Department for the Economy
www.economy-ni.gov.uk

Draft

Circular Economy

Strategy for Northern Ireland

Our Vision

By 2050, Northern Ireland will have an innovative, inclusive and competitive economy where business, people and planet flourish, with responsible production and consumption at its core.

Responding to the consultation

Why are we consulting?

A Circular Economy will be a key enabler of the Department for the Economy's 10X Economic Vision for a decade of innovation. This will facilitate an innovative, inclusive and sustainable approach to economic growth and make the most of new opportunities and possibilities presented by the 4th Industrial Revolution.

We are all experiencing the impact of resource scarcity in the rising cost of living. We know the earth provides an abundant, but finite supply of resources that we are rapidly depleting. To secure the future of our planet for the next generations, we need to work together to rethink how we use our resources, to switch to regenerative resources minimising waste and maintaining the value of our products and materials.

This revolution of resources is going to be an essential part of reducing our emissions and will be embedded within climate action plans and the delivery of Northern Ireland's multi-decade Green Growth Strategy.

We have engaged with stakeholders across government, business, academia and the third sector in developing this strategy, but we need to ensure our thinking is sound. We want you to tell us if you think we have accurately assessed the situation, and whether you think our proposals are right to kick start the transition to a truly Circular Economy using a whole system approach.

How to respond to the consultation

We would ask that you respond to the consultation using the online survey which can be accessed at the **Circular Economy Consultation page on the nidirect website consultations.nidirect.gov.uk**

If you are unable to respond using the online consultation facility, you can email your response using the response template provided to the following email address: **ces@economy-ni.gov.uk**

Before you submit a response, please read the **Privacy Notice** published along with the Consultation Documents, which shows how we will use personal information as part of the processing of responses.

An easy read version of the consultation document is available online but if you need documents to be provided in an alternative format, please contact the Circular Economy team by email: **ces@economy-ni.gov.uk**

Responses to this consultation are invited until 11.59pm on Monday 20th March 2023.

Executive Summary

We live in a world where we take valuable resources from the earth and make things that we may use only once before throwing them away. This 'take-make-use-dispose' model is known as the Linear Economy. It is unsustainable, costly and, moreover, it is unjust because it is based on a growth model which takes no consideration of the environmental and societal damage caused along the way.

The Circular Way offers an alternative model, that many countries are pursuing, in which:

- we rethink and reduce our use of earth's resources
- we switch to regenerative resources
- we minimise waste
- we maintain the value of products and materials for as long as possible.

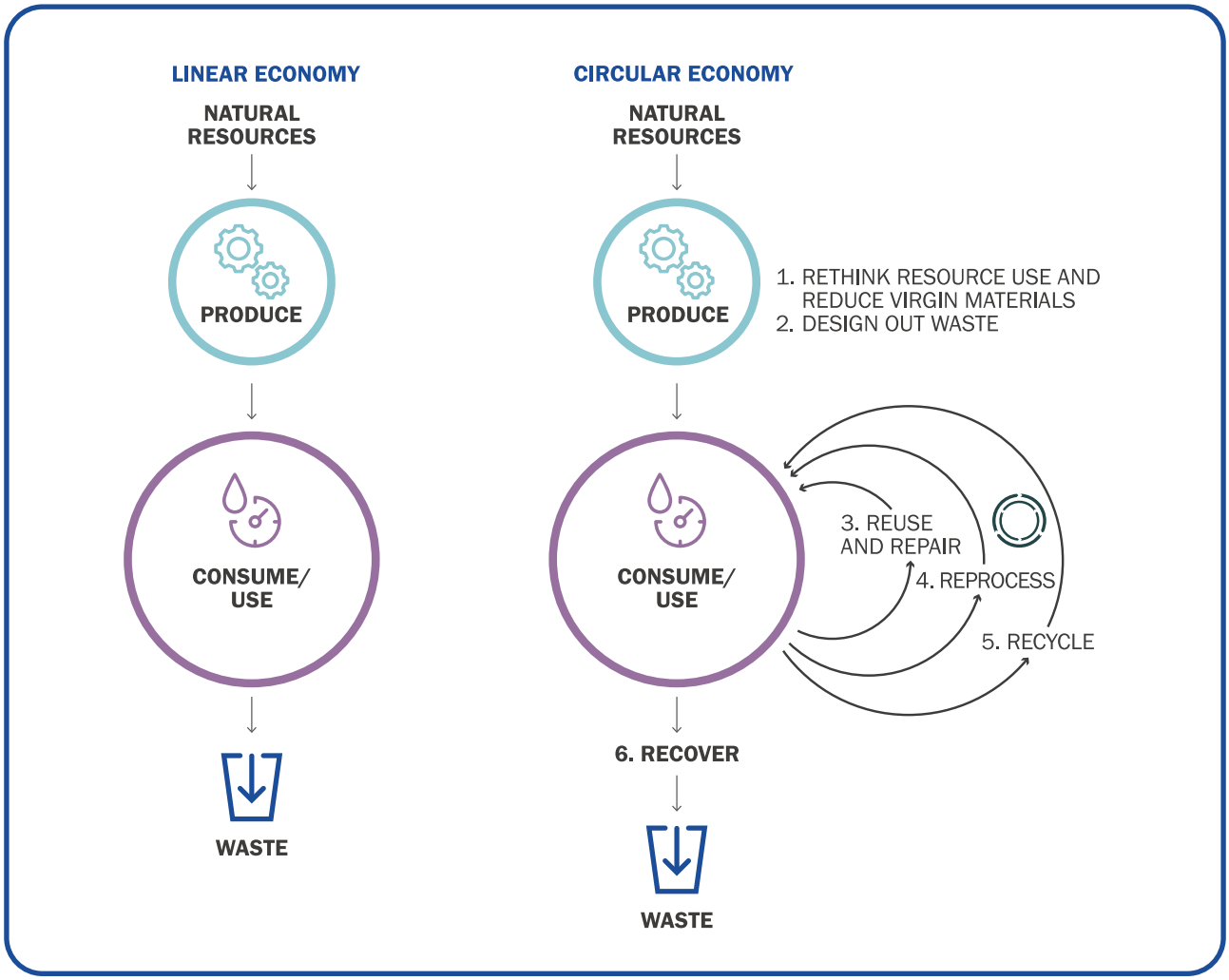

Figure 1 Linear vs Circular

Our research for this strategy has shown that Northern Ireland imports and extracts around **31.5 million tonnes of materials** annually. That is the equivalent weight of nearly 16 million cars.

Our current Linear Economy means that **92.1% or 29 million tonnes** of this is virgin material. Some of these materials are used for buildings and infrastructure which last for years. Unfortunately, the majority of these precious resources end up as waste rather than being reused, refurbished, remanufactured or recycled. With the development of this strategy, we aim to change this.

For a country the size and population of Northern Ireland, we are consuming a disproportionate amount of the earth's resources. It is estimated that each person in Northern Ireland is consuming some **16.6 tonnes of resources per year[1].**

This is our material footprint

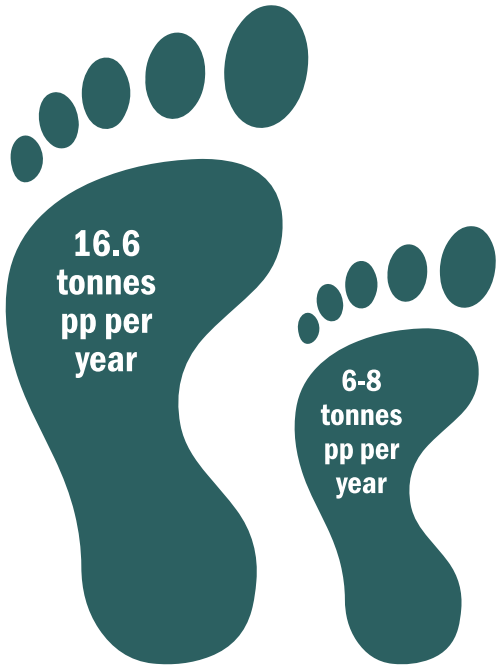

Figure 2 Current Material Footprint vs Recommended Material Footprint

It is a measure of the global (domestic and foreign) **extraction of raw materials** needed to meet the **final demand for goods and services** used by the residents of Northern Ireland. It is the total volume of material embodied within the whole supply chain to meet our demands.

To live sustainably, the United Nations recommends that we should only be using an average of **6-8 tonnes of resources per year.**

The goal of this strategy is to adopt a circular model and reduce our material footprint to live responsibly, build resilience, exploit new opportunities and secure future prosperity for businesses, people and our planet.

Our target is that, by 2050 we will have reduced our annual material footprint to 8 tonnes per person.

Rethinking our use of resources is also an essential part of tackling climate change and achieving net zero. Moving away from fossil fuels and increasing energy efficiency gains will address many, but not all emissions.

However, by transforming how we produce and use things, through applying circular thinking, we can reduce up to 45% of our emissions[2] and scale up our low carbon and renewable energy economy.

Recent events like the Covid pandemic and the war in Ukraine have shown us how interconnected we are globally, and how our societies, environment and economies are vulnerable to external shocks. The cost-of-living crisis is directly linked to resource scarcity and these global events will continue to impact us – unless we can work together to find system solutions. Circular approaches can help us do this.

Did you know?

- The average car is parked 92% of the time.
- 30% of food is wasted along the value chain.
- The average office space (pre-Covid) was only at 35-50% occupancy.

These are all wasted or under-utilised resources[3].

What we stand to gain: A more innovative, inclusive and sustainable economy

In the Linear Economy, societal and environmental issues rank behind economic ones. Moving to a more Circular Economy helps redress this imbalance. The 10X Vision outlines a transformative long term vision of a more innovative, inclusive and sustainable economy, where Northern Ireland is one of the top performing small advanced economies in the world. It places sustainable economic growth at the heart of our economic policy, with innovation acting as an engine for growth and creating positive outcomes for all our people and places.

This Circular Economy Strategy is a key enabler of the 10X Economic Vision and shares the same priorities, including building resilience to face any economic shocks, such as the current cost of living crisis. It will support innovation that will drive more responsible growth, creating new economic opportunities that reduce waste and carbon emissions. The benefits of which will be felt across all of our society.

