



ReNEW report into the Circular Economy in NI

Job Creation in the Circular Economy - Increasing Resource Efficiency in Northern Ireland

Authors; Peter Mitchell WRAP, Martin Doherty ReNEW
Acknowledgements; Dr Ian Garner WRAP NI
Date; 30 September 2015

Forewords

Minister for the Environment, Mark H Durkan MLA



I commend the work of the ReNEW project, and this report, for highlighting the benefits of embracing a circular economy. The ReNEW project exemplifies the benefits of working together with partners from across Europe to find innovative solutions to challenges that increasingly have an impact on our economy and quality of life. I am also pleased that the support of the Department has allowed the project to access European Union funding.

Our current insatiable consumption of natural resources is simply not an option for a secure future. We must change from the 'take, use and dispose' mentality we have become accustomed to, and move to a circular economy.

The focus of this report highlights one of the key benefits that emerge from a circular economy: increased employment. It shows the potential of the circular economy to deliver greater employment opportunities across a range of skills to the local economy. Importantly, it shows the potential for employment opportunities across the North.

The development of a circular economy provides an opportunity to make business and the community more sustainable and resource efficient - where materials and products are recovered and regenerated, and less energy is required. A circular economy will encourage innovation, deliver job creation, improve resource efficiency and productivity; thereby driving economic growth, and helping local businesses to remain competitive in the global market. In addition, a circular economy will lower energy use, reduce carbon emissions, and prevent materials from being dumped needlessly in landfills, assisting our efforts to tackle climate change and protect valuable ecological assets. All of which contributes to my vision for a 'Better Environment, a Stronger Economy'.

Throughout the report there are case studies demonstrating how local businesses, community and voluntary organisations, and the public sector have already understood the importance of the circular economy concept. But there is much more that we can do. We must work together, across government, and in partnership with business and the community, to ensure that Northern Ireland is geared up to exploit the opportunities afforded by a circular economy.

CIWM President John R Quinn



As President of CIWM, having chosen the Circular Economy as my theme for the year, I am very pleased and honoured to be associated with this report into the job creation potential of the Circular Economy. The social, environmental and economic imperative for Europe and its Member States to robustly embrace the Circular Economy agenda is now widely recognised as evidenced by the second and ostensibly more ambitious Circular Economy Package, the consultation for which ended last month with outcomes expected by the end of the year.

The drivers to move from a linear Take/Make/Use/Dispose economy to a Circular model are incontrovertible, given the increasingly limited availability of critical raw materials, increased price volatility and energy costs, and pressure generally on primary resources due to political volatility, population growth, expanding middle classes and increased urbanisation. As the biggest net importer of raw materials in the world Europe recognises that if it is to survive, and indeed thrive, in the new Global Economy it must grasp this nettle.

But the advantages are also there to be seen. While MacArthur estimates global annual savings of \$1 trillion in annual savings to the global economy by 2025, in Europe the potential for less waste, less resource use and more upcycling, remanufacture and re-use is significant. WRAP estimates an increased trade balance of 110 billion Euro, cost savings of 400 billion Euro, hundreds of thousands of new jobs, 500mT of carbon (eq) savings and a reduction in Europe's ecological footprint equivalent to an area the size of France.

In the UK recent work by Defra has shown how since the recession the resource management economy has consistently outperformed the average and even under a 'business as usual' scenario this is set to continue with an estimated increase of 50,000 more core jobs by 2020. There have also been studies on Circular Economy potential in both Scotland and Wales which have demonstrated similar opportunities on a regional scale, and identified specific sectoral opportunities for significant growth.

Also at a UK level, a recent WRAP / Green Alliance study projects net job creation of over 100,000 under a transformational Circular Economy Programme, with further added value through offsetting the decline in skilled employment and increased beneficial outcomes for areas of current high deprivation. This current study builds on the approach and methodology used in this UK- wide report and assess the potential at a Northern Ireland regional level.

The report concludes that the transformational expansion of the Circular Economy in Northern Ireland offers the potential to create more than 13,000 new jobs, many of them high value. It also identifies the sectors with the greatest potential in the region and concludes that the Northern Ireland workforce has specific skill-sets suitable for the implementation of a thriving Circular Economy.

I consider this report to be hugely significant for the Northern Ireland economy and particularly for the resource management sector.

I would congratulate the ReNEW team and its sponsors for the foresight in conceiving this report, WRAP for the skill and diligence in preparing it, and all the contributors and consultees who helped make it happen in a very challenging timescale.

I would commend it to all, and in particular our thought leaders and policy makers, as a document which in my view has the potential to become a critical and exciting first step to transforming Northern Ireland into a pathfinder in Circular Economy policy and practice.

Executive Summary

This report applies methodologies developed for the WRAP/Green Alliance study and addresses the broader aspects of circular economy employment in Northern Ireland, drawing on similar modelling methodology from the GB analysis. For recycling, re-use, re-manufacturing and bio-refining activities it will examine:

- Regional and occupation patterns of employment
- How these might develop in the future
- The potential for creating jobs in areas of higher unemployment
- The locating of occupations where there are appropriate skills in the unemployed
- Whether growing a circular economy can reverse the trend of declining mid-level occupations

Contents

- 1.0 Introduction 9**
- 2.0 Northern Ireland context for jobs in the Circular Economy 11**
- 3.0 Scenarios for developing the Circular Economy 11**
- 4.0 Economic arguments 13**
 - 4.1 Job Creation 14**
 - 4.2 The decline in mid-level jobs in Northern Ireland 15**
 - 4.3 Characteristics of the current labour market in Northern Ireland 17**
 - 4.4 Regional dispersion of employment and unemployment 17**
 - 4.5 Inactivity 18**
 - 4.6 Age structure 21**
- 5.0 Composition of employment by industry and occupation in Northern Ireland 21**
 - 5.1 Employment by industry 21**
 - 5.2 Employment by occupation 22**
 - 5.3 Employment in the agri-food sector in Northern Ireland 22**
 - 5.4 Potential for biorefining employment 23**
 - 5.5 Estimates of jobs in circular economy activities in Northern Ireland 24**
 - 5.6 Regional employment 29**
- 6.0 Scenario analysis and conclusion 31**
- 7.0 Project Partners and sub-partners 33**
- 8.0 Appendix 34**

1.0 Introduction

Forecasts of resource scarcity and pressures on economies both regionally and globally have been reported in detail in recent years¹. Supply risks in the increasingly competitive global economy mean that Northern Ireland, Great Britain and Europe must use natural resources better. There are also challenges in the use of labour in our economy, with the aim of growth in employment and prosperity clearly placed in the Northern Ireland's Economic Strategy (2012)². WRAP and Green Alliance (2015)³ presented an analysis of the [economics of increasing resource efficiency in Great Britain](#) showing that that by being more resource efficient, the labour market can grow too.

In the wider economy, how we use resources is influenced by a range of factors – across businesses, technologies, cultures and by the prevailing commercial and public finance conditions. Greater economic stability can be achieved through increased resource security along with new business and employment opportunities.

The circular economy concept has emerged as one way to address this. It moves us away from the traditional model of make, use and dispose for resource use to one where resources are retained in use for as long as possible (Figure 1). This can generate new and refreshed approaches to resource strategies, maximising value. Building a Circular Economy can unlock millions of pounds worth of value from materials used in key sectors in Northern Ireland.

There has been a step change in realising the potential of the circular economy in Northern Ireland in recent times. In May 2015, the EU launched a revised consultation on its proposals for an EU-wide approach to the circular economy, mapping out its aspirations for member states. And over the past two years, the €5 million InterregVB-funded [ReNEW](#) programme successfully engaged a range of industrial and research sectors, politicians, investors and policy makers in Northern Ireland and partners across North West Europe. It demonstrated how partners can develop innovative technical solutions for extracting and deriving value from materials contained in waste streams. It also explored the how EU and regional policy implementation either helped or impeded the path to a more circular approach to materials management.

