular economy offers Scotland a less immediately obvious prize: the opportunity to transform its labour market, by creating good quality jobs resilient to technological change and offshoring. What is more, these benefits would apply to areas and occupations with persistently high unemployment.

In this study, we show how Scotland's labour market could benefit from an even more circular economy, and propose ways to accelerate its development.

Section one looks at Scotland's labour market and identifies four specific challenges that could be helped by a more circular economy.

Section two presents three scenarios for 2030, with different degrees of 'circularity', illustrating the choices the country faces.

In section three we explain how Scotland's circumstances set it apart from the rest of the UK. Having conducted a similar study for the UK, our assessment is that Scotland is better disposed than the rest of the UK to accelerate its circular economy activity due to its current level of ambition and action.



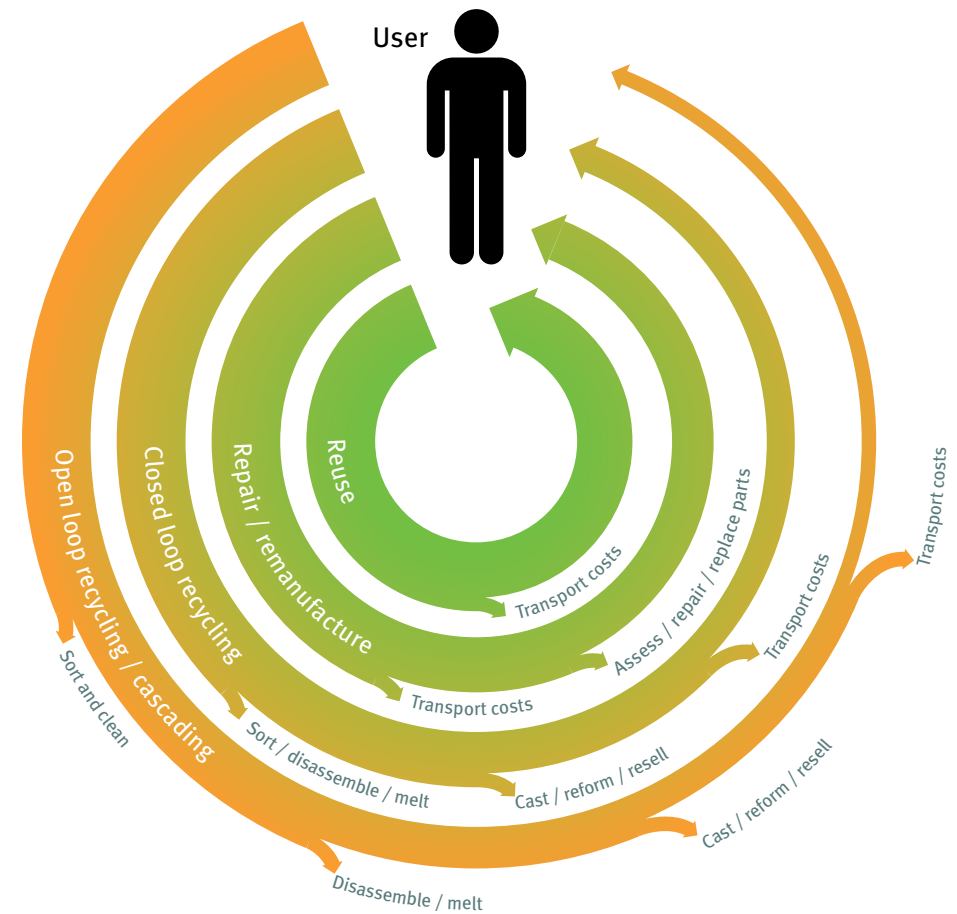
What is the circular economy?

A circular economy is one that 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: different business models include leasing and moving from providing products to services.

Where a product needs repair or reconditioning 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.



1

Scottish labour market challenges

1. Scottish labour market challenges

Expanding the circular economy could help to transform Scotland's labour market, by addressing four key labour market challenges: high unemployment, structural mismatch, the decline in mid level occupations and poor quality employment.

1. High unemployment

Scotland used to enjoy fairly low unemployment: it fell as low as 4.7 per cent compared to the UK's 5.2 per cent in 2007-08. But the recession, and ensuing low oil prices, hit Scotland particularly hard. The nation has seen a slower recovery, and higher unemployment in the interim, than the UK as a whole.¹ Scotland had over eight per cent unemployment in 2011 and 2012, though this fell to 6.2 per cent in 2014, equal to that of the UK.²

This means there were still 169,500 people unemployed in 2014, an increase of 39,400 on 2008.³

The circular economy could help to bring this figure down. Our analysis has found that new markets in valuable second-hand goods, a remanufacturing boom, better value extraction from recycled materials and a high tech biorefining revolution could, together, create up to 43,000 new jobs in Scotland.

These jobs would offer a diverse range of opportunities at all skill levels.