The objectives of the 10X Economic Vision, as set out in the 10X Performance Management Framework, are:

- **Innovation:** Northern Ireland will have a high performing economy driven by innovation underpinned by high levels of collaboration across business, academia, government and civil society. To do this we will increase total research and development expenditure by 55% by 2030 from a baseline of £1,167m in 2020.
- **Inclusion:** To create opportunities for economic growth which are distributed across society to benefit everyone. To do this we will increase Northern Ireland Household Disposable Income above the small, advanced economy average while maintaining NI as one of the top performing small advanced economies in relation to the Gini-coefficient (a measure of income equality).
- **Sustainability:** To double the size of Northern Ireland's low carbon and renewable energy economy to more than £2bn turnover and achieve 80% electricity consumption from renewable sources by 2030 so that households and businesses have access to essential and affordable energy.

We recognise that simply achieving any one of these will not be enough: we need to deliver against all three at the same time and the transition to a more Circular Economy will make a significant contribution to achieving these societal outcomes.

This strategy also aligns directly with Northern Ireland's draft Programme for Government and the draft Green Growth Strategy. It also makes a significant contribution to many of the UN Sustainable Development Goals.[4] These are a global call to action to end poverty, protect the earth's environment and climate and ensure people everywhere can enjoy peace and prosperity.

Northern Ireland's unique position provides an exciting opportunity to establish ourselves as a Circular Economy champion in the UK, with sustainable production and consumption firmly at its core. We can utilise technological advancements and knowledge to maximise the value of all the biological and technical materials passing through the economic system. This strategy highlights many of the opportunities that transforming to a Circular Economy can bring to businesses.

Adopting a circular mindset throughout society and business will be integral to a successful transition. In practice, this means:

- We must prepare for the future by developing skills that can adapt to a changing environment.
- Everyone will need to think about the contribution their role can make to reducing emissions and material use.
- We must all strive to retain the value of resources – in construction, product development, purchasing decisions, reverse logistics, repair or through use of digital technology.

How we developed this strategy

The ambition to develop a Circular Economy Strategy for Northern Ireland was initially set out in DfE's Draft Industrial Strategy. Recognising the importance of this area from a policy perspective, the Department sponsored a Policy Champions Network Task and Finish Group on the Circular Economy that recommended the development of a Circular Economy Strategic Framework. The following timeline provides a summary of the activities undertaken to develop a sound evidence base and the future plans:

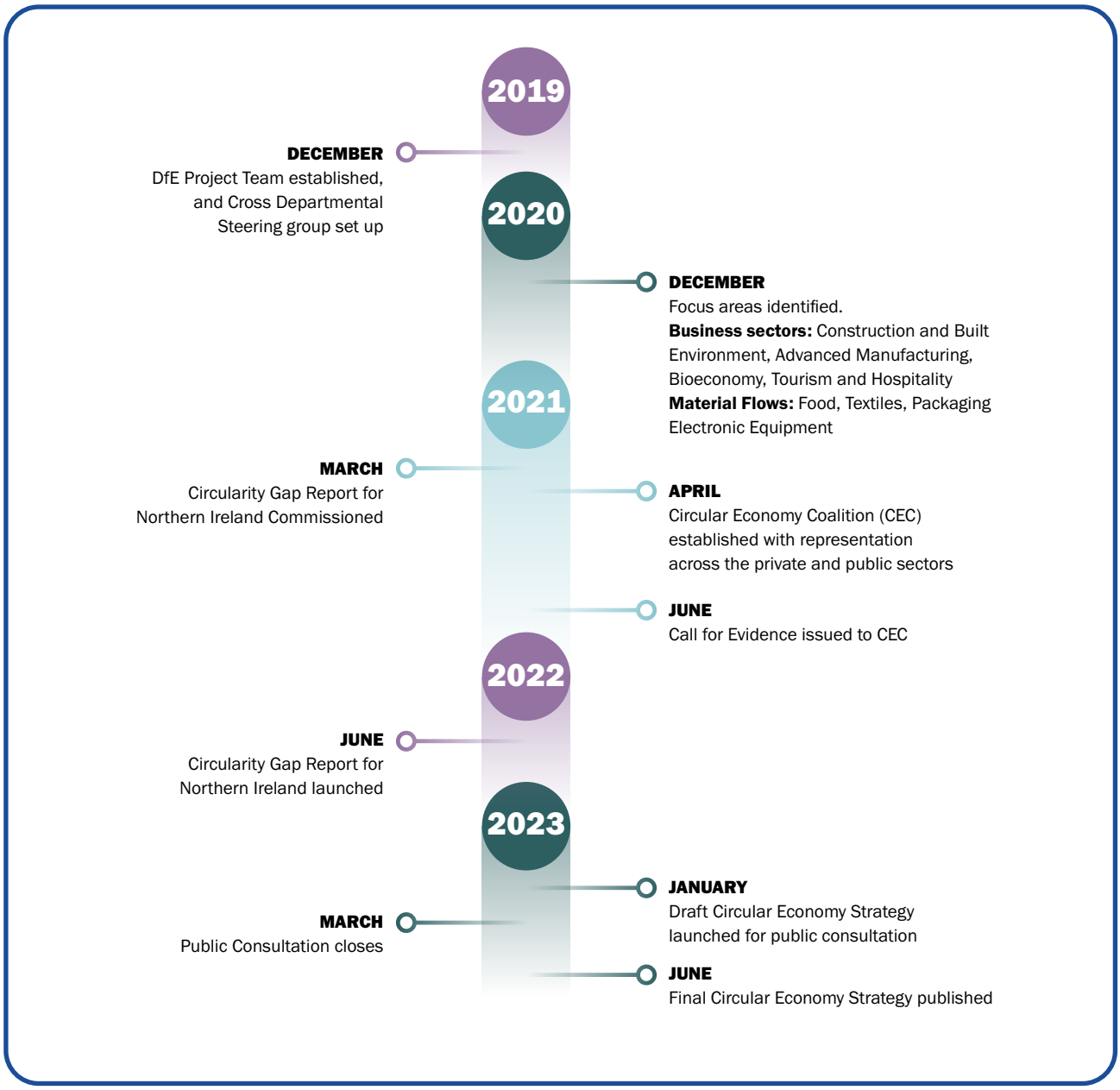

Figure 3 Timeline for development of the Circular Economy Strategy

In parallel with the workstreams identified in the timeline, we have sought to promote Circular Economy thinking across Northern Ireland government departments and embed the ethos of circularity in emerging policy. This work supports the delivery of key strategies across government and aligns closely with the workflows of our Vision for a 10X Economy, the Green Growth Strategy, the Environment Strategy, the Waste Management Strategy, the Skills Strategy and the Energy Strategy.

How will we make the transformation?

Reducing our material footprint and transitioning to a low carbon Circular Economy will require significant effort and involve numerous stakeholders. It also calls for strong collaboration across all sectors of society.

In the first instance, a great deal of effort will be required in order to raise awareness. A recent YouGov survey of 2,000 people across the UK found that **87%** had not heard of the Circular Economy concept[5]. What's more, understanding of the Circular Economy is often limited to a waste context, with a focus on recycling and recovery rather than reducing resource use, repairing, reusing and generating economic income. We aim to shift this focus and highlight the wider benefits.

The Circular Economy is not the end destination but provides a perspective which helps us make better decisions to design out waste and provide added value for business.

This strategy is a starting point to making the transition to a Circular Economy a reality. It provides a vision, a target and direction of travel for what can be achieved with the right investment and commitment from all stakeholders. The twelve proposals for change have been framed around the Ellen MacArthur Foundation Universal Policy Goals, informed by research and insight from the Circular Economy Coalition. It is important to note, however, this strategy will be dependent on securing sufficient funding to take it forward. Budgets beyond 2022/23 have not yet been allocated and are expected to be challenging.

Policy Goals	Proposals for Change
Collaborate for system change	1. Develop and implement a programme to support and promote behaviour change. 2. Create clusters and networks to raise awareness and assist collaboration. 3. Develop an outcome-focused Circular Economy monitoring framework.
Design out waste	4. Embed Circular Economy principles in public procurement. 5. Work with businesses to increase circular design.
Manage resources to retain value	6. Create and support platforms and hubs to share goods and materials. 7. Maximise the value of materials locally.
Stimulate system change with funding, incentives and penalties	8. Establish a Circular Economy funding programme. 9. Create a regulatory framework that supports and incentivises greater circulation of goods and materials.
Invest in innovation, research and skills	10. Invest in research and development to support the valorisation of materials. 11. Embed Circular Economy principles at all levels of education. 12. Design of future skills programmes and reviews of current programmes to support a Just Transition.

Actions

We will lead and coordinate across government through the following initial actions:

- Examining options for a **delivery unit,** in partnership with DAERA, to translate the proposals for change into action plans.
- **Embedding** Circular Economy principles in the development of the **Climate Action Plan, Departmental and Sectoral Action Plans.**
- **Raising awareness** of Circular Economy and **increasing circular thinking**.

The transition from a Linear to a Circular Economy will ultimately affect the lives of every person in Northern Ireland: how we live, work, travel and consume.

1.

What is the Circular Economy?

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In our current economy, we take materials from the earth, make products from them, and eventually throw them away as waste. The process is linear and it presumes a) that we have an infinite supply of resources and b) that the earth has infinite capacity to deal with our waste. We don't, and it doesn't.

In a Circular Economy, by contrast, we significantly reduce the amount of waste being produced in the first place. Figure 4 below illustrates this.

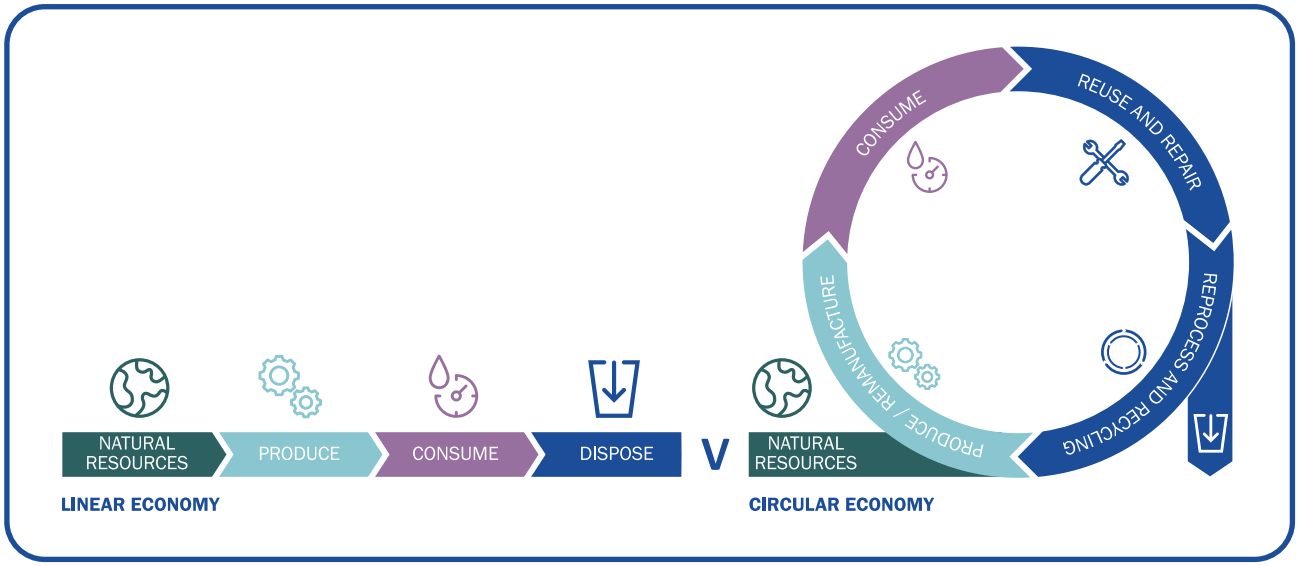


Figure 4 Linear vs Circular Economy

It's all about resources

Humanity relies on the earth's natural resources for everything: fuels to keep warm, building materials for shelter. We need its raw materials to feed and clothe ourselves, to make goods; to power our society.