ReNEW has overseen the establishment of research-led resource management initiatives to address how to shape the research agenda and its commercial potential for these technologies. These achievements showcased in visits to partner nations in Flanders, Germany, Ireland and Northern Ireland awakened realisation of the tangible prospects for growing a more circular economy in Northern Ireland. Development would exploit technical and sector strengths in areas such as food and drink, biorefining and the bioeconomy. The

¹ (refs – [Roadmap to a Resource Efficient Europe](#); *Towards the Circular Economy – economic and business rationale for an accelerated transition*, Ellen MacArthur Foundation, January 2012, *Resource Revolution; Meeting the Worlds Energy, Materials, Food and Water needs*. McKinsey 2011)

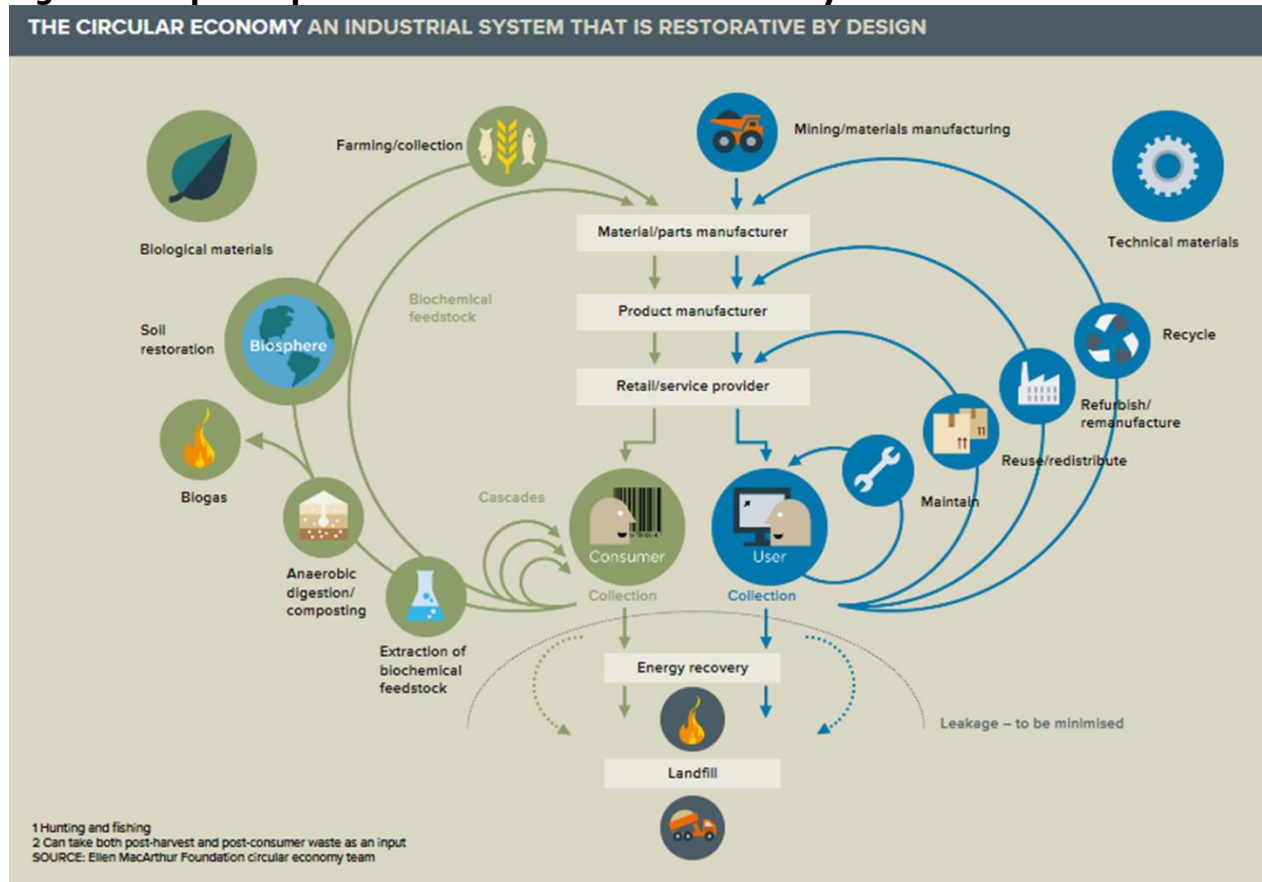
² 'An economy characterised by a sustainable and growing private sector, where a greater number of firms compete in global markets and there is growing employment and prosperity for all'

³ WRAP/GA (2015a) [Employment and the circular economy: job creation in a resource efficient Britain](#), Julian Morgan (Green Alliance) and Peter Mitchell (Wrap).

WRAP/GA (2015b) [Opportunities to tackle Britain's labour market challenges through growth in the circular economy](#) Julian Morgan (Green Alliance) and Peter Mitchell (Wrap).

role of renewable energy and smart energy grids in enabling development of manufacturing was also recognised as a key aspect for achieving greater traction in realising job growth potential.

Figure 1 Graphic representation of the Circular Economy



Ellen MacArthur Foundation

To demonstrate the real potential of job creation and additional employment security the report is punctuated with statements from businesses, research institutes and other government and public bodies showcasing what is already happening in Northern Ireland.

The economic position for job growth potential in Northern Ireland set out here is in the context of a larger circular economy. It indicates how circular economy development has the potential to create employment opportunities at various skill levels and to have the potential for a dispersal of jobs across NI, rather than relying on employment clusters around more traditional industry and commerce.

The aim is to set the scene for growing a circular economy in Northern Ireland. Clearly the job growth potential is a critical factor and this report sets up a platform for people, politicians and organisations to consider the economic and environmental risks of continuing to follow the linear economy model. The positive legacy of ReNEW sets up a powerful challenge to us to find ways to move from a 'business as usual position' to a bolder, transformative circular economy approach. The proposition developed in this report indicates that by 2030 following such an ambition could create over 13,000 circular economy jobs and lead to a lasting reduction in unemployment of 21,000.

*“Excess intermittent renewable energy, especially from wind farms, can increasingly be stored or converted to heat so that it is not wasted. End users of this heat and power will be helping to improve the efficiency and lower the cost of renewable energy at the same time as increasing the percentage of their energy that comes from natural sources. Organisations working within the growing circular economy are a perfect fit in this regard and B9 Energy would be keen to discuss how bilateral energy supply agreements could be set up in the future”. **David Surplus Director B9***

2.0 Northern Ireland context for jobs in the Circular Economy

In early 2015 there were 816,000 people in employment and 54,000 people in unemployment in Northern Ireland (6.4% of the labour force). However such headline figures mask more worrying underlying trends that pose challenges to the labour market in Northern Ireland.

First there are substantial (and persistent) differences in the unemployment rates across the economy, second there's a trend decline in the share in jobs in Northern Ireland that are mid-range in terms of their occupation and pay (which include administrative & secretarial jobs, skilled trades & crafts and process, plant & machine operatives): since 2004 around 13,000 jobs in mid-range occupations have disappeared in Northern Ireland.

Moreover, the rate of economic inactivity in Northern Ireland at 26.8% of the working age population is the highest in the United Kingdom. And, historically compared to elsewhere in the United Kingdom, has persistently been around 5 to 6% higher.

Linking increasing resource efficiency and growth in circular economy offers a potential for the creation of net jobs that can reduce unemployment and offer long lasting benefits to the performance of labour market in Northern Ireland. Regions across the United Kingdom where unemployment has been persistently higher, such as Northern Ireland, the North East and the West Midlands could see the greatest impact from job creation, especially among low to mid-skilled occupations where job losses are projected for the future.

3.0 Scenarios for developing the Circular Economy

The analysis of the economic conditions influencing Northern Ireland's job market and its development in a circular economy to 2030 can be interpreted against a range of scenarios. These are informed by opinion on the key aspects to consider and with reasonable ambition (WRAP/GA (2015)). They outline the potential development of a more resource efficient circular economy to include the labour market impacts and the potential for job creation in Northern Ireland (Table 1).

- Scenario 1 Business as usual - no new initiatives
- Scenario 2 Changes following the current development pathway
- Scenario 3 Adopting a transformational development pathway

Table 1: Job creation potential from expansion in the circular economy in Northern Ireland

Northern Ireland	Scenario 1	Scenario 2	Scenario 3
	No new initiatives	Current development	Transformation
Jobs growth	600	5,500	13,000
Circular economy jobs	9,000	14,000	21,000
Unemployment fall	180	1,300	2,300
Unemployment Rate fall	0.02%	0.15%	0.30%

Staying on the current development path to 2030 suggests an expansion in the circular economy in Northern Ireland could potentially require 5,500 new jobs in resource efficient activities such as recycling, reuse, repair and remanufacturing, with lasting reductions in unemployment by around 1,300 people. **In Scenario 2 there is a 70% increase in employment in circular economy jobs by 2030.**

For a transformational scenario, where a more extensive expansion of the circular economy in Northern Ireland is assessed, an even greater potential is offered and could create more than 13,000 jobs, and reduce unemployment by around 2,300 (or 0.3% of the labour force in Northern Ireland). **In Scenario 3 there is a 160% increase in employment in circular economy jobs by 2030.**

In these scenarios, the quantification of labour market impacts in Northern Ireland resulting from an expansion in the circular economy are based on cautious assumptions and should be considered illustrative rather than definitive particularly as the nature and pace of future technological change is highly uncertain.