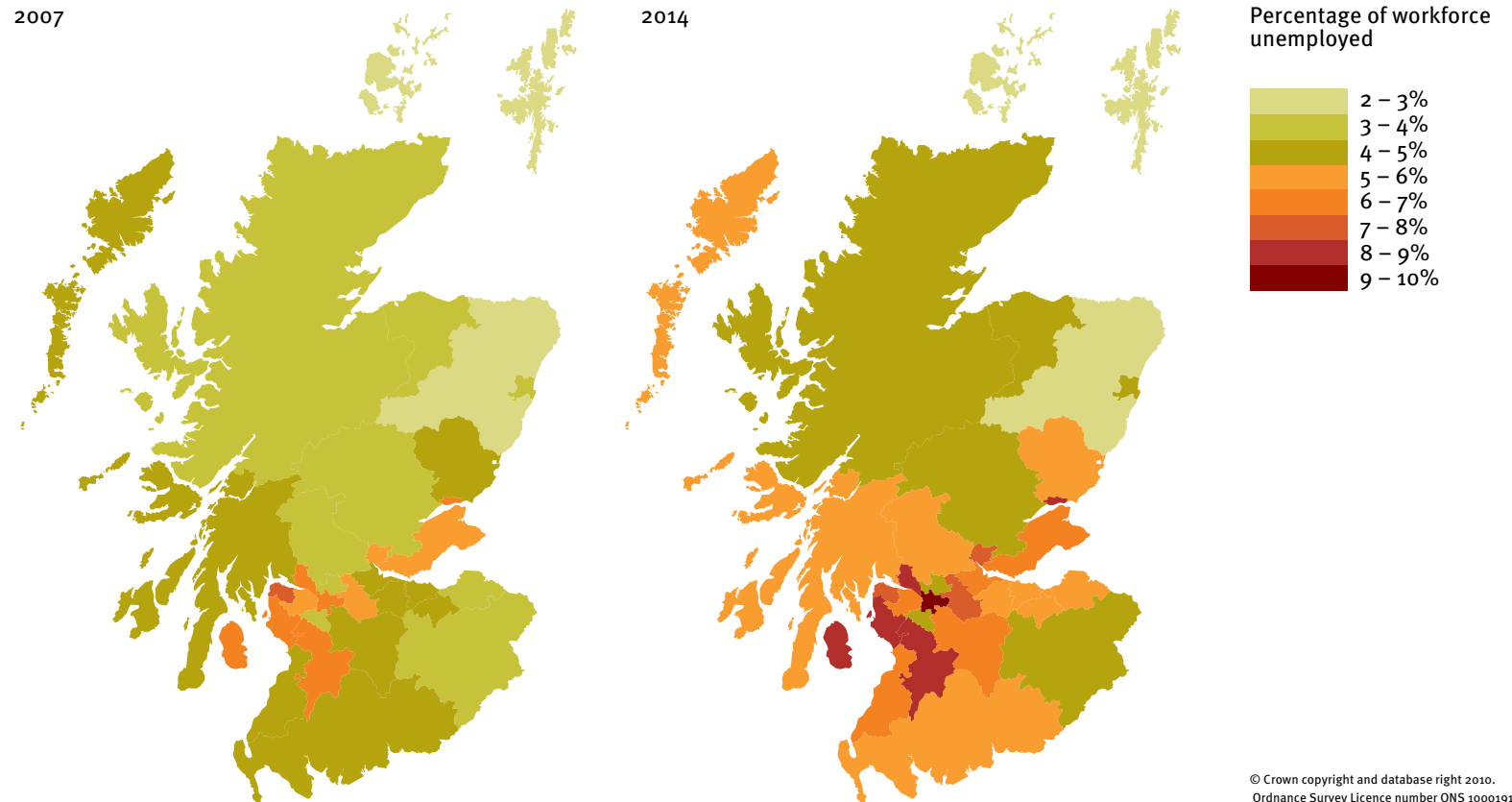
1. Scottish labour market challenges

2. Structural mismatch

High unemployment rates are also underpinned by structural challenges, which cannot always be fixed just by creating new growth areas in the economy.

Although exacerbated by the recession, a persistent trend in the Scottish labour market has been huge regional and occupational differences in unemployment. Even in the boom time of 2007, the difference was stark, with Aberdeenshire on 2.4 per cent and Inverclyde on 7.1 per cent.⁴

Unemployment rates



1. Scottish labour market challenges

This enduring spread can be explained by the concept of ‘structural mismatch’: the idea that new jobs are created in areas or in occupations where unemployment is already low, while job growth remains flat or declines in areas or at skill levels where a high number of people are seeking work.

The challenge is to align job vacancies with the pool of labour seeking them. A proliferation of vacancies in highly skilled positions, for example, would do nothing to help low skilled unemployed people competing for a limited number of low skilled jobs.

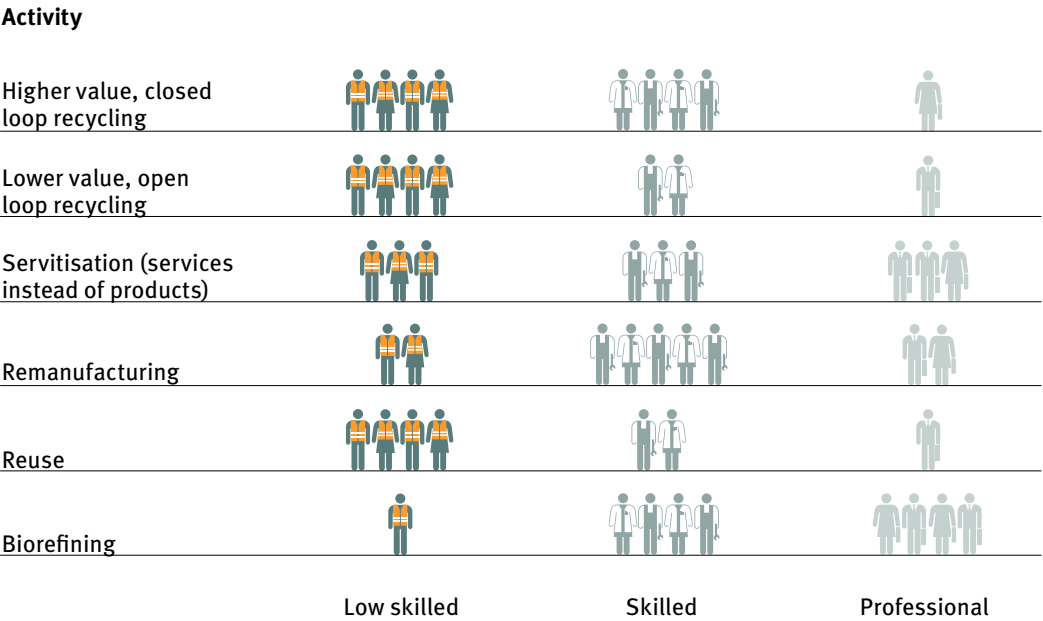
We have modelled the effects of circular economy job creation on the Scottish labour market, and shown it can create jobs in areas and occupations where people need them.