The Circular Economy offers an alternative model in which:

- we rethink and reduce our use of finite resources
- we switch to regenerative resources which replenish themselves
- we minimise waste
- we maintain the value of products and materials for as long as possible.

By designing out waste from concept to production and use, we can embrace the idea that by-products and end-of-use waste can be a resource – and can be valued as a secondary raw material.

A circular business maximises benefits from all its resources, while reducing negative environmental impacts from their use. This can significantly reduce both material and carbon footprints – which is why Circular Economy principles are now interwoven with the net-zero agenda at a global level. USA[6], China[7] and Japan[8] have adopted circularity as a model for growth because they believe it helps to decouple growth from the depletion of finite resources. These countries have published circular plans and are investing heavily in repurposing their economies.

The United Nations Economic Commission, which represents 56 states in Europe, North America and Asia, has committed to pursuing circularity as a catalyst for change, pushing consumers, retailers and regulators to eliminate unnecessary materials. These countries don't consider embracing CE as an option, but an urgent imperative[9].

It requires whole-system transformation

Transitioning to a Circular Economy will require government at all levels, businesses, innovators, investors, entrepreneurs and consumers to play their part in the process and work together to minimise disruption. The issues to be addressed are too complex to be approached in a fragmented manner. Only by adopting a new, innovative whole-system approach can we realise our economic, environmental and social ambitions.

Underpinned by innovation

Innovation is critical for achieving greater outputs through more efficient use of resources. This whole system approach requires us to do things differently to create value which is essential for driving productivity and competitiveness. Whether incremental or revolutionary, greater circularity of materials will require new process improvements, data and analytics, emerging technology, skills and more agile thinking to increase productivity.

It will also require us to examine our global trade relationships which are immensely complex and involve many interlinked systems. Figure 5 captures the interplay across competing factors that must be considered to maintain balance in the system. Transitioning to a Circular Economy will require these elements to change simultaneously.

Figure 5 Global Trade Relationships[10]

We need both incentives and mandates which are set out in the proposals for change.

Beyond GDP: Sustainable economic growth

As the global economy emerges following the Covid-19 pandemic, a business-as-usual recovery based on GDP growth and profitability alone will not be enough. There is now a once-in-a-lifetime opportunity to develop a new economic framework to compete in a more sustainable, innovative and inclusive economy. It is essential to integrate economic and social policy. There are many examples of high GDP per capita countries with high levels of inequality, or centres of innovation that have not had a positive impact on those living close by.

Northern Ireland's 10X Economic Vision establishes an ambition to create a step-change in how we think about our economy. It sets out a pathway for fundamental economic change and promotes inclusivity and recognises that when growth is more evenly spread the overall rate of growth is higher.

2.

Why we need to change

2. Why we need to change

The prospect is stark. If we do not change, by 2050 our existing natural resources will be depleted and our economic growth ambitions will be increasingly constrained.

Our current, linear economic approach of 'take-make-use-dispose' has resulted in an unsustainable growth model that is having an irreversible effect on the earth's ability to provide for us and threatens the way we live now. We are already seeing early signs of the impact, with the cost of oil, gas and electricity rising at unprecedented rates due to dwindling resources and disruption to supply chains.

We need to get ahead of the curve. A Circular Economy is not just an environmental imperative, it also has far-reaching economic and societal potential. It will give us the power to grow and thrive, by creating green jobs, upskilling our workforce, becoming more self-sufficient and improving our infrastructure.

Responsible growth

Adopting circular thinking will create opportunities for Northern Ireland to redefine growth, build greater resilience and provide a pathway to securing society-wide prosperity, without causing further environmental degradation. This echoes the 'Triple Bottom Line' approach from the 10X Economic Vision to promote innovative, sustainable and inclusive investment. Within industry there is already a move towards triple bottom line reporting, highlighting the importance of measuring financial, social and environmental impact. Within the Circular Economy this starts with addressing our current dependence on finite raw materials and carbon-intensive industries.

Supply and demand on global markets determines the cost of natural resources. As fossil fuels are phased out, there will be more competition for fewer resources. Unless we move to a new economic model that does not depend on depleting natural resources, our economy could retract irreversibly, we would miss out on opportunities to enter new markets and existing inequalities would get worse. Our activities would break additional planetary boundaries[11].

Growing a low carbon and renewable energy economy

The Circular Economy aims to be fuelled by renewable energy, created from sources that are not depleted when used e.g. wind, and reduces our dependence on fossil fuels. The demand for more sustainable industrial output is growing. To meet this demand we must prioritise the decarbonisation of the energy system to grow our low carbon and renewable energy economy. Solutions to reduce our dependence on fossil fuels should be designed with circularity in mind, developed with low carbon, resource efficient materials, and consider the full life cycle of all components.

Reconnect with nature

We can shape a nature-positive future and halt further loss of biodiversity by transforming how we produce, use and consume goods to adopt and mirror the regenerative processes of nature. People are rarely aware of how their choices impact nature. However, through this strategy and its delivery we hope to reconnect people with the earth's processes, which support and enable our daily life.

Respond to resource scarcity

The global population is expected to rise from today's figure of around 8 billion to an estimated 10 billion by 2050. While significant in itself, what is more concerning is that our increased demand for resources is not proportionate to the rise in population. Since 1970, our demand for resources has tripled while our global population has only doubled. This is largely driven by demand for resources which often causes greater environmental impacts and inequalities in lower-income countries. This rate of growth is placing unsustainable demand on natural, non-renewable resources.

It has been calculated that if the world's population lived as the UK currently does, we will need **the resources of three earths by 2050** just to meet our demands.

Figure 6 highlights the varying demand for resources across several countries. This strategy is the first time we have looked at economic growth through a circular lens, paying attention to the impact of our production and consumption patterns on the earth. It is an opportunity for Northern Ireland to lead on taking greater responsibility and creating new ways of creating shared prosperity.

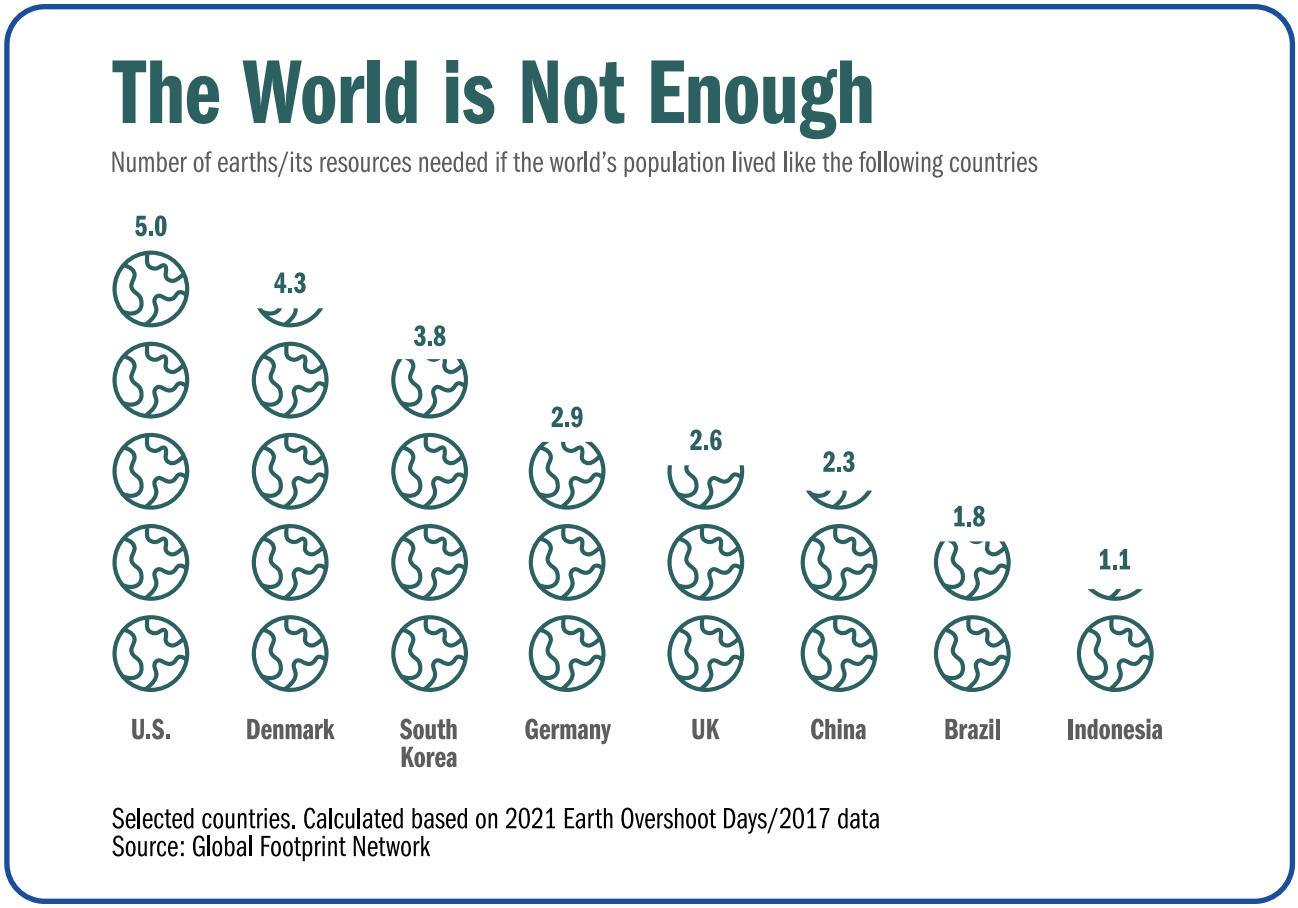


Figure 6 Chart: The World is Not Enough | Statista[12]

Reduce our material footprint

Our research has shown that Northern Ireland globally extracts **around 31.5 million tonnes** of materials annually to meet our final demand for goods and services. This is our current material footprint. Our current Linear Economy means that **92.1% or 29 million tonnes** of this is virgin material. Some of these materials are locked in, because they are located within buildings and infrastructure but unfortunately the majority of our resources end up as waste rather than being reused, refurbished, remanufactured or recycled. **Our material footprint per person per year is currently double the recommended footprint for sustainable living.**

We did not always live this way. Earlier generations were more mindful of the resources they used and needed. We used to live rurally and follow natural biocycles, but modern urban living and linear methods of production and consumption, which have undoubtedly brought huge advancements for society, have also introduced hugely wasteful practices and damaged our environment.