Giant’s Park Environmental Resource Park

Belfast City Council’s Giant’s Park is a trail blazing regeneration initiative, to transform a closed waste landfill site to create an innovative environmental resource park. Located on the shores of Belfast Lough, Giant’s Park, comprising 340 acres, is the largest regeneration site in Belfast. The Environmental Resource Park offers significant potential to deliver jobs, and demonstrates the Council’s commitment towards the green economy strand of the Programme for Government, and building a resilient city of the future.

The waste landfill site was closed to dumping in 2007. Infrastructure works has commenced to provide new access roads, and to prepare up to 30 acres to leverage the future development of the Environmental Resource Park. The works are being part funded by the European Regional Development Fund under the Sustainable Competitiveness Programmed for Northern Ireland under the Local Economic Development (LED) Measure Invest NI and the Council.

The Environmental Resource Park is being promoted as an attractive location for cleantech environmental businesses focussing on renewable energy technologies, recycling, resource management, and environmental services. Such an approach would build on the concept where businesses cooperate with each other to reduce waste and share resources to maximise the potential synergies within the Environmental Resource Park. Bringing together companies working in renewable energy, recycling and other environmental technologies the Environmental Resource Park will develop an innovative

cleantech business cluster, the first of its kind here. It has the potential to make Northern Ireland a world leader in investment in the environmental technology sector and which could act as a catalyst for further economic growth.

*The project has the potential to create up to 400 green collar jobs, as well as training opportunities, in the environmental, renewable energy and innovative waste management fields that will make a real difference in strengthening the City's economic future. **Susan Quail, Belfast City Council***

4.0 Economic arguments

While there are arguments made that greater resource efficiency offers the potential to create employment, WRAP/GA (2015b) reported that in comparison with most studies that report job creation in the circular economy in terms of gross jobs, obtaining an estimate of net job creation is more challenging. This section focuses on the labour market economics that will influence the job growth potential of the circular economy in Northern Ireland. It addresses the main topics of:

- Economic basis for job creation in a growing circular economy
- Characterisation of the Northern Ireland Labour Market and circular economy requirements
- The potential Northern Ireland labour market impact from expanding the Circular Economy to 2030

Case Study – Sustainable Utilisation of Poultry Litter, Innovation secures future growth of NI poultry meat sector

As part of a £4.7 billion agri-food sector, the poultry meat industry is a key player. It employs over 6,000 people and has ambitious plans for significant expansion under the 'Going for Growth' strategy.

The challenge

The poultry meat sector has an intractable problem: it annually produces over 200,000 tonnes of poultry litter as a by-product of the rearing process, which could double under the growth plans. Its use as an agricultural fertiliser has contributed to nutrient enrichment of waterways, making compliance with EU water quality standards difficult.

In recent times, an industry-led proposal to develop a large scale Waste to Energy plant to manage poultry litter failed at the planning stage. DARD in 2011, identified a range of potential technologies to process poultry litter, but many of these were relatively unproven at commercial scale.

SBRI approach to driving innovation

To address this, in 2012, DARD and DETI launched a Small Business Research Initiative (SBRI) project to drive innovative solutions to find a sustainable means of dealing with NI poultry litter. With nine project stakeholders it was a very good example of cross-government working.

The aims of the Sustainable Utilisation of Poultry Litter (SUPL) Project at the outset were to have 'One or more innovative technologies or processes which will present the NI poultry industry with practical, economic and sustainable ways of reducing phosphorus surpluses currently arising as a result of the application of litter to land'.

Out of a total of 39 applications, nine SBRI Phase 1 contracts were awarded to contractors to provide 'Proof of Concept' of how their proposed technologies would not just dispose of NI poultry litter but how they would sustainably use it over the long-term. Proposed technologies showing promise included anaerobic digestion, aerobic composting and gasification.

The SUPL Loan Scheme – ‘Pivot’ the process

EU pressures, through its Nitrates Action Programme negotiations, gave urgency to the project. All the key stakeholders decided that commercial scale demonstrator plants should be developed in SUPL Phase 2. A conventional SBRI Phase 2 would only allow the development of small scale ‘prototype’ plants, which would still be unlikely to convince funders that any of the technologies were proven at scale. In spite of these constraints, insights from Phase 1 SBRI provided the project team with the flexibility to ‘pivot’ the approach in Phase 2 by moving to the development of the SUPL Loan Scheme. Launched in 2014, the loan scheme could make loans at commercial rates of up to 40% of the capital costs of two demonstrator-scale plants, each treating a minimum of 20,000 tonnes of NI poultry litter. After two calls for Expressions of Interest, several well-developed proposals were brought to InvestNI for consideration, with the prospect of the first formal offer of a loan being made in autumn 2015 to develop an Anaerobic Digestion plant.

Circular Economy in Practice

The poultry litter will be used alongside other feedstocks to generate biogas that in turn will generate renewable electricity. The phosphate-rich liquid digestate can be applied as a valuable crop nutrient and, as a scarce resource worldwide, there is future potential to recover phosphorus and increase its value.

*Innovation driven through SBRI and the SUPL Loan scheme has demonstrated excellent cross-government working. It has turned a significant challenge into an opportunity not just enabling a successful NI sector develop, but helping it transition to a circular economy model, giving opportunity for future growth and increased employment. **Alan McVicker, Strategic Investment Board***

4.1 Job Creation

From economic theory, the natural rate of unemployment or NAIRU (“Non Accelerating Inflation Rate of Unemployment”) is the lowest level of unemployment which can be sustained over a long period of time in any economy. Most mainstream economists, while recognising the potential for cyclical unemployment in the short run, would question how long an economy can remain demand-deficient, believing that market forces would ultimately drive unemployment to its NAIRU. This would appear to leave little scope for any growing (or shrinking) sector to have any lasting impacts on overall employment and net job creation.

In the short run, if unemployment in any country is above the NAIRU then a growing sector might help speed the adjustment towards it through creating additional jobs, at least for a period of time. However, it would not permanently raise or lower unemployment as market forces would eventually have returned unemployment to its NAIRU level anyway ie its equilibrium level. So if market forces driving the return to the NAIRU are strong, then the short term may not be a very long time – perhaps up to one to two years. By contrast, if these equilibrating mechanisms are weak, then it may take many more years before unemployment returns to the NAIRU. Hence, even short term net job creation may offer significant benefits for a substantial period of time.

However, in the long run, the only way a growing sector can permanently create net or additional jobs is if it can lower the NAIRU. There is a wide literature on the determinants of the NAIRU, see Layard et al (1991)⁴ for a summary of arguments, with economists emphasising the importance of factors such as collective bargaining, employment regulations, social security and the terms of trade.

⁴ Layard, R., Nickell, S. & Jackman, R. (1991) Unemployment: Macroeconomic Performance and the Labour Market, Oxford University Press.

The focus here is on the extent to which mismatch is a determinant of the NAIRU in labour markets in Great Britain and Northern Ireland. **Mismatch of jobs relative to available vacancies can arise either because of regional mismatch, where people looking for work don't live in the places where jobs are offered, and/or occupational mismatch, where the skills and employment experience of people looking for work don't match the jobs on offer.**

So the key question is the extent to which an expansion in circular economy activity in Northern Ireland is able to reduce such mismatches (either regional or occupational) and hence the NAIRU so that lasting improvements in the functioning of labour markets can be gained.

Evidence for the United Kingdom, cited in WRAP/GA (2015) indicates that labour market mismatch is estimated to account for around 3% of the unemployment rate, Smith (2012)⁵, and a study by Patterson et al (2013)⁶ finds that as much as a third of the rise in UK unemployment since the start of the financial crisis could be down to mismatch.

Recent evidence for Europe shows that skills mismatch is a significant explanatory factor contributing to a worsening in labour market performance, and moreover the explanatory power of skills mismatch has increased since the financial crisis (European Commission (2013)⁷). Another important factor appears to be a lack of redeployment opportunities for displaced low-skilled workers, as evidenced by the growing disparity between the skills of the labour force and the skills required by employers at a regional, country and European area level where job losses have been strongly concentrated among low skilled workers, (Draghi (2014)⁸).

4.2 The decline in mid-level jobs in Northern Ireland

Several studies have highlighted the emergence of labour market mismatch stemming from the decline in the share of jobs that are mid-level in terms of their occupations, skills and pay, for example these are jobs that are in skilled trades or plant and machinery operatives. At the same time the share of jobs in the top and bottom tiers of the labour market has increased hence the structure of the labour force has become polarised: increases in employment in low skilled and low paying jobs, and high skilled and high paying jobs such as managerial or professional posts but with fewer employment opportunities in mid-level jobs in terms of skills and pay.