In an ambitious scenario, more than 14,600 of the jobs created could be ‘net’ new jobs, ie jobs that put unemployed people into work rather than displacing existing jobs. Many studies on job creation neglect this crucial distinction.

In particular, the number of jobs produced in former industrial heartlands like Glasgow could be substantial, due to its potential for remanufacturing. Dundee City, East Ayrshire and Clackmannashire are other high unemployment areas with the potential to see significant falls in unemployment levels.

Different circular economy activities can also provide work at a range of different skill levels, which match some of the labour market challenges Scotland faces.

Job creation potential by skill type



1. Scottish labour market challenges

3. The ‘hollowing out’ of the labour market

A persistent trend in advanced economies is that jobs in mid level occupations are in apparent terminal decline, while low and high level jobs are on the increase. This is known as the ‘hollowing out’ of the labour market.

Although forecasting is notoriously difficult, this trend is projected to continue. The biggest losses forecast are for skilled trades, administrative occupations and plant and machinery operatives, while fast growth is projected in higher skilled occupations, such as senior managers and professional occupations, as well as lower skilled occupations such as caring and personal service occupations.⁵

This trend is attributed to a variety of factors, including technological developments, but also competition from abroad, and an ageing population requiring more personal service and care provision.⁶

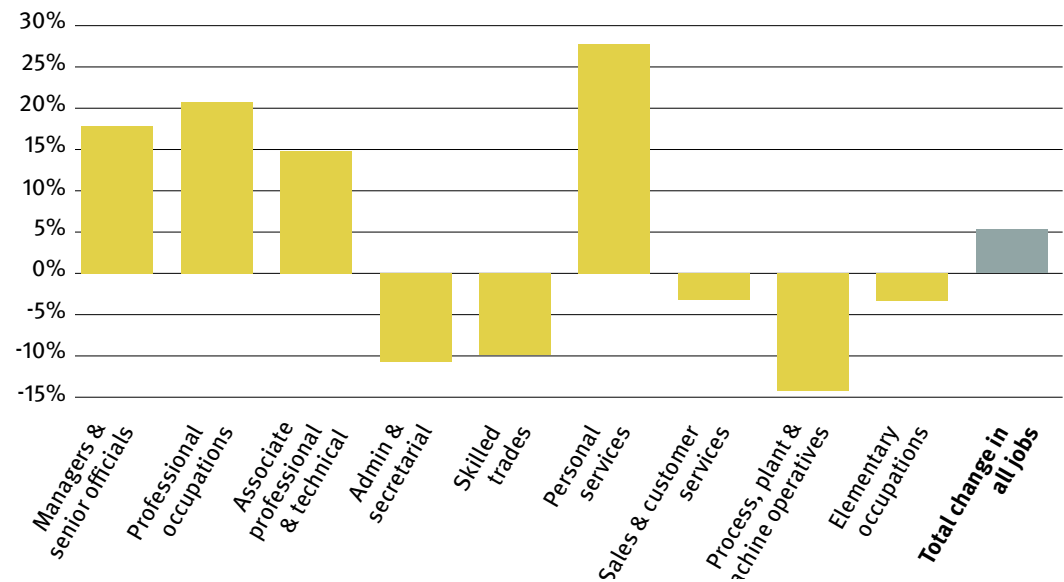
These changes are not necessarily negative. As Deloitte has pointed out, no one mourned the loss of 90 per cent of clothes washing jobs when machines took over.⁷

The challenge will be to ensure that the skills the labour force is currently equipped with can be applied to new areas in the short to medium term, while in the long term enabling the labour force to adapt and change to match the demands of a future, more resource resilient, economy.

Although a small proportion, around 16 per cent, of the net jobs produced by a more circular economy will be subject to the same pressures from technology and offshoring affecting other mid level jobs, many more will be resilient. This means that the circular economy could offer good employment prospects for a group with an otherwise uncertain future. In an ambitious scenario this could offset 7.5 per cent of the projected decline in mid level and low level jobs.