We need to rebalance the scales, focusing on significant reductions to our material footprint through innovative solutions to tackle the global climate, water and biodiversity emergencies – which is why this strategy introduces a target to halve our material footprint per capita by 2050.

Support the Net Zero agenda

In February 2020 the Northern Ireland Executive declared a climate emergency[13] and in March 2022 passed the Climate Change Act[14], which sets overarching targets for Northern Ireland of reducing greenhouse gas emissions to:

- 48% lower than the 1990 baseline by 2030
- net zero by 2050.

To achieve these goals, government has been tasked to develop a Climate Action Plan, Departmental and Sectoral Action Plans to ignite a major programme of work involving government bodies, industry and communities.

Many other countries have considered circularity as a prerequisite to meeting net zero goals and tackling climate change and have therefore embedded it within their decarbonisation plans. **Lowering resource use goes hand in hand with lowering carbon emissions.**

Northern Ireland has successfully focused on a transition to renewable energy, complemented by measures to improve energy efficiency. This effort will address many, but not all emissions.

According to 'Completing the Picture: How the Circular Economy Tackles Climate Change[15]' by the Ellen MacArthur Foundation (EMF), these efforts would address 55% of our global emissions. The **remaining 45%** relates to how we produce and consume things, which makes the Circular Economy transition an essential tool in tackling climate change. The calculations vary at a country level.

The Six Carbon Budget, issued by the Climate Change Committee and required under the Climate Change Act, provides ministers with advice on the volume of greenhouse gases the UK can emit during the period 2033-2037. It focuses on addressing 'territorial emissions' (those arising from UK sources, plus its contribution to international aviation and shipping). It also urges ministers to reduce consumption emissions, The Climate Change Committee advises that consumption emissions (i.e. the broader impact of UK consumption including emissions embedded in imported goods and services) are 50% higher than our territorial emissions. Rethinking our use of resources and increasing circularity of materials will help reduce both types of emissions through revolutionising production and consumption patterns.

Rethinking and reducing our demand for finite resources is as important as securing energy supply from sustainable sources and developing technologies to deal with carbon in the atmosphere.

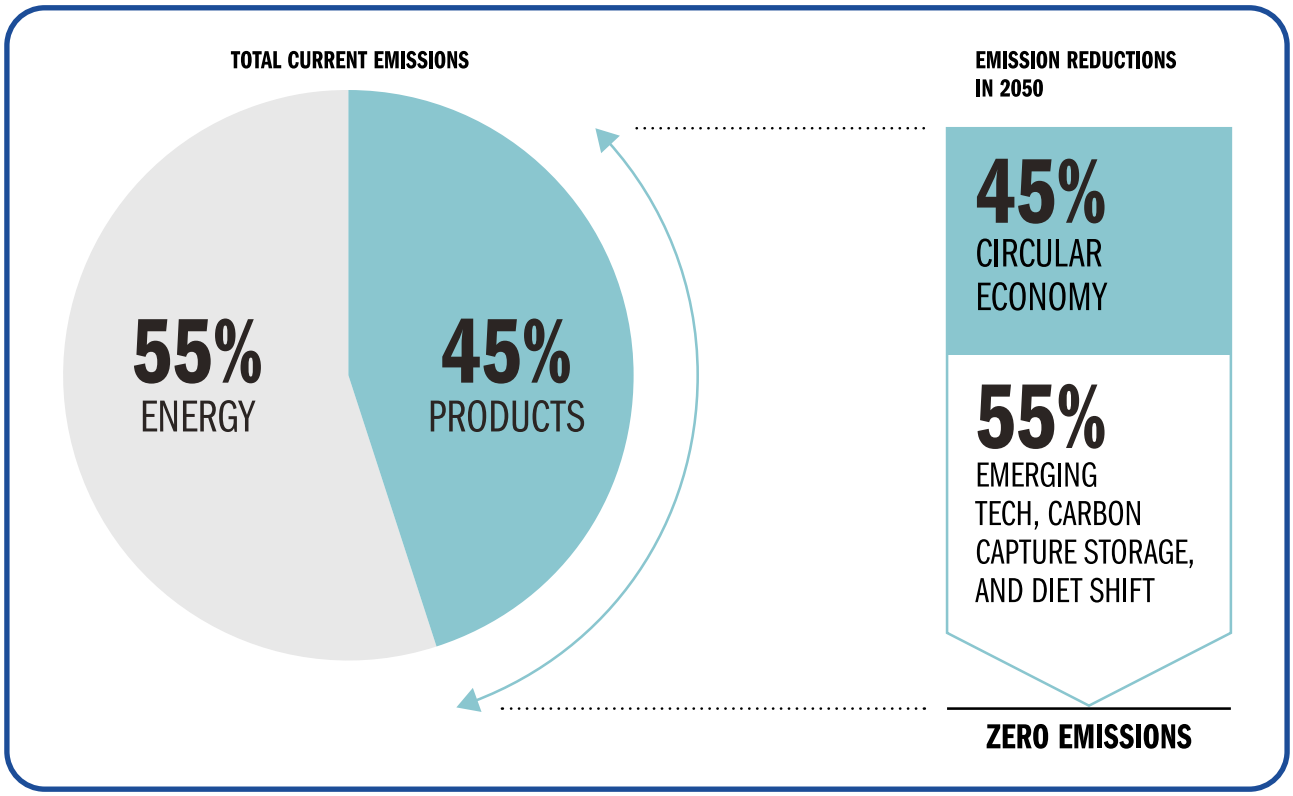


Figure 7 Completing the Picture, EMF

Figure 7 provides an overview of how global emissions may be reduced. While Northern Ireland percentages may be slightly different based on its manufacturing and agriculture sectoral profiles, there is still recognition that managing our resources more efficiently will play a significant role in emissions reduction. The EMF Completing the Picture paper explores the impact on emissions if circularity was increased in the production of food, steel, cement, plastic and aluminium.

Embedding CE principles within our climate action plan, departmental plans and sectoral plans will greatly assist wider government in reducing all emissions. It will also contribute to doubling the size of Northern Ireland's low carbon and renewable energy economy which is a target within the Energy Strategy.

Help industry reduce indirect emissions

All businesses will need to start measuring their emissions to calculate their carbon footprints and report on sustainability. Figure 8 depicts the different emissions which are categorised under Scope 1, 2 and 3 emissions.

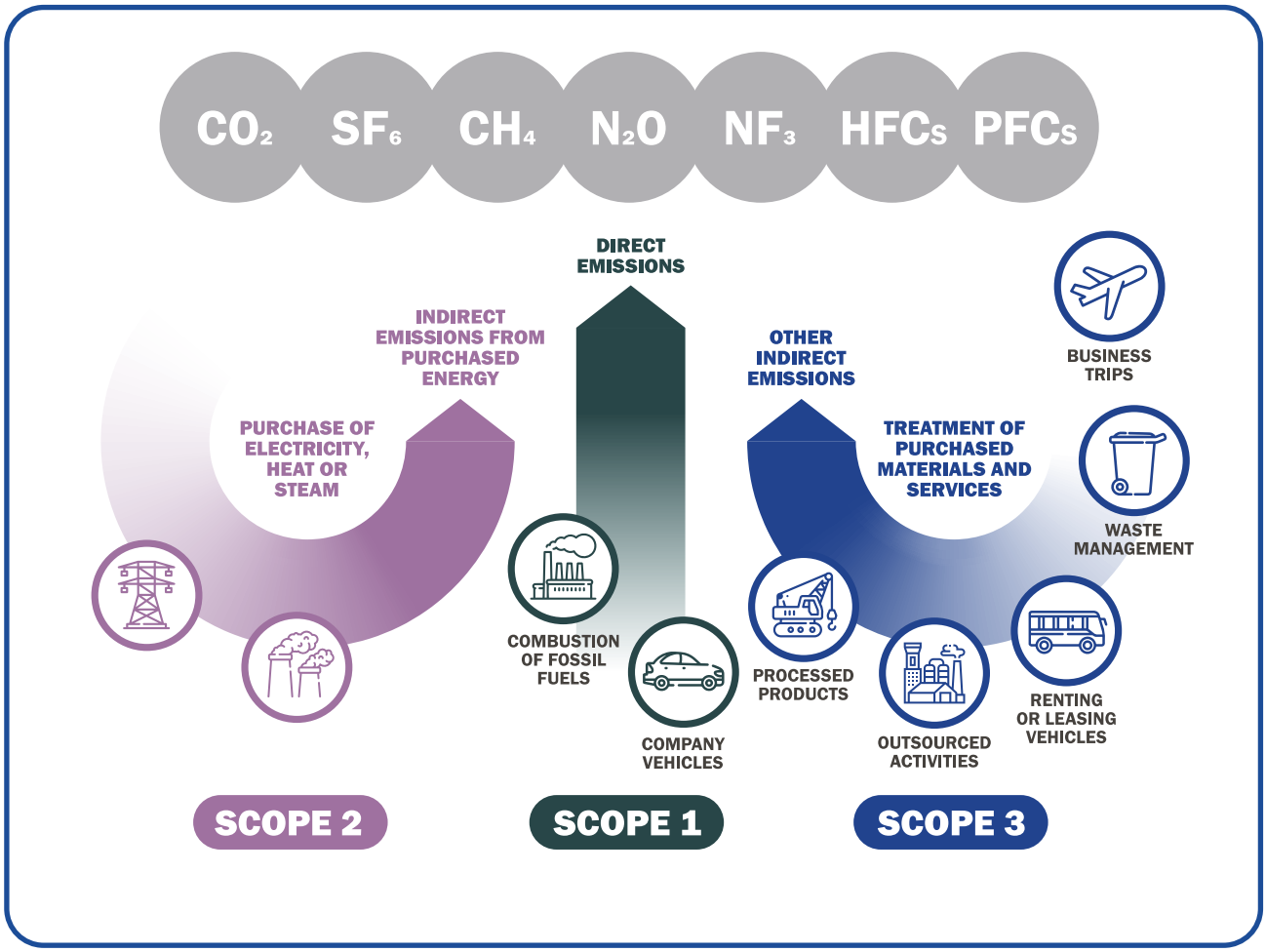


Figure 8 The Difference Between Scope 1, 2 & 3 Emissions – Tim Greenhalgh (SavemoneycutCarbon.Com)

Scope 1 covers direct emissions that a company generates while performing its business activities. Scope 2 covers indirect emissions from purchased energy, while Scope 3 covers indirect emissions in the value chain.