If expansion in the circular economy can address regional or skills mismatches, it could reduce the NAIRU and create lasting net jobs, over and above any short-term gains. This is indeed likely to be the case because jobs in circular economy activities are often localised

⁵ Smith (2012) "Unemployment and mismatch in the UK" Bank of England/Institute of Macroeconomics Conference on Unemployment, productivity and potential output: the aftermath of the crisis, October 2012

⁶ Patterson et al (2013) Mismatch Unemployment in the U.K, mimeo Federal Reserve Bank of New York website, Patterson, C., Sahin, A., Topa, G. & Violante G.L.

⁷ European Commission (2013) Labour Market Developments in Europe 2013, European Economy 6, 2013, European Commission

⁸ Draghi (2014) Unemployment in the euro area, Speech by the President of the European Central Bank, Annual central bank symposium in Jackson Hole, 22 August 2014

and therefore can create geographically dispersed employment opportunities, with a high proportion of jobs with low to intermediate skill levels.

Table 2 provides an indication of the extent to which there has been a decline in mid-level jobs in Northern Ireland and the United Kingdom labour markets. It shows the change in the employment share by occupation from January 2004 to March 2015. For both Northern Ireland and the United Kingdom, occupations in the middle segment of the labour market (which include administrative & secretarial jobs, skilled trades & crafts, and process, plant & machine operatives) have seen a trend decline in their share of total employment. Since 2004, this equates to around 13,000 mid-range occupations disappearing in Northern Ireland.

By contrast, lower paying occupations (jobs in personal care, leisure & other services, Sales & customer services and posts in elementary occupations) have, for the total for this group, experienced an increase in employment share of 0.5%. There are also similarities for the sub-categories over this time period comparing between the Northern Ireland experience and the United Kingdom as a whole. For example, the employment share in personal care, leisure and other services occupations increased in both Northern Ireland and the United Kingdom while for sales and customer services jobs there was a common decline in the employment share, albeit slight. For elementary occupations the employment share in Northern Ireland increased but declined in the United Kingdom over this period.

For the higher paid and higher skilled occupations (including managers, directors & senior officials, professionals, associate professionals & technical posts) the share of total employment has increased in both Northern Ireland and the United Kingdom, by 1.1% and 1.4% respectively.

Table 2: Occupational structure of employment: change in employment share January 2004 - March 2015

	Northern Ireland		United Kingdom	
	Change in share of employment	Average wage (£/hr)	Change in share of employment	Average wage (£/hr)
High wage occupations				
Managers, directors & senior officials	-0.8	20.04	0.5	19.63
Professional occupations	2.4	19.42	2.8	19.48
Associate professional & technical	1.6	13.99	1.2	14.98
Total	+1.1		+1.4	
Mid-wage occupations				
Administrative and secretarial	-0.8	10.55	-2.4	10.65
Skilled trades occupations	-3.1	11.04	-1.2	10.20
Process, plant and machine operatives	-0.2	9.45	-1.3	9.63
Total	-1.4		-1.6	
Low wage occupations				
Personal care, leisure and other services	1.9	8.74	1.4	8.25
Sales and customer services	-0.4	7.67	-0.6	7.55
Elementary occupations	0.1	8.09	-0.3	7.45
Total	+0.5		+0.1	

Source: Annual Population Survey, ONS, DETI ASHE, 2013, Wrap calculations

In summary, the experience in Northern Ireland is broadly consistent with that elsewhere in the United Kingdom in that there has been a trend increase in the share of all employment in both low skilled and low pay jobs, and high skilled and high pay jobs but with increasingly fewer employment opportunities in mid-level jobs.

While in general a growing circular economy is likely to supply a range of jobs requiring differing education, skills and training and differing levels of pay. The question is whether such an expansion in circular economy activity in Northern Ireland can potentially offer at least some jobs that are mid-range in terms of their occupation, skill requirements and pay characteristics.

4.3 Characteristics of the current labour market in Northern Ireland

This section reviews the key aspects of the labour market in Northern Ireland against the context of the overall experience in the United Kingdom. It makes an assessment of the scope for job creation through expansion of the circular economy in Northern Ireland and/or the possibility that it could also address the decline in mid-level jobs in its labour market over the past decade or so.

4.4 Regional dispersion of employment and unemployment

During March – May 2015 the average unemployment rate in Northern Ireland was 6.4% compared to an average of 5.8% of the labour force in the UK (Table 3). The striking feature of the table is the substantial variation in unemployment rates across the United Kingdom. Unemployment is highest in the North East, Yorkshire & the Humber and London, followed by Wales, Northern Ireland and the West Midlands. The lowest unemployment rates are in Scotland, the East Midlands, the South West, the East of England and the South East.

Table 3: Headline labour market estimates March – May 2015 (thousands, seasonally adjusted)

	Economically active		Employment		Unemployment		Economically inactive	
	Aged 16+	Aged 16 - 64	Aged 16+	Aged 16 - 64	Aged 16+	Aged 16 - 64	Aged 16 - 64	Aged 16 - 64
	Level	Rate %	Level	Rate %	Level	Rate %	Level	Rate %
North East	1,268	74.5	1,171	68.7	97	7.8	422	25.5
North West	3,526	75.8	3,317	71.2	210	6.1	1091	24.2
Yorkshire & the Humber	2,692	77.0	2,508	71.7	185	7.0	776	23.0
East Midlands	2,355	78.6	2,241	74.7	113	5.0	619	21.4
West Midlands	2,771	75.7	2,607	71.0	165	6.1	861	24.3
East of England	3,112	80.4	2,971	76.6	141	4.7	727	19.6
London	4,572	77.0	4,264	71.7	308	6.9	1327	23.0
South East	4,607	80.4	4,406	76.9	201	4.5	1071	19.6
South West	2,782	81.2	2,656	77.4	127	4.7	617	18.8
England	27,686	78.0	26,140	73.6	1,546	5.7	7511	22.0
Wales	1,510	75.9	1,410	70.7	100	6.8	461	24.1
Scotland	2,769	78.7	2,616	74.3	152	5.6	727	21.3
Northern Ireland	870	72.6	816	67.9	54	6.4	320	27.4
United Kingdom	32,835	77.8	30,982	73.3	1,853	5.8	9,019	22.2

Source: ONS Labour Force Survey, March - May 2015

4.5 Inactivity

The unemployment rate is just one measure of spare capacity in the labour market but, under the International Labour Organisation's definition of unemployment, it only includes people without a job who want to work, and who have been actively seeking work during the past four weeks, and are available to start work in the next two weeks.

People who don't satisfy all of the criteria for being unemployed according to this definition are categorised as economically inactive. They don't have jobs but are not counted as unemployed (Table 4).

Because the unemployment rate does not cover groups such as discouraged workers (who have given up looking for work say through a lack of job opportunities), or people who are temporarily sick or for other reasons are not actively seeking work it is likely to underestimate the degree of spare capacity in the labour market.

Table 4: Economic inactivity in Northern Ireland and the United Kingdom, April 2014 – March 2015

Economic inactivity - unadjusted (Apr 2014-Mar 2015)				
	Northern Ireland (Level)	Northern Ireland (%)	United Kingdom (Level)	United Kingdom (%)
All People				
Total	312,600	26.8	9,222,300	22.7
Student	86,100	27.5	2,448,600	26.6
Looking After Family/Home	76,800	24.6	2,336,000	25.3
Temporary Sick	6,700	2.1	198,500	2.2
Long-Term Sick	93,400	29.9	2,020,200	21.9
Discouraged	#	#	48,200	0.5
Retired	34,100	10.9	1,308,500	14.2
Other	13,900	4.5	862,300	9.3
Wants A Job	49,000	15.7	2,230,200	24.2
Does Not Want A Job	263,700	84.3	6,992,000	75.8

Source: ONS annual population survey

Notes: numbers are for those aged 16-64.

% is a proportion of those economically inactive, except total, which is a proportion of those aged 16-64

While the economically inactive includes discouraged workers it also includes other groups (such as the long-term sick or retired), who are not likely to return to the labour market where there is an expansion in labour demand. Nevertheless, **around 16% of people who are inactive in the labour market say that they want a job which implies that a 'truer' measure of spare capacity in the labour market is at least 1 or 2% higher than the unemployment rate.**

Indeed, a key difference in the Northern Ireland labour market compared to elsewhere in the United Kingdom is in the detail on economic inactivity. During April 2014 to March 2015, the inactivity rate in Northern Ireland was 26.8% of the working age population (aged 16–64). This is significantly higher than the United Kingdom average rate (22.7%) and is the highest in the United Kingdom.

Moreover, as Table 4 shows the inactivity rate in Northern Ireland is more than three times the unemployment rate. Compared to inactivity in the United Kingdom and in other nations, the inactivity rate in Northern Ireland has been persistently around 5 to 6% higher than that in the United Kingdom.