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

Predicted change in occupations between 2012 and 2022⁸



1. Scottish labour market challenges

4. Under-employment, insecurity and job dissatisfaction

The change in traditional employment patterns, and the shift to part time, self-employed, temporary and zero hours contract jobs is another challenge for the future of the labour market.⁶

For some employees this has meant more flexible working, freedom and job satisfaction. But, for many, it has meant insecurity and under-employment, ie people wanting to work more than the hours that are available to them. Under-employment in Scotland has risen from 6.7 per cent in 2007 to 8.6 per cent in 2014.²

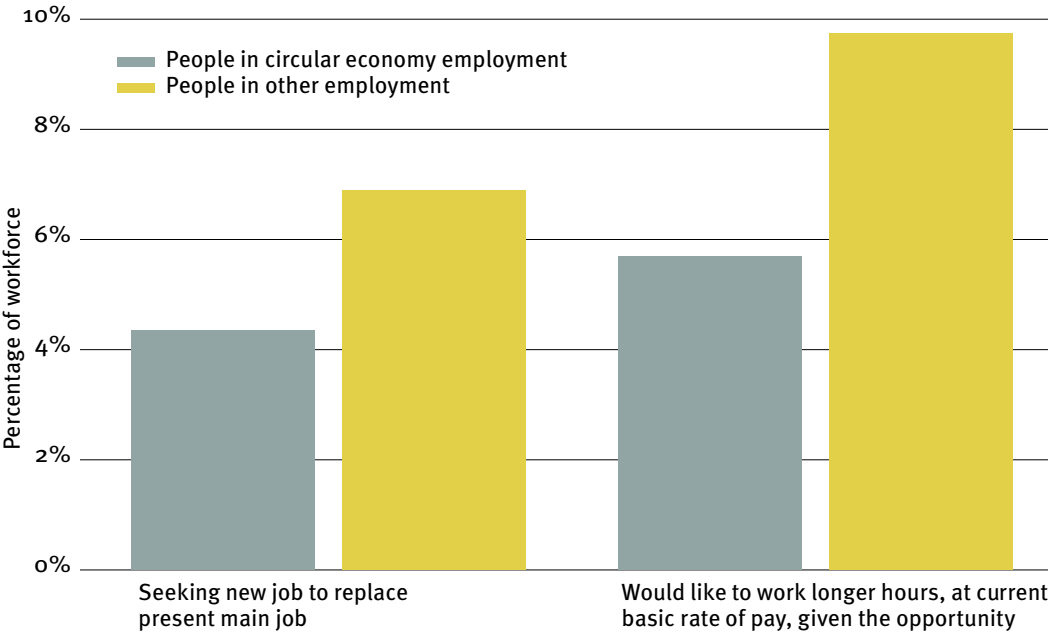
The picture of falling unemployment rates over the past five years, while an undoubtedly positive story, misses these important details.

We have assessed two aspects of current circular economy jobs: whether they provide adequate hours of work and whether people with these jobs are seeking replacement jobs.

On both counts jobs in the circular economy come out better than other jobs: employees in circular economy industries tend to like their jobs more and are less likely to report under-employment. However, it should be noted that the margins of error are significant due to small sample sizes.

(See annex on page 12 for more information.)

Levels of job satisfaction



2

Three scenarios
for 2030

2. Three scenarios for 2030

Three scenarios

How much Scotland’s labour market benefits from the circular economy depends on how circular it becomes. Here, we present three scenarios for Scotland in 2030.

Scenario 1: No new initiatives	Scenario 2: Current development rate	Scenario 3: Transformation
In the most modest case, Scotland could continue on its existing trajectory but not introduce any new initiatives. The circular economy already employs 56,000 people.⁹ In this scenario a further 3,400 jobs could be created, including 1,300 net jobs.	With increased ambition, new policies would be developed at the same rate as has been seen over previous years. Growth in remanufacturing could create new opportunities in former manufacturing areas. Reuse and recycling rates would increase, adding jobs in these sectors. 19,200 gross jobs could be created, including 7,100 net jobs.	In the most ambitious scenario, additional benefits would include new biorefining jobs across a range of skill levels. Scotland would be well positioned to avoid continued reliance on declining North Sea oil and gas. 43,000 gross jobs could be created, including 14,600 net jobs.

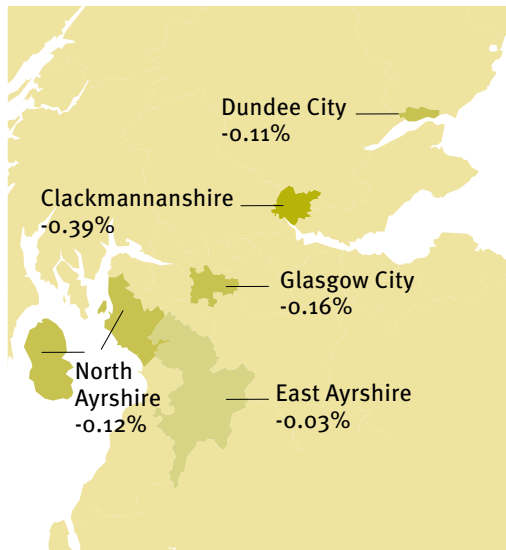
2. Three scenarios for 2030

Providing jobs where they are needed

Potential percentage change in unemployment: top five regions

The circular economy will create employment across much of Scotland, but the biggest increases will be seen in areas of high unemployment, including Clackmannanshire, Glasgow, and Dundee.