As climate action plans are developed and businesses start to make investments and interventions to achieve net zero, Circular Economy interventions will become more relevant and helpful, particularly in relation to reducing Scope 3 indirect emissions through more efficient use of resources. According to the Carbon Trust[16] Scope 3 emissions can account for up to 90% of a company's total emissions, which creates considerable opportunity for improving performance.

3.

Where are we now?

3. Where are we now?

Up until 2020 the UK played a leading role in the development of the Circular Economy and was responsible for advocating for higher targets and ambition in the European Circular Economy Package. Whilst Northern Ireland is no longer part of the EU, we will still be impacted by the policies adopted elsewhere.

The Circular Economy is seen as an opportunity to secure access to vital resources, maintain global competitiveness and ensure a high-quality environment. Circular Economy approaches can cut industrial emissions, contributing to climate change mitigation, reduce the production of, and exposure to hazardous substances. Europe has committed to accelerating the transition to a Circular Economy – with circular principles central to both the EU's Industrial Strategy[17] and EU Green Deal[18].

The European Commission's Circular Economy Action Plan (2020) introduced legislative and non-legislative measures, including:

- improving product durability
- reducing use of hazardous chemicals
- increasing recycled content in products
- enabling remanufacturing and high-quality recycling
- restricting single-use and in-built obsolescence
- banning the destruction of unsold durable goods
- incentivising CE business models to keep things in use
- supporting the digitalisation of product information
- rewarding products based on their enhanced sustainability performance.

The Commission also recognises the need to **empower consumers to make sustainable purchases** – hence the introduction of a **right to repair** for electronic devices and use of **eco-labels** to make companies prove their green claims and tackle 'greenwashing'.

The Commission has also developed a **Green Public Procurement** (GPP) criterion for many goods and services to help raise standards and create demand for more circular products and purchasing arrangements.

Much of the legislation and directives from the European Circular Economy Package (CEP) have been adopted by the UK post EU Exit, and there is a willingness to continue on this path, with many of the original EU targets for waste prevention now passed into UK law.

In relation to waste, Northern Ireland transposed the following CEP targets which requires:

- **55% rate of recycling of municipal waste by 2025.**
- **60% rate of recycling of municipal waste by 2030.**
- **65% rate of recycling of municipal waste by 2035.**
- **Limits no more than 10% of municipal waste going to landfill by 2035.**

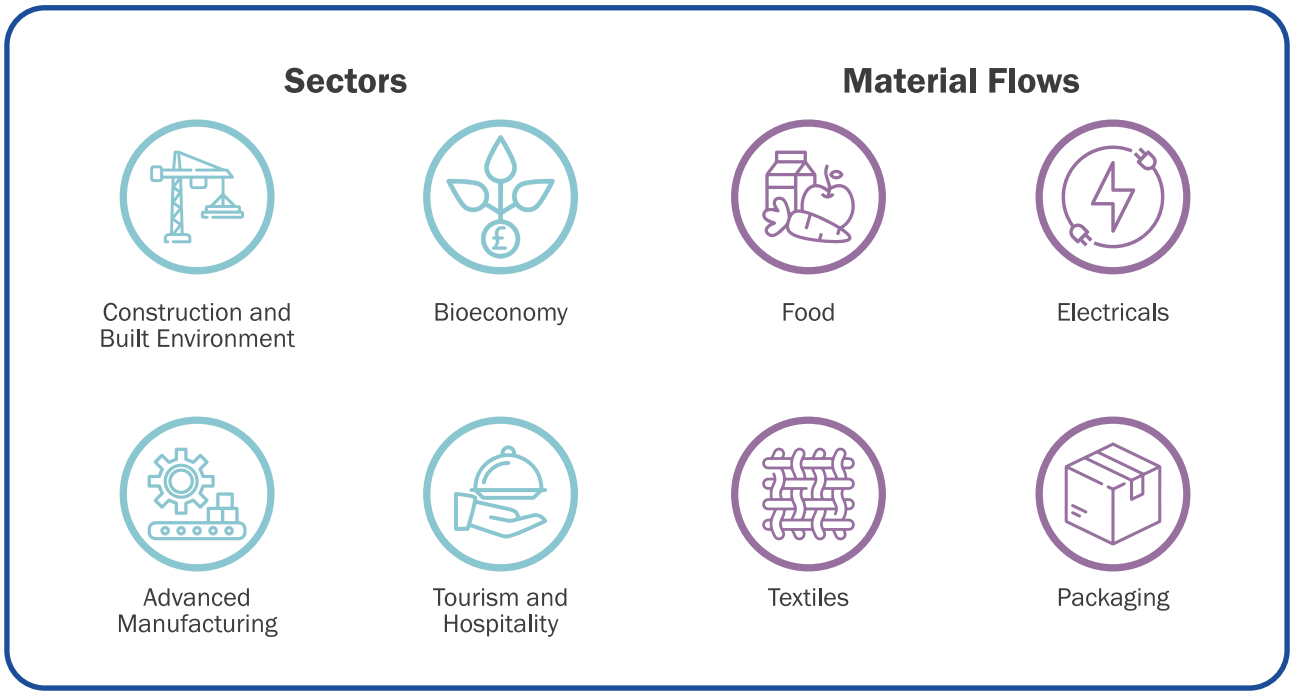
Further to these targets, the recent Climate Change Act introduced a target of a 70% rate of recycling for all waste by 2030 which further raises ambition.

In the same way that the European Circular Economy Action Plan is framed within the wider Green Deal programme, our Circular Economy Strategy will be a critical deliverable within Northern Ireland's Climate Action Plan and the Green Growth Strategy.

Developing our focus areas

A Circular Economy impacts on nearly every aspect of how we live and work because it deals with and aims to transform how resources/materials flow through and are allocated in an economy. Early in the development of this strategy, it was agreed that we could not meaningfully consider all business sectors and material flows for the Northern Ireland economy, so it was decided to follow the Ellen MacArthur Foundation (EMF)[19] toolkit for Circular Economy policy-makers, which recommended the identification of focus areas.[20]

We identified four **sectors** and four **material flows** to be targeted with CE policy interventions:



Why were these focus areas chosen?

- Each has been identified as an essential sector to support the decarbonisation of industry.
- Greater circularity within this area presents a significant economic opportunity.
- It presents an opportunity to reduce material use and carbon emissions, and restore the natural environment.
- It has been identified as a high-value chain in the European Circular Economy Package Action Plan and aligns with other international Circular Economy strategies.

These eight focus areas provide opportunity to highlight the difference greater circularity can make in particular areas, but it will take all sectors to transform and rethink their relationship with resources to reach net zero.

The focus areas will have a mutually beneficial relationship with the sectors and clusters identified in the 10X Performance Management Framework to reduce our carbon footprint and waste. The sectors and clusters include:

- Agri-Tech
- Life and Health Sciences
- Advanced Manufacturing and Engineering
- Fintech/financial services
- Software (including cyber)
- Screen industries
- Low Carbon

The synergies between research and development in these sectors and clusters and our eight focus areas will become apparent through our Proposals for Change in chapter 5. While the focus areas, sectors and clusters will evolve and change over time, the desire to focus efforts where benefits can be maximised will remain.

Current management of resources

Waste

Waste is a critical sector in a Circular Economy because of its role in managing material to retain value. While waste is not identified specifically as a focus area, we have considered the interplay between it and other sectors as well as the opportunities for it to diversify and become a key circular enabler. Policy proposals will be brought forward in the new Waste Management Strategy, currently being developed by DAERA in which the role of the waste sector will feature prominently.

During 2020/21 Northern Ireland Councils:

- Collected over 1 million tonnes of waste.
- Recycled 50% of that waste.
- Sent just over 20% to landfill, of which nearly 130,000 tonnes (13% of total waste collected) were biodegradable in nature.
- Incinerated nearly 25% of the collected waste in the form of Refuse Derived Fuel (RDF)[21]. RDF can be used in energy from waste facilities to generate heat and power.

Water

Water is a valuable resource which goes through an energy intensive treatment process before reaching our taps. Currently in Northern Ireland we are consuming on average 145 litres of tap water per person (pp) per day, which is high in comparison to Portugal (132 litres pp per day) France[22] (128 litres pp per day). Our usage is slightly less than the UK average of 150 litres pp per day.

Northern Ireland benefits from having just one water company unlike England, so if government wanted to reduce water from being wasted, it could start monitoring usage across all users. This would complement the current work undertaken by the Northern Ireland Environment Agency, which measures and monitors water quality with enforcement powers to penalise those responsible for pollution.

Current barriers to circularity

When asked to identify current barriers to greater circularity, our Circular Economy Coalition identified several issues which have been collated and summarised below. In the following sections we set out proposals for circular systems change, utilising the levers available to government to address these barriers.

The Circularity Gap Report: Northern Ireland

Having established our eight focus areas, we appointed Circle Economy, widely known for its annual global Circularity Gap Report (CGR), presented at the World Economic Forum to develop a baseline of circularity for Northern Ireland. The CGR NI produced by Circle Economy has been used to inform this strategy.

The methodology looks at our consumption patterns and seeks to understand what level of material is required to meet our societal needs across seven areas: nutrition, manufactured goods, communication, mobility, healthcare, services, housing and infrastructure.

This emphasis on socio-economic needs is broader than our focus areas and includes mobility, housing, healthcare and communication. This provides helpful insights into the scale of demand for resources as a result of our consumption patterns.