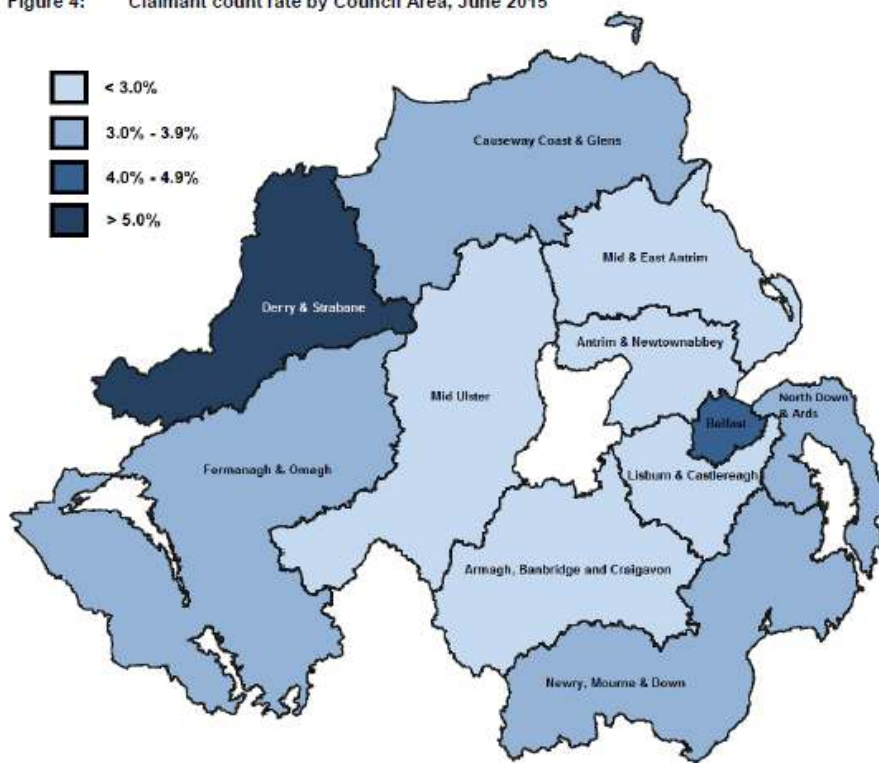
At a sub-regional level the dispersion of unemployment across Northern Ireland is uneven (Table 5). The highest unemployment rates are in Derry City and Strabane, Belfast and the Causeway Coast and Glens, elsewhere in Northern Ireland unemployment rates are below the national average of 3.6% on a claimant count basis.

Table 5: Claimant count unemployment rate by council area in Northern Ireland, June 2015

Council area	% of pop aged 16-64
Antrim and Newtownabbey	2.5
Armagh, Banbridge and Craigavon	2.9
Belfast	4.9
Causeway Coast and Glens	3.6
Derry City and Strabane	7.1
Fermanagh and Omagh	3.3
Lisburn and Castlereagh	2.2
Mid and East Antrim	2.8
Mid Ulster	2.6
Newry, Mourne and Down	3.3
North Down and Ards	3.0
Northern Ireland	3.6

Figure 1: Claimant count unemployment rate by council area in Northern Ireland, June 2015

Figure 4: Claimant count rate by Council Area, June 2015



© Crown copyright and database rights NIMA MOU207.2

4.6 Age structure

The chances of being unemployed is related to age (Table 6). The unemployment rate (based on claims for Job Seekers Allowance) for people aged 18-24 is 6.3% in Northern Ireland compared to 3.6% for all ages, and this pattern persists for unemployment spells of up to 12 months. By comparison older people are, on average, likely to experience lower unemployment rates.

Table 6: JSA claimant count by age and duration of unemployment in Northern Ireland and the United Kingdom, June 2015

JSA claimants by age and duration (June 2015)				
	Northern Ireland (Level)	Northern Ireland (%)	United Kingdom (Level)	United Kingdom (%)
All Ages				
Total	41,655	3.6	732,245	1.8
Up To 6 Months	16,715	1.4	400,015	1.0
Over 6 And Up To 12 Months	9,480	0.8	126,125	0.3
Over 12 Months	15,460	1.3	206,105	0.5
Aged 18 To 24				
Total	10,755	6.3	151,155	2.6
Up To 6 Months	5,955	3.5	100,515	1.7
Over 6 And Up To 12 Months	2,930	1.7	29,545	0.5
Over 12 Months	1,870	1.1	21,090	0.4
Aged 25 To 49				
Total	22,370	3.6	415,830	1.9
Up To 6 Months	8,245	1.3	222,600	1.0
Over 6 And Up To 12 Months	4,830	0.8	71,080	0.3
Over 12 Months	9,295	1.5	122,155	0.6
Aged 50 To 64				
Total	8,505	2.6	164,385	1.4
Up To 6 Months	2,495	0.8	76,100	0.7
Over 6 And Up To 12 Months	1,715	0.5	25,440	0.2
Over 12 Months	4,300	1.3	62,850	0.5

Source: ONS Jobseeker's Allowance by age and duration with proportions

5.0 Composition of employment by industry and occupation in Northern Ireland

5.1 Employment by industry

In Northern Ireland a comparatively higher share of employment in Northern Ireland is in:

- agriculture
- forestry and fishing
- manufacturing
- wholesale and retail trade, and
- the repair of motor vehicles and motorcycles, and human health and social work activities.
-

Those that are comparatively lower in Northern Ireland than in the United Kingdom are:

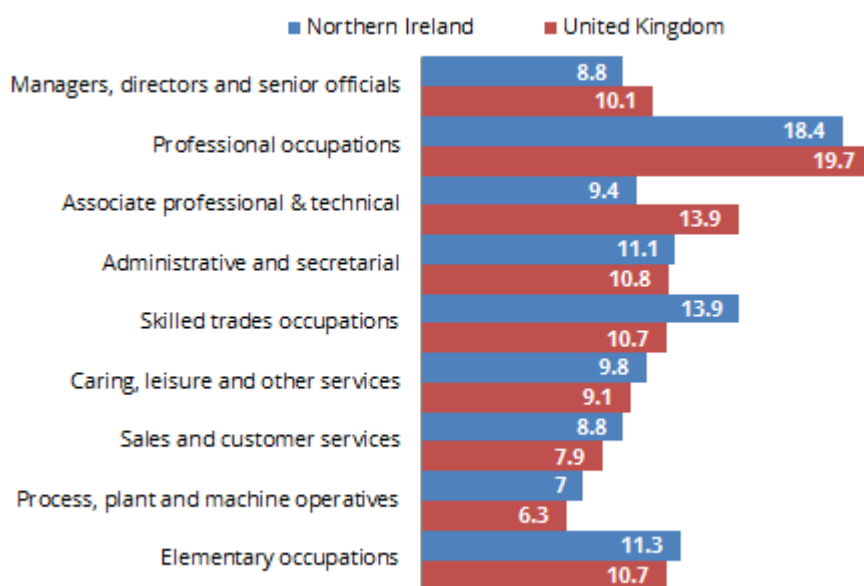
- professional
- scientific & technical activities
- information & communication, and
- administrative & support service activities.

(A comparison of the composition of employment in Northern Ireland to that in the United Kingdom is in Appendix 1).

5.2 Employment by occupation

In Northern Ireland there are also some notable differences in the composition of employment by occupational category compared to the United Kingdom (Figure2). In Northern Ireland fewer people are employed as managers, directors and senior officials, and in professional and associate professional and technical occupations. But there are proportionately more people employed in skilled trades, personal services, sales and customer services, process, plant and machine operatives and in elementary occupations.

Figure 2: Employment by occupation in Northern Ireland and in the United Kingdom, 2013



Source: ONS Annual population survey

*WIS Group is Northern Ireland's largest process control, automation, instrumentation and environmental engineering company. With over 30 years' experience, WIS has an impressive track record supplying tailored solutions to the water, waste water, agricultural, renewable energy & aerospace and industrial sectors. WIS Group has developed a local Anaerobic Digestion bio-energy solution designed to meet the needs of the UK and ROI markets and, with a performance that surpasses international competition. WIS Group's Renewable Energy division has grown from a start in 2010 and now employs more than 35 Engineers, Technicians and Technical Support staff. WIS Group specialises in Energy from Waste projects, and designs and constructs high performance anaerobic digestion plants. This excellence in engineering has been recognised by the Green investment Bank and numerous other equity investors as it is now viewed as the technology of choice and clearly demonstrates that Northern Ireland can lead from the front in the emerging Circular Economy. **John Toner, Group Chairman and CEO***

5.3 Employment in the agri-food sector in Northern Ireland

The agri-food industry is the largest manufacturer in Northern Ireland, employing 27,000 in food and drink processing and a further 47,000 in farming so these are key industries in terms of their economic contribution and employment in Northern Ireland. Employment in the agri-food sector is 6% of overall employment, its combined contribution to overall GVA in

Northern is around £1 billion or 3.5% of the total (agriculture contributes £378 million gross value added to the economy, more than double the UK average., food and drinks processing adds a further £600 million). It is estimated that every £1 million spent in the agri-food sector a further £1.9 million is added to the regional economy output (£0.5 million in regional GVA) and supports 22 jobs (FTE).