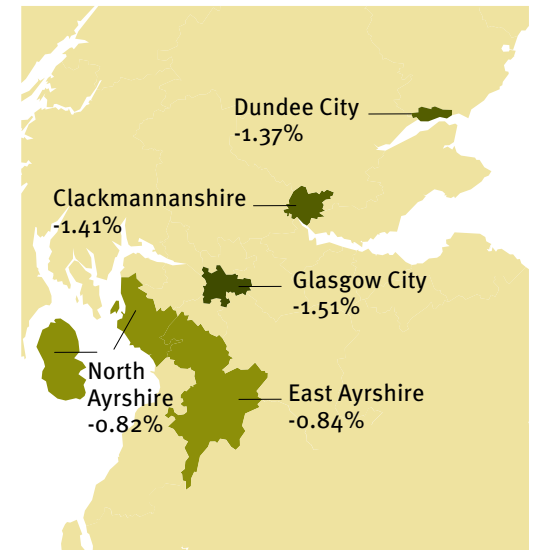
Scenario 1



Scenario 2



Scenario 3

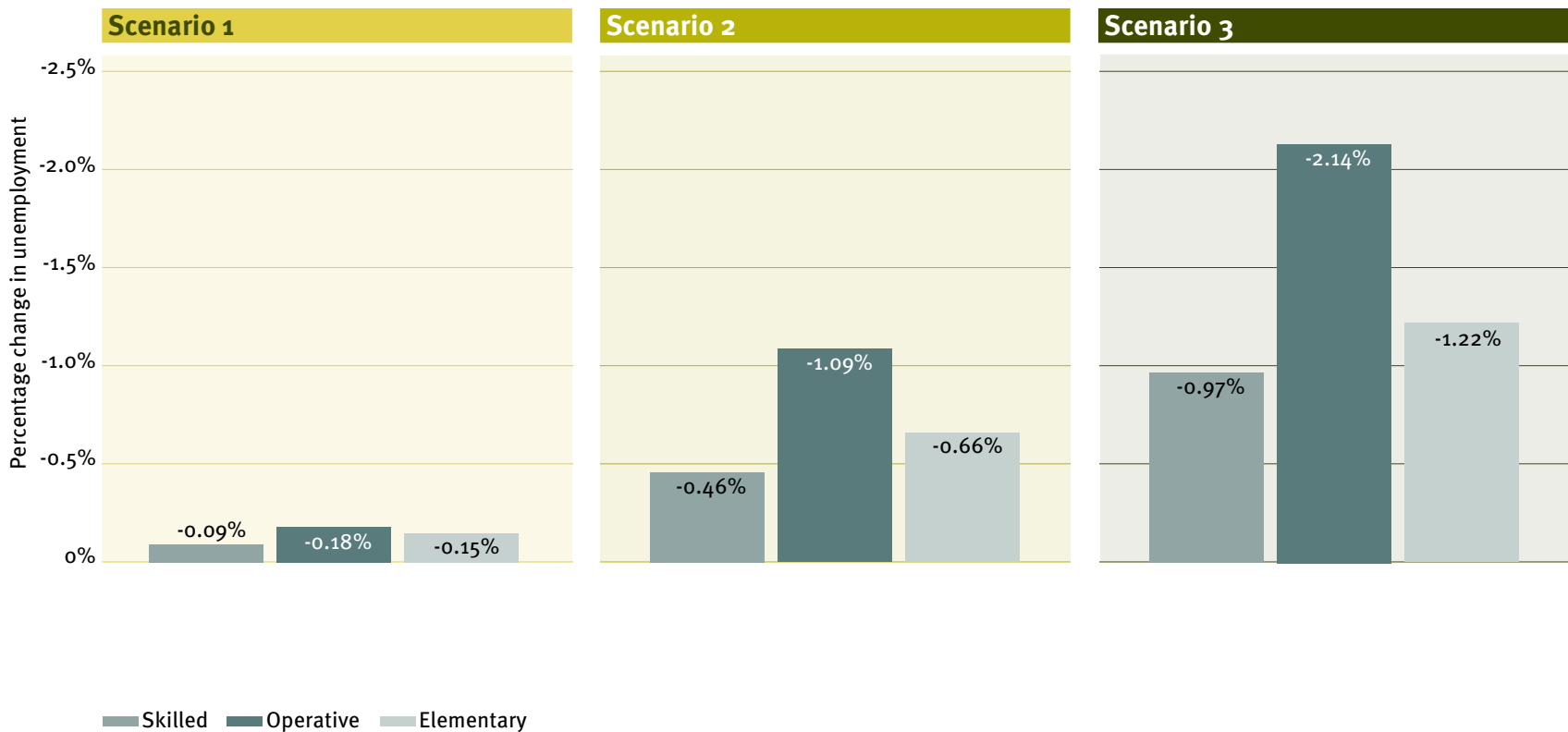


2. Three scenarios for 2030

The circular economy will create employment across all occupation types, but the biggest increases will be seen in skilled, operatives and elementary occupations.