The circularity metric is the share of secondary materials over total material consumption used to meet the needs of an economy. In Northern Ireland this has been calculated as 7.9%, made up primarily by the recovery and recycling of high-volume mineral construction and demolition waste, along with high-value metal, glass, animal and mixed food wastes.

Key findings

- Circle Economy has categorised Northern Ireland as a 'shift economy'. This means that while the country is home to a very small percentage of the global population (0.025%), its material consumption (0.03%) and carbon footprint (0.04%) are disproportionately higher.
- Our economy is **7.9%** circular – meaning that **92%** of it is dependent on materials from virgin resources.
- There is a lack of understanding of the correlation between business decisions/ lifestyle choices and their impact on the environment.
- The report highlights agriculture and construction as our most material and emission-intensive sectors.
- The key interventions proposed are to reduce consumption through awareness raising and introducing targets to reduce our material footprint.

The CGR challenges us to reimagine and redesign the way in which we extract and use our resources. This is referred to as a revolution in resource use, and actions need to be prioritised by the scale of material use. This signals a focus on the **construction** and **agriculture** sectors.

Benchmarking our material footprint

Figure 9 shows how Northern Ireland compares with the UK and global averages in terms of:

- our material footprint per capita per year
- carbon footprint per capita per year
- domestic material extraction per capita per year.

The CGR measures all of these metrics in tonnes per person per year. It is evident that our material footprint (16.6 tpa) is considerably higher than the global average (11.9 tpa) but slightly less than the UK average (18.4 tpa). According to other Circularity Gap Reports, Norway is one of the highest, consuming 44.3 tonnes per person per year, along with Sweden, which consumes 25 tonnes per person per year.

Deloitte has recently commissioned Circle Economy to undertake a CGR at a UK-wide level, which will provide a useful reference point and good opportunity for collaboration across jurisdictions.

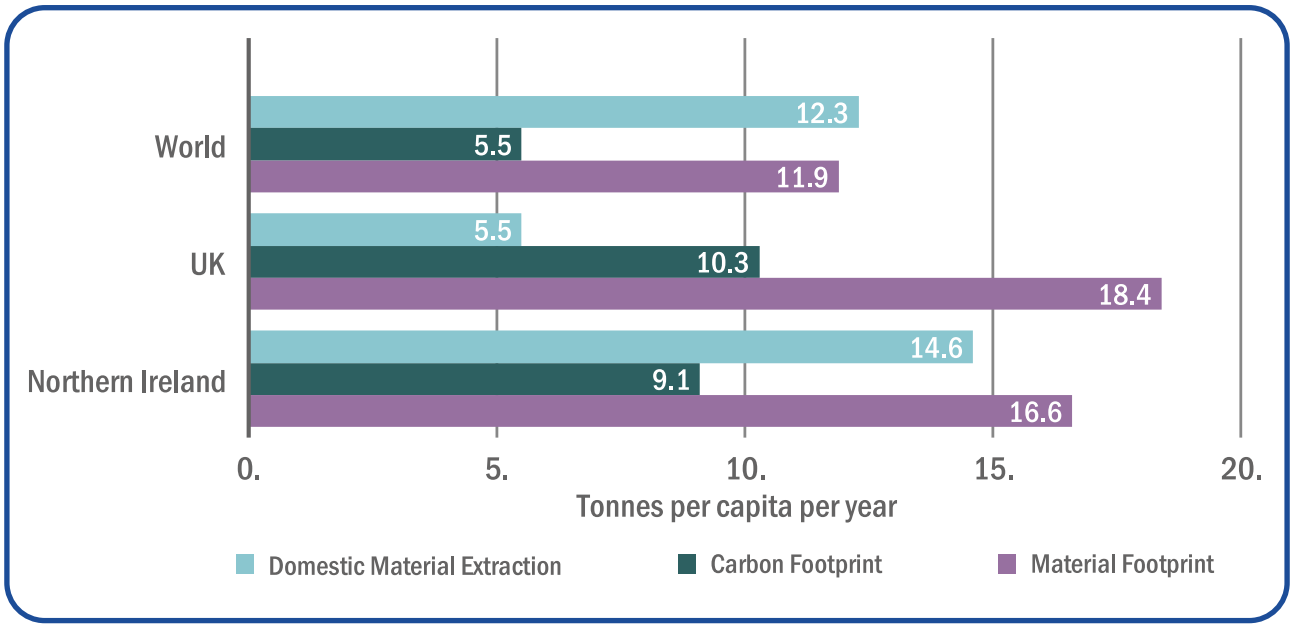


Figure 9 Comparison of metrics, in tonnes per capita per year

Envisioning a circular Northern Ireland

The CGR modelled several scenarios with interventions to boost Northern Ireland's circularity metric. These interventions are designed to challenge conventional thinking, raise awareness, and redefine the linkages between government levers, behaviour of industry and citizens with the resulting impacts on material use and carbon emissions.

The scenarios are not aligned completely to the focus areas but consider broader 'what if' scenarios which can be tested by the CGR model. Hence why mobility, procurement and a circular lifestyle appear in the scenarios but are not identified as focus areas.

The report concluded that these interventions can, if combined, more than double the level of circularity in the Northern Ireland economy from 7.9% to **16.1%,** while our material footprint would be reduced by **48%**.

Reducing our material footprint: Circularity Gap Report scenarios

Nurture a circular food system

A circular system based on a more balanced diet can *reduce the material footprint by **16%** and increase the metric by **1.9%**.*

More sustainable production, with greater emphasis on organic, seasonal and local production, combined with more sustainable land management, can *reduce the material footprint by **0.5%** and increase the metric by **0.04%**.*

Create a circular built environment

More re-using of building materials and components, a greater focus on renovation and retrofitting rather than new-build can *produce a **7.7%** decrease in material footprint and increase the metric by **1.4%**.*

Increased use of local materials and supply chains, energy-efficient appliances and heat pumps running on renewable energy *can reduce the material footprint by **0.9%** and increase the metric by **0.1%**.*

Increased occupancy of commercial and residential buildings *can lower demand for new-build, decreasing our material footprint by **2.6%** and increasing the metric by **0.2%.***

Champion circular manufacturing

Better resource efficiency – reduced use of virgin steel, aluminium, lower volumes of scrap metal, and more recycling *– can reduce material footprint by **2.3%** and increase the metric by **0.2%**.*

Improving reuse, remanufacturing, refurb and repair of materials, and enhancing collaboration across supply chains *can reduce the material footprint by **2.3%**, increasing the metric by **0.2%**.*

Power clean mobility

Increased use of public transport, more car sharing and shifting to bike and foot *can reduce the material footprint by **3.1%** and increase the metric by **0.3%**.*

Improving fuel efficiency plus greater use of electric vehicles *can reduce material footprint by **4.7%** and increase the metric by **0.4%**.*

Leverage public sector procurement

Restricting the expansion of public building stock while focusing on the renovation of older buildings combined with a sustainable food system *can reduce the material footprint by **3.8%** and increase the metric by **3%**.*

Journey towards sustainable tourism

Shifting expenditure to the local economy away from overseas holidays would ultimately result in ***lower emissions*** and ***less pollution*** from travel. This would have a slightly negative effect on both the metric (decreasing it by 0.03%) and the material footprint (increasing by 0.3%). This is due to the increase in local consumption and demand for materials. However, it would also result in lower emissions and less pollution from travel.

Welcome a circular lifestyle

Shifting towards a community-based lifestyle that embraces sharing over ownership. Textile consumption is reduced; items are repaired and repurposed; single-use plastic is significantly reduced; paper products are made from recycled pulp; products are digitised, and staycations are preferred to long-distance travel. This could *reduce the material footprint by **13.5%** and increase the metric by **1.1%.***

Circularity Gap Report: Northern Ireland conclusions and recommendations

The Circularity Gap Report is very useful as it estimates our material footprint, where it comes from and conveys the environmental pressures that Northern Ireland is responsible for. However, it only considers the cycling of materials and therefore doesn't capture levels of repair or reuse, reprocessing or the impact of our actions on biodiversity, pollution or toxicity. We recognise therefore the need to develop a broader measuring framework to align indicators in the 10X Strategy and the Green Growth, and Climate Action Plans.

The CGR concludes that our current economic system is inadequate for the challenges ahead. It calls for radical transformation of how we extract, produce, use and dispose of our resources.

The Report recommends raising the material-use agenda on a par with emissions-reductions targets because the two go hand in hand. It suggests that we need to address our current barriers with the right economic incentives and provides some examples of how to go about this.

- Create a 'coalition of the willing', bringing together industry leaders, government, arm's length bodies and academics to boost capacity and capability.
- Establish a 'circular investment fund' for infrastructure and other enablers.
- Provide financial mechanism(s) to help fund capacity and knowledge-building.
- Develop metrics and mandatory targets to send signals to the private sector to adapt and mobilise resources.
- Measure progress. To do this, we must improve waste data collection, compilation and harmonisation to ensure robustness and enable tracking.
- Develop peer-to-peer learning and knowledge transfer from other regions in the UK, the Republic of Ireland and globally.

These recommendations have shaped our proposals for change and actions.

Through systemic changes that permeate government, the private sector, the third sector, academia and individuals, 'going circular' can become the country's new reality.

How do we compare to others on the Circular Economy journey?

UK

The National Interdisciplinary Circular Economy Research (NICER) programme, established by UKRI[23] is a four-year, £30m investment initiative that aims to deliver research, innovation and the evidence base to move the UK towards a resilient Circular Economy. It is facilitated through five research centres, with each centre leading on a particular sector including chemicals, metals, mineral-based construction materials, technology metals and textiles. This is the UK's largest and most comprehensive investment in the Circular Economy to date and signals the funding opportunities that could be open to Northern Ireland. This integrated interdisciplinary research and innovation community is committed to engaging with all interested stakeholders to ensure the benefits of the work are felt by many.

The UK has also started to tax companies that import into or manufacture in the UK, 10 tonnes or more of finished plastic packaging components annually. The tax is payable if the components contain less than 30% recycled plastic (and will be permitted under other regulations and food safety standards). The tax came into force on 1 April 2022 and is charged at a rate of £200 per tonne.

Scotland

The Scottish Government was the first of the UK nations to declare a climate emergency and to publish its Circular Economy strategy, 'Making Things Last',[24] in 2016. This set out a clear vision and priorities for action. Zero Waste Scotland (ZWS)[25] is the lead body in Scotland responsible for promoting and advising on all Circular Economy matters. It is committed to leading citizens to use products and resources responsibly, focusing on where they can have the greatest impact on climate change. ZWS works alongside government, local councils and other bodies to jointly deliver a more Circular Economy.