For every job created in the food processing sector another two jobs are created elsewhere in the regional economy supply chain. Employment in food and drink processing (as a per cent of all total private sector employment) is 10% to 15% in Mid and East Antrim, Lisburn and Castlereagh and Armagh, Banbridge and Craigavon.

Beef and sheep meat poultry meat and milk and dairy products and drinks sub sectors make the largest economic contribution in terms of GVA and sales.

*Society faces many overarching global challenges such as climate change, energy price volatility, security and environmental pollution. These challenges cascade directly down to us in Northern Ireland where we must play our part in meeting EU directives targeted at reducing greenhouse gas emissions, decarbonising our energy supply and improving the quality of our environment and in particular water. We need to strive to meet certain goals such as the Northern Ireland Renewable Heat and Electricity Targets. It is also necessary to reduce the levels of pollution in the environment and comply with the demands of the water framework directive. There are ways by which the water utilities can adopt low carbon sustainable waste water treatment methods and furthermore the Agri-Food sector can sustainably manage increasing quantities of waste water effluents compliantly while contributing to an indigenous biomass energy supply chain; This includes energy plantations of short rotation coppice (SRC) willow which can also be utilised for the sustainable recycling of waste waters. There are several good examples of successfully implemented SRC willow schemes (both water utility and Agri-food industry focused) which are currently recycling significant quantities of the plant macronutrients nitrogen and phosphorus and thus limiting their discharge into the environment which is a major cause of water pollution.” **Dr Chris Johnson AFBI***

In Northern Ireland there are nine anaerobic digestion facilities, of these six are located on-farm, processing a mixture of feed stocks including manure, slurries and/or other energy crops. Of the other three, one facility is a commercial facility processing wastes including poultry and cow slurry, another is a facility that processes industrial waste largely from abattoirs, and the other is an experimental small scale demonstration plant processing slurry and energy crops.

5.4 Potential for biorefining employment

There has been substantial growth in refining capacity for biofuels in Great Britain. In terms of the larger scale production facilities, biofuel capacity has increased to more than 1.5 million litres a year. Initially dominated by biodiesel projects, there are now several very large bioethanol plants, the most recent addition being the Vivergo plant in Hull, Britain’s largest biofuel plant.

agriAD Power Ltd have been involved in the Biogas Sector in Northern Ireland for several years. Biogas is a central technology in the Circular Economy. In terms of how the Circular Economy can have a significant impact on the overall NI Economy, we believe that the displacement of imported diesel for freight transport with biogas upgraded to biomethane (Renewable Natural Gas) to be used as a transport fuel for gas powered trucks. According to UK Government Statistics, in 2012 the freight sector in NI imported £453.5M of diesel. If the available food waste within Northern Ireland was fermented and upgraded to

*biomethane through anaerobic digestion there would be sufficient biomethane generated to displace 10% of the diesel imported into Northern Ireland and make a significant contribution to NI's renewable transport fuel target of 10%. Not only would this provide a displaced saving of £45M per year to the NI economy but because biomethane is a third cheaper than diesel then there would be a direct saving of £15M to the NI economy per year. **Thomas Cromie, Director agri-AD***

Large-scale plant tends to be located at or close to sea ports to allow for bulk shipment of either feedstock or product, or in proximity to the businesses they supply, for example automotive fuel or chemicals manufacturers.

However, there are also dozens of smaller businesses across the UK involved in the collection of used cooking oil for the production of biodiesel, in most cases from the hospitality sector and food manufacturers, but also from households through local authority provision of collection points.

In addition, significant amounts of biowaste are collected and processed through a range of other biological treatment options. Open-air windrow composting is the biggest, in terms of tonnage handled, biowaste treatment technology: some 5.9 Mt of organic waste is sent to composting facilities, 2.6 Mt to AD sites and 2.5 Mt to mechanical and biological treatment (MBT).

It is estimated that in the United Kingdom the biofuels sector employs more than 3,500 people directly across 200 businesses with several thousand indirect jobs in the associated supply chains. Total UK employment in the AD sector is estimated at 482 full-time equivalents. In terms of composting and MBT there are an estimated 1,370 jobs. Jobs in the biorefinery sector in general offer a mix of occupations with low to high skill requirements, ranging from plant and crop development, cultivation and harvesting, transport, distribution and storage of feedstock, plant design, deployment, maintenance and repair to development, testing and marketing of innovative products. A wide range of skills and occupation types are also represented from manual operatives, roles in agriculture, logistics to bio-scientists and chemical engineers. The AD sector provides jobs associated with a range of occupation, skill and pay types from the design, construction, operation and maintenance of the plants to feedstock purchasing and products sales and marketing positions.

In broad terms, jobs in circular economy activities tend to be regionally dispersed and there is significant employment in low and mid-wage occupations. Nevertheless, there are some differences between different circular economy activities. Waste management and recycling tend to offer a disproportionate amount of low and low to intermediate skill level employment in the areas of collection, handling and processing materials for recycling. Remanufacturing, in common with original manufacturing, tends to require more skilled workers.

Biorefining requires highly skilled occupation types, but there is also scope for growth in lower skilled jobs in collection, cultivation and harvesting.

5.5 Estimates of jobs in circular economy activities in Northern Ireland

From the analysis of the available labour market and the current key industry areas and job skills ranges, the estimate of the current labour market employment in circular economy activities in Northern Ireland and recent trends in jobs growth for these types of activity, and characteristics in terms of location, pay and occupation is overlaid to assess the real potential for the circular economy to support job growth.

'Bryson Recycling is the largest provider of household recycling services to local authorities in Northern Ireland. We have, for a long time, held the view that recycling is about much more than just achieving targets. For us, finding ways to ensure that recyclables end up in high value end uses helps to ensure that social and environmental benefits are maximised. Bryson Recycling employs over 220 staff in the collection and sorting section of the supply chain. The materials we collect and sort are predominantly reprocessed in Europe, however, where we are able to collect and keep the materials separate on specialised recycling vehicles, they are almost always sold for reprocessing in Northern Ireland or elsewhere in the UK. We estimate that the added economic value generated by reprocessors in Northern Ireland is a multiplier that makes each tonne worth about 10 times more to the economy than the collection and sorting process alone. This is why the process of collection has to be viewed as a critical part of the supply chain that is able to determine whether we utilise recycling as an economic opportunity or as an exercise in compliance. Northern Ireland has a strong base of materials reprocessors for most recyclable types generated in local households. We have a unique opportunity to develop a buoyant and sustainable circular economy in this sector.' **Eric Randall, Director, Bryson Recycling**

This analysis is inevitably hampered by the fact that current progress towards a circular economy is challenging hence the Northern Ireland economy at present is fairly linear, despite notable in employment growth in activities such as recycling and reuse.

To get an idea of the current scale of circular economy activities in Northern Ireland a proxy indicator of employment is constructed using official employment data. The mapping is based on the methodology applied in the WRAP/GA (2015a) and is summarised in Table 7 which also describes the nature of circular economy activities.

In terms of the mapping for this employment indicator proxies are used for some more established categories.

- re-use employment - by employment in the retail of second hand goods sector
- repair activities - by employment in the repair of machinery and equipment sector and the repair of electronic and household products sector
- closed and open loop recycling activity- by employment in the wholesale of waste and scrap sectors and the waste and recycling sector, and
- circular economy activity relating to servitisation jobs - by employment in the rental and leasing sectors.

East Belfast Mission (EBM) set up a refurb project aimed at diverting goods from landfill thus helping to increase stock levels in the 12 restore charity shops creating 17 jobs in the process. Furniture that would have gone to landfill is now taken from recycling centres and given a second chance – suites are recovered and wood items painted and goods are then sold through Restore outlet at very competitive prices. In 2011 a similar project started up. Recycle is the repair and refurbishment of second hand bicycles. It was found that there were vast amounts of old bikes being left at recycling centres and many of them needed very little to make them safe for resale.

One of the objectives of these projects was to provide training and employment in local areas. Since the projects started, four jobs have been created including a van driver, a warehouse manager, a store person and a person who works on the bikes project. Approximately 60 unemployed people contribute each year to these projects via work placement schemes where they learn new skills and are helped to readjust to the "working world". We calculate in excess of 200 ton of waste is moved per annum by these projects with goods being made available to low income families.

EBM is currently initiating a mattress project, similar to the furniture and the bikes where old mattresses are stripped and recovered and then sold through the restore shops. It is expected through time that this may also create added jobs in the Approved Recycling Centre.