Providing the types of jobs that are needed

Impact on unemployment: top three occupation categories

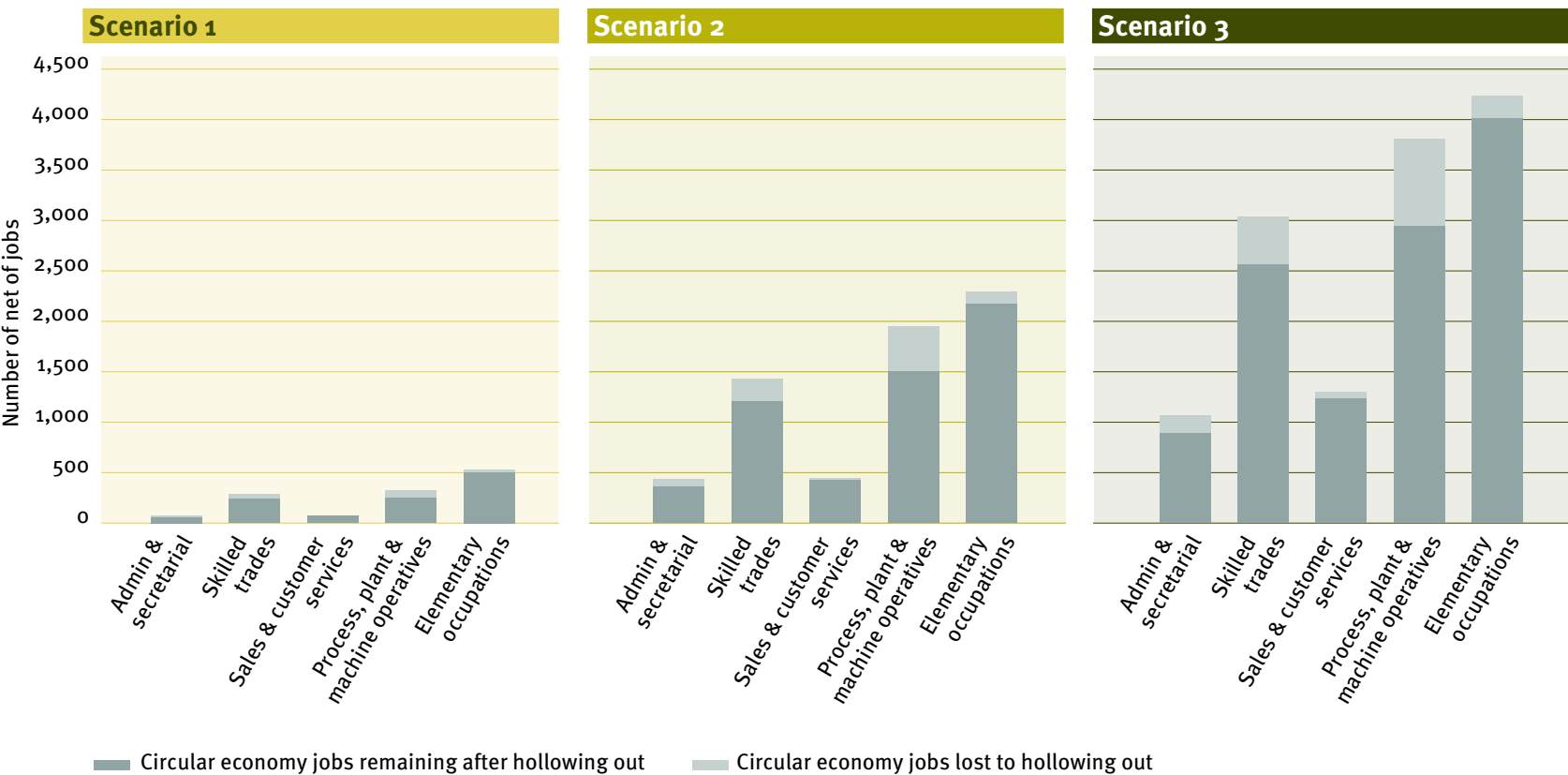


2. Three scenarios for 2030

The jobs provided would be mostly resilient to the so-called ‘hollowing out’ of the labour market, ie the offshoring and mechanisation trend threatening to destroy mid level jobs. While some circular economy jobs might be lost to these wider trends, the majority of them would remain.