The country has proposed a Circular Economy Bill[26], which would introduce charges for single-use items and increase the charge on plastic bags (from 5p to 10p). The Bill includes a requirement for circularity in public procurement. Scotland is also delivering its Food Waste Reduction Action Plan and is supporting business innovation through its Circular Economy Investment Fund[27].

In addition, ZWS is leading research into measuring circularity. One study[28] concluded that no single metric can be used because it requires measuring emissions reduction across the whole supply chain from extraction of raw materials, transportation of materials, manufacturing use and reuse to disposal. ZWS has decided to focus on the use of a material flow account and carbon footprint as a starting point.

England

The Resources and Waste Strategy (RWS) 2018[29] for England forms part of the UK Government's 25-Year Environment Plan[30]. Much of the legislation and directives from the European Circular Economy Package (CEP) have been adopted by the UK post-EU exit, and there is a willingness to continue on this path, with many of the original EU targets for waste prevention now passed into law. England has started to publish its Material Footprint[31] as part of monitoring progress against the RWS.

Wales

The Welsh Government's strategy 'Beyond Recycling'[32] in 2021, sets out its aim of making a circular, low-carbon economy in Wales a reality, with a set of key actions to deliver the objective of zero waste by 2050. It commits to reducing resource use needed for one-planet living by 2050. The focus of the strategy is on reducing waste and supporting the reuse, repair and recycling industries. The Government has set a series of indicators to measure progress and has invested over £750m to date in improving recycling rates. Additionally, it has set up an innovation fund, which has to date provided support for 180 innovative projects.

These actions form a key part of Wales's drive towards becoming a zero-waste, carbon net-zero nation by 2050 or earlier.

Republic of Ireland

The Department for Environment, Climate and Communications published a waste action plan in March 2020, followed in December 2021 by 'Living More, Using Less'. This is a cross-government Circular Economy strategy designed to transition all sectors and at all levels of government.

The Department is also a partner of CIRCULÉIRE, a €4.5m public-private partnership that is a cross-sectoral, industry-led innovation network dedicated to accelerating the transition with a focus on Circular Bioeconomy, Industrial Symbiosis and Circular Procurement.

In March 2022, the Cabinet Office approved €98m of budget and passed a Circular Economy Bill[33] which became law in July 2022. It incentivised the use of reusable and recyclable alternatives to a range of wasteful single-use disposable packaging and other items. It also re-designates the existing Environment Fund as a Circular Economy Fund, which will remain ring-fenced to provide support for environmental and Circular Economy projects and introduces a mandatory segregation and charging regime for commercial waste, similar to what exists for the household waste market.

It streamlines the national processes for End-of-Waste and By-Products decisions, tackling the delays which can be encountered by industry. It also supports the availability of recycled secondary raw materials in the Irish market and consolidates the government's policy of keeping fossil fuels in the ground – by introducing prohibitions on exploration for and extraction of coal, lignite and shale oil.

France

France has embraced the Circular Economy through a programme of legislation that aims to eliminate waste and pollution at design stage, transforming production, distribution and consumption. The first phase introduced a ban on single-use plastic items and limiting plastic food packaging. The target is now the phasing out of single-use plastic packaging completely by 2040. It is also planning to ban paper till receipts and disposable dishes in fast-food restaurants from 2023. It was the first country to ban the disposal of unsold non-food products, requiring companies to reuse, donate or recycle them.

UK City Approaches

Given that many circular initiatives have more effect in urban areas, it is not surprising that cities have taken a lead in promotion of the Circular Economy. This place-based approach to investment is advocated in the 10X Economic Vision to differentiate Northern Ireland. London has set out ambitious plans and has appointed ReLondon to lead CE in the capital and is responsible for delivering its Circular Economy Route Map[34]. This prioritises food, textiles, plastics, electricals and the built environment.

In Scotland, the Chamber of Commerce in Glasgow initiated 'Circular Glasgow', which is leading businesses, in partnership with Zero Waste Scotland and the City Council, in raising awareness and highlighting the opportunities for growth, innovation and resilience through circular models.

Belfast City Council and Dublin City Council were recently awarded funding by the Shared Island Fund to jointly undertake a feasibility study to develop infrastructure, facilities, and institutional frameworks to support transition to a green economy and meet climate ambitions. This work will identify opportunities to make the island a leader in establishing a vibrant, equitable, and innovative Connected Circular Economy.

4.

A Circular Economy: Benefiting business, people and planet

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The Circular Economy delivers benefits in three major categories in creating a more innovative, inclusive and sustainable economy.

For business

- Swapping from finite, potentially risky or under-pressure resources to safer, sustainable materials provides resource security, price stability and creates resilience, helping businesses to prosper.
- Diversifying both the locations and materials in supply chains can also help reduce business risks.
- Innovative research and development will create new opportunities for enterprises to start up and grow.
- New by-products from recovered waste can open new markets and sales opportunities.
- Expanding business models to include repairs, remanufacturing, reselling and sharing can generate new and more consistent revenue streams.
- The Circular Economy promises significant benefits to the workforce as it supports the market for secondary products and materials across all regions, which will create new job opportunities.

For people

- People will be supported to develop relevant skills that will help them transition fairly and inclusively from carbon intensive industries into new jobs.
- Products and services will provide greater efficiency, durability, better end-of-life outcomes with greater overall consumer satisfaction.
- We will have greater choice and quality of products and services at a reduced cost through additional circular models and through reuse and introduction of quality standards.
- Traditionally marginalised groups will be supported by socially conscious businesses adopting circular business models, providing training and employment opportunities for those with disabilities or health conditions.
- Total ownership costs will reduce as products are designed for remanufacturing, repair and recycling.
- Better choice of healthy locally produced foods as the circular food system reduces our reliance on chemical farming interventions.

For planet

- We can ensure we function within the limits of our natural resources and that we sustain human life on our planet.
- Ecosystems are regenerated, and biodiversity thrives because extraction, waste and pollution are reduced.
- We will increase land productivity, reduce food waste from farm to fork and optimise nutrient return to the soil to combat such losses.
- By extending material cycles and making products last longer, we can reduce landfilling and energy-intensive recycling processes and cut down on the pollution caused by material extraction processes.
- For industries like concrete or steel production, becoming more circular could reduce emissions by up to 40%[35]. Reducing waste to landfill and transforming energy-hungry industries will significantly bring down greenhouse gas emissions.
- The planet's resources will be under less pressure as we scale up our low carbon and renewable energy economy.

Circular Business Models

The World Economic Forum consider the following circular business models as key for businesses to gain a competitive advantage:

1. **Circular input models**: Within the production process, traditional virgin material inputs are replaced with bio-based, renewable, or recovered secondary materials. It reduces the costs of supplies , increasing productivity and reducing demand for virgin resources.

2. **Resource recovery models**: The focus here is on the recovery of embedded materials, energy and resources at the end of a product's useful life. The material is kept in use at its highest value reducing waste while also displacing the extraction and processing of virgin resources. These models generally provide incentives for customers to return products.

3. **Product life extension models**: Products have been designed for repairability, upgradability, reusability, ease of disassembly, reconditioning, and recyclability of all components. These models slow the flow of materials through the economy and reduce the rate of resource extraction and waste generation.

4. **Sharing models**: Through sharing platforms, these business models facilitate the sharing of under-utilised products which reduces demand for new products and their embedded raw materials. It ensures idle assets are shared across a community or industry while providing customers with affordable and convenient access to products and services.

5. **Product as a service**: These models enable customers to purchase the use of a product for a period of time while the producer maintains ownership and responsibility for maintenance. It shifts the focus from product ownership to stewardship and from volume to performance, which incentivises green product design increasing durability and reducing overall demand for virgin resources.

As an island on the periphery of mainland Europe, we have to import many of the materials we need to power our industries and produce products. The invasion of Ukraine has heightened our awareness of risks to supply chains and price inflation. In an increasingly competitive world, having first-mover advantage will provide growth potential for our business community, but just as importantly result in better environmental performance and good socio-economic outcomes.

The new business models proposed will result in higher levels of innovation and more targeted research and development and increasing focus on innovation active firms. Northern Ireland can use this to its advantage if it starts to enact Circular Economy principles.

Potential for job creation

We don't yet know with certainty the level of potential jobs growth for Northern Ireland, but predictions from elsewhere indicate the scale of opportunity. ReLondon, for example, recently estimated that the Circular Economy could create over 250,000 jobs in London by 2030. These would be in addition to the existing 231,000 circular jobs in London[36]. This increase will be driven by consumer demands for eco-friendly products and services, new businesses in sharing, renting or leasing, increased reuse and repair and increased use of secondary materials.

Green Alliance[37] (GA) has also carried out research in this area for the UK. 'Levelling up through Circular Economy jobs'[38], published in 2021, showed how moving to a Circular Economy provides the UK with an opportunity to level up the country with jobs in remanufacture, repair, recycling and reuse. GA shows that with an ambitious approach from government, up to 450,000 jobs can be created across regions of the UK that need jobs the most.

As part of our research, we assessed the current number of jobs in Northern Ireland in circular activities as well as the potential opportunities for some of our focus business areas.

We calculated that circa 70,000 jobs – nearly one-tenth (8.9%) of the Northern Ireland total – are currently contributing to the Circular Economy either directly or indirectly. Figure 10 provides a breakdown of Core, Enabling and Indirect circular jobs. It is not realistic that all future jobs will be circular, but a doubling of the number of circular jobs would be a realistic target for Northern Ireland.