*The profit from sellable items that was waste is fed back into EBM to help sustain the other projects: helping the unemployed and deprived people in the local community. **Cathy Megahey, PR & Communication EBM***

Table 6: Mapping employment in circular economy activities to official data

Circular economy activity	Sector proxies in official data
Closed and open loop recycling – processes that create new products from waste without changing the inherent properties of the material. For example recovering PET from bottles for use in other PET applications. Open loop recycling – also referred to as downcycling, is where recovered materials are used to create products with lower value, for example use of glass containers an aggregate	Wholesale of waste & scrap Waste & recycling
Repair/remanufacturing - where products need repair or reconditioning before going back into use remanufacturing preserves most value.	Repair of machinery & equipment Repair of electronics & household goods
Reuse - examples included are electrical & electronic goods and textiles. These products are worth more than the raw materials they are made up from. A re-used iPhone retains around 48 per cent of its original value compared to just 0.24 per cent of its original value as recycle.	In-store retail of second hand goods
Servitisation – examples are systems and business models that make more effective use of assets including include leasing of products and provision of products as services thereby deferring consumption of new assets. Many examples are B2B (business to business) such as Xerox and Ricoh leasing photocopiers and printers, Interface’s carpet business or Philips ‘pay per Lux’ but there are B2C (business to consumer) and C2C (customer to customer) examples such as Airbnb or Streetcar.	Renting & leasing activities

Source: WRAP/GA (2015)

While this approach has limitations, for example, it is not really possible to separately identify remanufacturing or servitisation with any precision, it is one which uses the best available information from official statistics. As such, it is useful as an attempt to quantify the current level of employment in circular economy activities in Northern Ireland. It also serves as an indicator to establish broad trends and to track progress in employment in businesses currently operating in sectors with a high propensity towards circular economy activities, namely the repair, reuse, remanufacturing, recycling and rental & leasing sectors. The results of this mapping exercise are summarised in Table 8, further details are provided in Annex table A2.

It is estimated that there are more than 8,000 people currently employed in circular economy activities in Northern Ireland. For these activities as a whole employment has increased by 12% since 2009. As expected around half these jobs are in the waste & recycling sector, which has grown substantially in line with the increase in

household recycling rates in Northern Ireland. These have increased from 12.5% in 2003 to over 40% in 2015.

Since 2009 Northern Ireland’s employment has expanded in all activities apart from wholesale of waste and scrap and rent/lease activity – a pattern that is similar to the experience in other regions of the United Kingdom.

*Huhtamaki Lurgan Ltd is a Finnish owned Company part of a Global Business specialising in Food Packaging. The Dollingstown site manufactures Moulded Fibre Egg Packaging & Cup Carriers. The manufacturing operation is in its 80th year being the first purpose built mill in Europe producing moulded products from paper pulp. It is now the only one of its kind in the UK & Ireland supplying the majority of egg cartons to all major multiples. The Company is a large contributor to the local economy and one of the largest employers with over 220 employees supported by 300+ suppliers many Northern Ireland based. The products are made from paper newspapers & magazines and post-industrial off cuts sourced. All of the products are fully recyclable finding their way back through the UK & Ireland recycling paper collection systems to be re-used to manufacture new products. All products are biodegradable, compostable and 100% FSC recycled. As an example of a Circular Economy in action in Northern Ireland, the humble Egg Carton fits extremely well!. Local sourcing is important to the success of the business. As customer demand has grown there is an increasing need for additional tonnage. High quality domestic paper streams are somewhat limited in supply locally due to the widespread mixing of the dry recyclables (paper, plastics, aluminum and glass) when collected from the home. In our experience material from mixed collection systems result in a significantly higher reject material versus that collected through a kerbside box system. The additional cost of processing such material versus the same quantity in kerb box equates to 10 full time jobs. Developing local circular economies encourages a collaborative supply chain that not only provides cleaner raw materials but also the stability required for business partnerships to invest long-term. This can secure local jobs, support growth, while at the same time doing right for the environment can only be welcomed in Northern Ireland. **Jeff Kearon, Logistics Manager, Huhtamaki***

Table 8 Estimates of employment in circular economy activities in Northern Ireland, 2013 and 2009

	2013	2009
Repair of metal products, machinery and equipment	619	270
Repair of computers and personal and household goods	435	334
Waste collection, treatment and disposal activities; materials recovery	4,213	3,641
Wholesale of waste and scrap	256	319
Retail sale of second-hand goods in stores	535	480
Rental and leasing activities	2,091	2,260
TOTAL	8,149	7,304

Source: NISRA Census of Employment, 2014

Table 9 shows the distribution of the share of employment in these proxy circular economy activities by region and by nation across the United Kingdom. Broadly speaking, there is a correspondence between employment patterns in the circular economy and those of the economy as a whole. In other words, employment in the circular economy is distributed across the United Kingdom, broadly in line with the overall distribution of employment. Having said this however, for Northern Ireland the employment share for the renting & leasing activities, repair of electronics and household goods and repair of machinery equipment at around 1% are a little below Northern Ireland's 3% share of all employment in the United Kingdom.

Table 9: The distribution of employment by circular economy activity and by nation and region, 2013

	Waste & recycling	Wholesale of waste & scrap	Retail of second hand goods in store	Renting & leasing	Repair electronics and household goods	Repair machinery equipment	All Employment
North East	3%	4%	3%	4%	1%	2%	4%
North West	14%	14%	12%	10%	7%	11%	11%
Yorkshire and The Humber	8%	10%	9%	6%	7%	11%	8%
East Midlands	9%	10%	6%	9%	8%	10%	7%
West Midlands	6%	20%	8%	9%	7%	9%	8%
East	10%	7%	10%	12%	16%	14%	10%
London	10%	8%	13%	12%	10%	7%	14%
South East	13%	9%	16%	14%	28%	12%	14%
South West	9%	6%	10%	9%	6%	6%	8%
Wales	7%	3%	4%	5%	2%	6%	4%
Scotland	8%	6%	7%	9%	7%	12%	8%
Northern Ireland	3%	2%	2%	1%	1%	1%	3%

Source: ONS BRES, APS, Wrap calculations

As the transition to the circular economy accelerates, it is envisaged that the nature of circular economy activities and their relative employment shares will evolve. The levels and trends in employment in businesses currently operating in repair, reuse, recycling and rental and leasing sectors can be thought of as a useful approximation to the circular economy as it currently stands in Great Britain and Northern Ireland.

Average gross hourly pay in circular economy activities in Northern Ireland (Table 10) ranges from £9.30/hour in the waste and recycling sector (waste collection, treatment and disposal activities and materials recovery) to £20.74/hour in the repair sector (repair of metal products, machinery and equipment). For rent/lease activities average gross hourly pay is around £9.74/hour, Pay rates for circular economy activities appear to be mid-range in terms of the overall labour market for waste & recycling jobs and for rent/lease activities, with jobs in repair of machinery and equipment at the top end (in terms of pay).

Table 10: Average gross hourly pay in circular economy activities in Northern Ireland

	2013
Repair of metal products, machinery and equipment	£20.74/hr
Waste collection, treatment and disposal activities; materials recovery	£9.30/hr
Rental and leasing activities	£9.74/hr

Source: DETI, ASHE 2014 (provisional)

5.6 Regional employment

In assessing the scope for an expansion in circular economy activity to create jobs, and/or addressing disappearing mid-level jobs in the Northern Ireland labour market, . Analysis has shown that there is uneven distribution of spare labour market capacity as measured by unemployment rates or inactivity rates across regions and nations, and sub regions in Northern Ireland. For growth in the circular economy to have the potential to address regional imbalances in unemployment, it is necessary to generate employment across the country, not just in areas where unemployment is low. This holds true for the potential for the circular economy to grow.

One way of assessing this potential is to look at the geographical dispersion of businesses operating in the sectors identified in the mapping exercise discussed above (Table 11). For Northern Ireland the proportion of businesses in these sectors (relative to all business in Northern Ireland) is broadly in line with the distribution for other nations for businesses involved in waste & recycling (waste collection, treatment and disposal and materials recovery and wholesale of waste & scrap).

But there are some interesting differences. For example, against the rest of the UK, the proportion of Northern Ireland businesses in repair activities (repair of metal products, machinery and equipment, repair of computers and personal and household goods) is lower in England, Wales & Scotland. And the proportion of Northern Ireland businesses relating to retail sale of second-hand goods in stores and rental and leasing activities is also slightly lower.