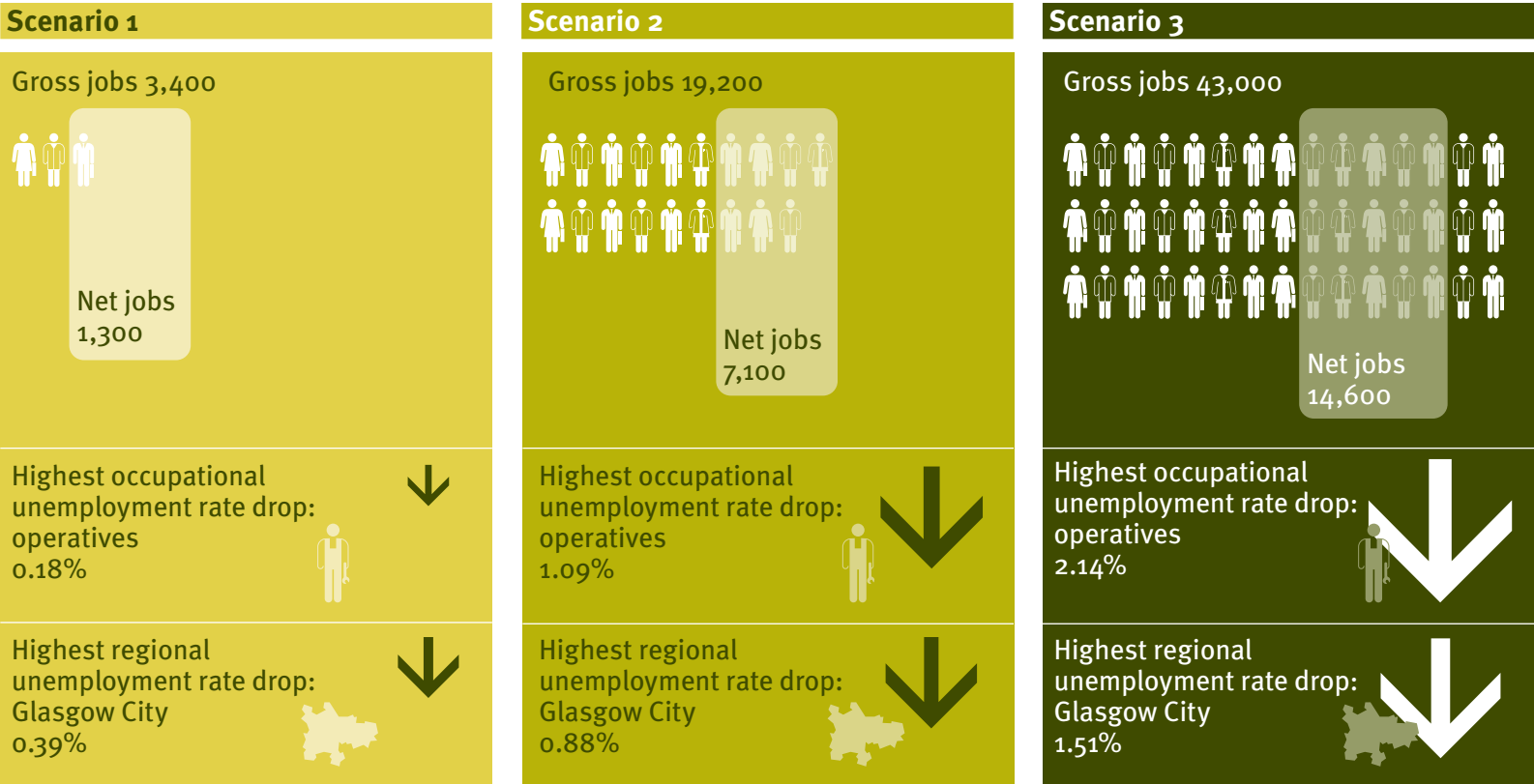
Future proofing the labour market

Net job creation in vulnerable occupations



2. Three scenarios for 2030

Summary of the benefits of developing the circular economy in Scotland



3

What is Scotland's
potential for
transformation?

3. What is Scotland's potential for transformation?

All three of our scenarios provide some labour market benefits but they scale up dramatically as circular economy ambition increases. At one end of the spectrum, scenario one would see the resource economy remaining mostly linear, making a limited contribution to overcoming labour market challenges. At the other, scenario three would be transformational: it could create 43,000 new jobs, a 76 per cent increase on the 56,500 already employed in circular economy activities, and this would include 14,600 net jobs.

Scotland is well placed to achieve the rates given in scenario three. It has a supportive political approach to the circular economy, a number of businesses already operating circular economy business models, and enabling policies, plans and institutions.

In particular, Scotland's remanufacturing industry is more developed than the rest of the UK. Two thirds of the turnover in the aerospace manufacturing sector already comes from remanufacturing activities, and there is great growth potential in areas such as the automotive and ICT sectors.¹⁰

Scotland is also well placed to develop the bioeconomy. While it has 8.3 per cent of the UK population, it has 13 per cent of commercial anaerobic digestion, 12 per cent of industrial anaerobic digestion and 11 per cent of composting facilities in the UK.⁷ The future of this sector, within a more circular economy, would be to shift from biofuels into bioplastics and biomaterials. Scotland's bioeconomy roadmap and national plan for industrial biotechnology can provide a framework to capture these opportunities.

Scotland's zero waste regulations have also been more comprehensive and targeted than other parts of the UK. Its many relevant institutions, including innovation and enterprise agencies, are well positioned to develop and commercialise new technologies and business models in a circular economy.

So Scotland is in an exciting position. It could use its circular economy advantages to create significant numbers of good quality jobs, address longstanding issues of structural unemployment, and establish a future labour market that is resilient to technological change and offshoring.

Circular economy sector activity under the three scenarios

	Starting rate 2014	Scenario one: No new initiatives	Scenario two: Current development rate	Scenario three: Transformation
Recycling rate (percentage of waste recycled)	47%	55%	70%	85%
Remanufacturing rate (percentage of manufacturing turnover from remanufacturing activities)	16%	16%	28%	39%
Growth in reuse (from 2014 level)	n/a	10%	10%	25%
Growth in servitisation (from 2014 level)	n/a	5%	30%	100%
Growth in biorefining (from 2014 level)	n/a	5%	30%	100%

Annex: methodology

For the most part, this study closely follows methodology developed for a similar, broader study of the UK labour market, published earlier this year by Green Alliance and WRAP.¹¹ The finer details are explained in the technical report *Opportunities to tackle Britain's labour market challenges through growth in the circular economy*. Scotland was itself part of this UK-wide study, but was treated as a single region, which masked specific labour market challenges within Scotland and underestimated its potential for net job creation.

This study differs from the earlier one in a number of important ways. First, it assumes a more advanced starting point for the circular economy in Scotland, due to Scotland's actual remanufacturing and recycling rates. This changes the baseline and scenario one, but the other two scenarios are mostly unchanged to allow maximum comparability.

Second, the geographical analysis for Scotland was carried out down to local authority level rather than regional level. This meant the spread of unemployment rates was revealed in more detail, from 2.7

per cent in the Orkney Islands to 9.5 per cent in Glasgow.

To avoid overestimating potential jobs, we made a slight change to the methodology. It is agreed by most economists that unemployment could never reach zero, as there will always be people changing jobs, and because low levels of unemployment put pressure on inflation. For the UK-wide study, a reasonable assumption was made that all regions could theoretically get unemployment down to the lowest observed rate for a UK region, which was 4.6 per cent in the South West. In Scotland's case, however, it seemed unrealistic to base the assumption on rates as low as Orkney, applied across the country, so we used a rate of 3.9 per cent as a reasonable aspiration, as local authorities covering ten per cent of Scotland's population achieve that rate or below.