Table 11: Distribution of businesses by circular economy activity and by nation, 2013

	Northern Ireland	England	Wales	Scotl and	United Kingdom
Repair of metal products, machinery and equipment	0.3%	0.5%	0.6%	0.6%	0.5%
Repair of computers and personal and household goods	0.3%	0.4%	0.3%	0.4%	0.4%
Waste collection, treatment and disposal activities; materials recovery	0.4%	0.3%	0.5%	0.4%	0.3%
Wholesale of waste and scrap	0.1%	0.1%	0.1%	0.1%	0.1%
Retail sale of second-hand goods in stores	0.4%	0.5%	0.6%	0.6%	0.5%
Rental and leasing activities	0.8%	0.9%	1.1%	1.1%	0.9%
All circular economy activity	2.3%	2.7%	3.2%	3.1%	2.7%

Source: ONS IDBR, Enterprise/local units by 4 Digit SIC (2007) and UK nations, Wrap calculations

Figure 2 distribution of existing authorised waste operations in NI



6.0 Scenario analysis and conclusion

WRAP/GA (2015a) provides a comprehensive discussion of the potential for an expansion in circular economy to offer employment opportunities that are distributed across regions and occupations.

Key conclusions drawn from the analysis are that;

- a growing circular economy can offer geographically dispersed employment a range of occupations.
- Reuse and open loop recycling activities are likely to be the least geographically concentrated, requiring activity at a local and regional level across countries with remanufacturing activity likely to be relatively more concentrated and located near existing OEM manufacturing facilities.
- For both open/closed loop recycling and reuse activities there's a strong potential to offer some lower skilled jobs with remanufacturing and recycling activities requiring a greater proportion of mid-level skilled jobs.

This analysis extends to the labour market in Northern Ireland the three indicative circular economy expansion scenarios for Great Britain outlined in WRAP/GA (2015).

The scenario baseline estimates of employment in circular economy activities in Northern Ireland are taken from the mapping (Table 7). In terms of gross job creation the analysis allows for some possible job offsets in other sectors of the economy in the modelling of the scenarios, however it is important to note that the impacts here are assumed to be direct labour market impacts and so do not include indirect or induced impacts.

To demonstrate the potential for an expansion in the circular economy to offer net job creation through reducing regional mismatch in unemployment in Northern Ireland the analysis assumes that the probability of job displacement (where new vacancies are filled by people moving from existing posts) is proportional to the degree of spare capacity available in the labour market. So for example where there is relatively limited spare labour market capacity the probability of job displacement is likely to approach unity quite rapidly. The assumptions underpinning the three circular economy expansion scenarios for the United Kingdom are described in detail in WRAP/GA (2015).

The first scenario assumes that there are no new initiatives undertaken but that there is some further advancement in circular economy activities, which are mostly located in the recycling sector and the repair & reuse sectors with limited development in adoption of servitisation approaches. It suggests an increase by 2030 in employment of around 600 jobs (gross) in circular economy activities in Northern Ireland and a slight reduction in the number of unemployed (Table 10).

The second scenario considered sees a continuation of current trends in the development of the circular economy activity, in which further advances are made in recycling and there is also moderate progress made in remanufacturing, repair & reuse and servitisation. The estimates in this scenario indicate that by 2030 there is a potential to create over 5,500 jobs (gross) in Northern Ireland with lasting reductions in unemployment by around 1,300 people (Table 10).

In the third scenario it is assumed that there is a much more extensive development of circular economy activity with recycling at high levels with still moderate progress in repair

and reuse but with substantial advancement in remanufacturing and servitisation activity. The indicative results in this scenario suggest that by 2030 there could potentially be around 13,000 jobs (gross) created in circular economy activities in Northern Ireland and lasting reductions in unemployment by around 21,000 (Table 10). In this scenario the number of circular economy jobs in Northern Ireland more than doubles by 2030.

Table 10: Job creation potential from expansion in circular economy activities in Northern Ireland

Northern Ireland	Scenario 1	Scenario 2	Scenario 3
	No new initiatives	Current development	Transformation
Jobs growth	600	5,500	13,000
Circular economy jobs	9,000	14,000	21,000
Unemployment fall	180	1,300	2,300
Unemployment Rate fall	0.02%	0.15%	0.30%

I'm delighted that the Council is continuing to build on its progressive reputation in the fields of waste and resources management. I understand that much work has been going on in developing what we initially called a "Materials Strategy" although, as this progressed, it became apparent that it was an inadequate title as it failed to recognise what contributions could be made from this area into wealth creation, jobs and employment for the city. The Circular Economy package as it's beginning to take shape could also great provide great promise for developing green/cleantech operations at the Council's North Foreshore.

Rt Hon, Lord Mayor, Arder Carson

I've been involved in considering how Belfast could prepare itself for the Circular Economy and, over the summer, much thought has been given to which parts of the Council could be involved, what they could contribute and how this could all hang together. At this stage, it's apparent that no one service has sole ownership of this agenda but it will need several to coordinate and deliver what promises to be an exciting piece of work which could have far-reaching opportunities for employment in Belfast. We've taken the first step in considering how the different services could work together and, in doing so, I understand that we're amongst the first UK councils to have done so. ***Julie-Anne Corr Johnston, Chair of People & Communities Committee***

7.0 Project Partners and sub-partners



Fachhochschule Köln
Cologne University of Applied Sciences
Campus Gummersbach



Biorefining & Bioenergy
AN SPÉIRSIÚC BÍOLÓGÍE
& BÍOLÓGÍE BÍOGÉANÓIRÍE

UNIVERSITÄT
DUISBURG
ESSEN

Open-Minded



UNIVERSITY of LIMERICK
OILISCOIL LUIMNIGH



(VAL)+



8.0 Appendix

Table A1: Workforce jobs by industry section in Northern Ireland and the United Kingdom, March 2015

Industry	Northern Ireland		United Kingdom	
	Number	%	Number	%
A : Agriculture, forestry and fishing	33,000	3.9	408,000	1.2
B : Mining and quarrying	2,000	0.2	74,000	0.2
C : Manufacturing	85,000	10.1	2,642,000	7.8
D : Electricity, gas, steam and air conditioning supply	2,000	0.2	129,000	0.4
E : Water supply; sewerage, waste management and remediation activities	5,000	0.6	197,000	0.6
F : Construction	61,000	7.2	2,124,000	6.3
G : Wholesale and retail trade; repair of motor vehicles and motorcycles	137,000	16.2	4,935,000	14.7
H : Transportation and storage	32,000	3.8	1,567,000	4.7
I : Accommodation and food service activities	49,000	5.8	2,256,000	6.7
J : Information and communication	18,000	2.1	1,344,000	4.0
K : Financial and insurance activities	19,000	2.3	1,132,000	3.4
L : Real estate activities	8,000	1.0	547,000	1.6
M : Professional, scientific and technical activities	38,000	4.6	2,958,000	8.8
N : Administrative and support service activities	50,000	5.9	2,778,000	8.2
O : Public administration and defence; compulsory social security	58,000	6.9	1,507,000	4.5
P : Education	78,000	9.3	2,928,000	8.7
Q : Human health and social work activities	127,000	15.1	4,224,000	12.5
R : Arts, entertainment and recreation	19,000	2.3	971,000	2.9
S : Other service activities	20,000	2.4	884,000	2.6
T : Activities of households as employers; undifferentiated goods-and services-producing activities of households for own use	1,000	0.1	69,000	0.2
TOTAL	843,000	100.0	33,673,000	100.0

Source: ONS

Table A2: Employment in circular economy activities in Northern, 2013

Repair of metal products, machinery and equipment	619
Repair of fabricated metal products	-
Repair of machinery	322
Repair of electronic and optical equipment	-
Repair of electrical equipment	-
Repair and maintenance of ships and boats	-
Repair and maintenance of aircraft and spacecraft	53
Repair and maintenance of transport equipment n.e.c.	-
Repair of other equipment	-
Repair of computers and personal and household goods	435
Repair of computers & peripheral equipment and communication equipment	167
Repair of consumer electronics and household appliances, footwear and leather goods, furniture and home furnishings and other personal & household goods	268
Waste collection, treatment and disposal activities; materials recovery	4,213
Waste collection	2,794
of non-hazardous waste	2,642
of hazardous waste	152
Waste treatment and disposal	251
Materials recovery	1,168
Wholesale of waste and scrap	256
Retail sale of second-hand goods in stores	535
Rental and leasing activities	2,091
Renting and leasing of motor vehicles	510
Renting and leasing of cars and light motor vehicles	445
Renting and leasing of trucks	65
Renting and leasing of personal and household goods	456
Renting and leasing of other machinery, equipment and tangible goods	1,125
Renting and leasing of agricultural machinery and equipment	-
Renting and leasing of construction and civil engineering machinery and equipment	650
Renting and leasing of office machinery and equipment (including computers)	-
Renting and leasing of other machinery, equipment and tangible goods n.e.c.	385
TOTAL	8,149

Source: NISRA Census of Employment, 2014