Third, this study takes a more detailed look at remanufacturing, at a sector by sector level. The UK analysis took a fixed proportion of the UK's manufacturing to be suitable for remanufacturing and assumed that, in all cases, remanufacturing was

twice as labour intensive per unit of revenue than original manufacturing. It also assumed that, for suitable sectors, an ambitious aspiration would be to reach a rate of 50 per cent turnover from remanufactured goods. Both assumptions were taken from Next Manufacturing Revolution's report.¹² For this study, we instead used data from Oakdene Hollins to calculate a sector by sector maximum potential remanufacturing rate and also a sector by sector multiplier of the relative labour intensity of remanufacturing to manufacturing.

Fourth, it was particularly hard to quantify growth in the biorefining sector due to difficulty obtaining data on existing biorefining jobs. For the UK study, this sector was not included in the quantitative analysis, but we have included it here, using best available data, due to its importance in the Scottish economy.

Finally, this study attempts to quantify job quality, drawing on the UK-wide *Labour Force Survey* which we have assumed is a good approximation for Scotland.¹³ Sample sizes were small, and the data was only available

for repair, recycling, sale of second-hand goods and rental and leasing. Biorefining, servitisation and, most notably, remanufacturing were not included. Controlling for gender, the difference is statistically significant for men while, for women, the sample size is too small but the point estimate follows men in showing circular economy jobs fare better. With 95 per cent confidence intervals (+/-1.96 standard errors), margins of error are:

	Replace job	Under-employment
All	1.3%	1.6%
Male	1.4%	1.7%
Female	3.3%	4.4%

A detailed analysis of the potential of circular economy jobs to provide secure, satisfactory employment would be an interesting area for further study.

Endnotes

- 1 Brian Ashcroft, 2015, 'Fraser economic commentary', www.scottisheconomywatch.com/brian-ashcrofts-scottish/2015/06/fraser-economic-commentary-june-2015.html
- 2 Unemployment rate - aged 16-64, from the *Annual population survey (Jan-Dec)*, for the years 2007, 2011, 2012 and 2014, accessed 21 August 2015, available at www.nomisweb.co.uk
- 3 The Scottish Government, *Local area labour markets in Scotland: statistics from the Annual population survey*, 2014, www.gov.scot/Resource/0047/00477512.pdf
- 4 Within Scotland, model based unemployment rates for 16+ are used. Source: *Annual population survey (Jan-Dec)*, Claimant count available: Table 2.3 www.gov.scot/Resource/0047/00477522.xls, accessed 21 August 2015
- 5 UK Commission for Employment and Skills (UKCES), 2014, *UK labour market projections: 2012 to 2022*, www.gov.uk/government/publications/working-futures-2012-to-2022
- 6 Gail Rogers and Kenny Richmond, Scottish Enterprise, June 2015, 'Scotland's labour market: job polarisation and inclusive growth', University of Strathclyde / Fraser of Allander Institute Economic Commentary: 39(1), www.strath.ac.uk/media/departments/economics/fairse/fecvol39no1/Scotland%E2%80%99s_labour_market,_%E2%80%99job_polarisation%E2%80%99_and_inclusive_growth.pdf
- 7 Katie Allen, 'Technology has created more jobs than it has destroyed, says 140 years of data', 17 August 2015, *The Guardian*, www.theguardian.com/business/2015/aug/17/technology-created-more-jobs-than-destroyed-140-years-data-census
- 8 UKCES, 2014, op cit
- 9 Calculations based on SIC codes for repair, reuse and rental and leasing, remanufacturing jobs from Oakdene Hollins,; biorefining calculations from www.gov.uk/government/uploads/system/uploads/attachment_data/file/266090/ecofys-uk-biofuel-industry-overview-v1.5.pdf; www.zerowastescotland.org.uk/sites/files/zws/Scottish%20ASORI%20Report%2020140924%20Final.pdf; www.wrap.org.uk/content/operational-ad-sites; www.wrap.org.uk/sites/files/wrap/ASORI%202012.pdf; www.qualitycompost.org.uk/producers; www.scottish.parliament.uk/ResearchBriefingsAndFactsheets/S4/SB_13-41.pdf
- 10 Oakdene Hollins calculations August 2015; Zero Waste Scotland and Oakdene Hollins, March 2015, *Circular economy evidence building programme remanufacturing study*, www.zerowastescotland.org.uk/sites/default/files/Remanufacturing%20Study%20-%20Full%20Report%20-%20March%202015_o.pdf
- 11 Julian Morgan and Peter Mitchell, January 2015, *Opportunities to tackle Britain's labour market challenges through growth in the circular economy*, Green Alliance and WRAP, www.green-alliance.org.uk/opportunities-to-tackle-britains-labour-market-challenges.php
- 12 Dr G Lavery, N Pennell, S Brown and Professor S Evans, 2013, *The next manufacturing revolution: non-labour resource productivity and its potential for UK manufacturing*, Next Manufacturing Revolution, www.nextmanufacturingrevolution.org/wp-content/uploads/2013/09/Next-Manufacturing-Revolution-full-report.pdf
- 13 *Labour force survey July-September 2014*, available www.nomisweb.co.uk, accessed February 2015

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By Emily Coats

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Green Alliance

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