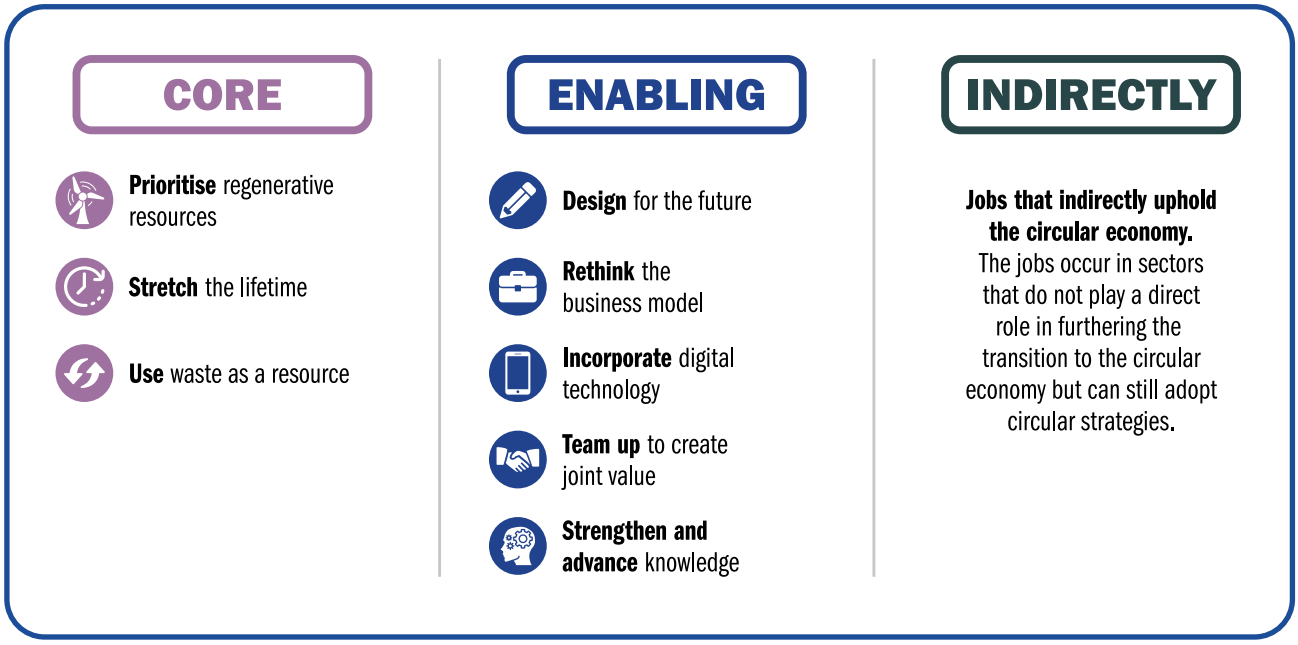


Figure 10 Circle Economy - Circular Jobs

To realise these jobs, we will prioritise and invest in innovation to develop new technological solutions, and the right set of skills and competences. Individuals skilled in Science, Technology, Engineering and Mathematics (STEM) disciplines are the frontrunners of new technological development and innovation, and the transition to a circular economy will increase demand for these skills.

While this draft strategy refers to circular jobs, we are aware of the drive by government to create green jobs in the 10X Economic Vision and as one of the three goals of the Draft Green Growth Strategy. A green job perhaps has a broader scope than a circular job. However, this is a developing area and is the subject of much debate. The Office for National Statistics (ONS) has launched a consultation on Defining and Measuring Green Jobs[37] to produce data and as a basis for measurement. In our response to the consultation, we have shown interest in Northern Ireland acting as a pilot/pathfinding project to explore the development of Environmental Goods and Services Sector (EGSS) accounts for Devolved Administrations which would help in the development of a Green Job metric.

Leading the way: Early adopters of circularity

Business will often lead systemic economic change, and Northern Ireland business is no different. Here are some examples of local companies that have already adopted circular business models.

Artemis Technologies

Artemis Technologies' growth plans include building a new facility in Belfast to test a new piece of green maritime technology, the eFoiler electric propulsion system. It is an example of circularity as it was developed through virtualising iterative designs, optimising use and negating the need to build physical pilots, reducing demand for materials. Artemis is part of a consortium tasked with designing and building zero-emission high-speed ferries and has received £30m from UKRI.

Frylite

Frylite supplies cooking oil to the food industry and also collects used cooking oil free of charge from businesses. It is circular for two reasons: the oil is transported in reusable containers which can be used ten times, and secondly the collected used oil is kept in use as it is cleaned and filtered before being sold to a biodiesel plant for further use. The company recently invested £2m in a new depot, which is hoped will create 25 new jobs – a further testament to the company's success.

Vyta

Based in Belfast, Vyta collects and disposes of IT equipment. The equipment is collected and wiped of all data, then repaired if necessary, preparing it for resale. If it can't be reused, they ensure it is shredded and recycled, but 9 times out of 10 the equipment is sold on and the revenue covers the client's costs. This is another company reaping the benefits of a circular model. They have recently grown their team from 37 to 120 in order to meet the demand for their services.

Responsible

Belfast start-up company Responsible has developed a technology solution to enable fashion brands to buy back previously worn items from shoppers. It operates a CE business model, by partnering with brands to give customers the option to sell items back at the end of their life for a predetermined price/store credit.

Lakeland Dairies

Organic wastes from Lakeland Dairies in Newtownards are sent to AD plants and the biogas generated is brought back and used to power the manufacturing process. This accounts for up to 40% of the energy requirements for the facility.

5.
Proposals for change

5. Proposals for change

Following significant stakeholder consultation, independent research and learnings from our evidence base, we have developed twelve proposals for change which will create more sustainable production and consumption patterns in Northern Ireland.

The proposals have been framed around the five universal Circular Economy policy goals developed by the Ellen MacArthur Foundation (EMF)[38] which provide a blueprint to align ambition and create a common direction of travel.

Delivery of these proposals will depend on the commitment of stakeholders and their ability to collaborate.

Our proposals are ambitious, which is fitting for a country committed to a model of sustainable and inclusive economic growth. They are also strategic and cross-cutting, and we recognise sectors may progress at different speeds.

Policy Goals	Proposals for Change
Collaborate for system change	**1.** Develop and implement a programme to support and promote behaviour change. **2.** Create clusters and networks to raise awareness and assist collaboration. **3.** Develop an outcome-focused Circular Economy monitoring framework.
Design out waste	**4.** Embed Circular Economy principles in public procurement. **5.** Work with businesses to increase circular design.
Manage resources to retain value	**6.** Create and support platforms and hubs to share goods and materials. **7.** Maximise the value of materials locally.
Stimulate system change with funding, incentives and penalties	**8.** Establish a Circular Economy funding programme. **9.** Create a regulatory framework that supports and incentivises greater circulation of goods and materials.
Invest in innovation, research and skills	**10.** Invest in research and development to support the valorisation of materials. **11.** Embed Circular Economy principles at all levels of education. **12.** Design of future skills programmes and reviews of current programmes to support a Just Transition.

In the following sections, we will explain the need and opportunities presented by each of the proposals for change.

Collaborate for system change

Proposal 1: Develop and implement a programme to support and promote behaviour change

Our behaviours and individual choices about what, where and how we purchase products, how long we use them for, whether we can reuse or repair them, and when and how we dispose of them, will ultimately determine if Northern Ireland can successfully transform to a Circular Economy.

Our 'throw away' culture is full of single-use items. While many of these make our lives more convenient, they are contributing to significant levels of material waste and environmental damage. Small changes can make a significant and positive impact and will become more vital as resource scarcity continues to worsen.

A recent report 'In our hands, behavioural change for climate and environmental goals'[39] issued by the House of Lords, urged ministers to lead a public campaign using all government levers to guide public behaviour change in order to stop biodiversity loss and achieve net zero. It also claims that one third of our emission reductions must come from people changing their behaviours.

Educating citizens and businesses on how to embed circularity into their everyday lives and providing information to enable them to make more informed choices will be key. Over the last few years people have become more aware of and interested in calculating and monitoring their carbon footprint. We want to see this repeated in relation to material footprints.

While marketing and design can heavily influence our behaviours, it is our personal responsibility to move towards a system that is more aligned to nature.

We need to build an understanding of material use and circular options that will ultimately lead to people thinking in a more circular way in their day-to-day lives. Examples include promoting consuming products as a service through hiring or borrowing rather than ownership and 'product stewardship,' where 'everyone who imports, designs, produces, sells, uses and disposes of products has a shared responsibility to reduce the environmental and human health and safety impacts of those products.'[40]

Driving behaviour change will require a range of tactics, nudging businesses and citizens to think in a more circular way and make the choice for themselves, combined with regulation, legislation and enforcement. An example of this is the plastic bag levy, which has transformed our usage of single-use plastic bags.

Changing our patterns of consumption will require strong collaboration across all sectors[41] to address each stage of the consumer journey.

To avoid duplication, we will work alongside the Green Growth and Climate Action teams as they begin to implement their commitment to Support Behavioural Change, to align our approach. We will also work closely with organisations who currently lead on environmental behavioural change campaigns in Northern Ireland, such as WRAP and Keep Northern Ireland Beautiful.

Data and monitoring will be key to measuring the impact of campaigns and messaging and we will need to baseline current behaviour to measure the influence any campaigns would have.

Government will provide vocal and visible leadership to build momentum on the transition to a Circular Economy.

Potential impacts of changing behaviour:

- Cutting food waste could save households £500 a year. Over 70% of the food waste in the UK is from households, so that is a lot of potential savings. Some 4.5 million tonnes of that waste, valued at £14 billion is still edible. (WRAP UK)
- Just 4% of local people know that the production and consumption of clothing and textiles is harmful to our environment. The average UK household owns around £4,000 worth of clothes, around 30% of which have not been worn in the last year. This unused clothing is collectively valued at £30 billion. (Keep Northern Ireland Beautiful)

More details of the opportunities to change behaviours in respect of food, textiles, electrical and electronic goods[42] and packaging can be found in Annex 3 of this strategy.

Collaborate for system change

Proposal 2: Create clusters and networks to raise awareness and facilitate collaboration

Many of the barriers to circularity will not be addressed without using existing and new clusters and networks to research, design, test and deliver transformative solutions.

Changing mindsets, business models and developing new products and services is going to be a complicated task. Especially for Northern Ireland, which has many SMEs with limited time and resources. We recognise that working collaboratively with companies, researchers and public authorities will provide the best opportunity for success.

Clusters are a geographic collection of interconnected companies producing similar or related goods/services that are innovation-orientated, seeking to benefit from integration across businesses.

Networks are an alliance of organisations (public/private or other) seeking to work together to achieve an economic goal, this could be within or outside a cluster. Networks may involve organisations within the same sector or across sectors which belong to the same value chain.

The following three examples highlight potential areas of growth, which would benefit from collaborative clusters and networks:

Access to secondary construction materials

We need to increase the provision, quality and accessibility of secondary and regenerative materials. This will be in step with research programmes with our colleges and universities. Stakeholder engagement will be crucial to make the secondary building materials market competitive and will require collaboration across the entire value chain from architects, manufacturers, designers and regulators to contractors.

Growth of sustainable packaging

As well as working within existing sector networks to promote and make circular practices the norm, we will need to explore alternative solutions to existing industry problems, e.g. the Polymer Processing Research Centre at Queen's University will become an important source of expertise as the packaging sector seeks to increase use of secondary materials and make changes to design to increase recycling and reprocessing potential.

Irish Biomap Public Network

The Biomap[43] developed by the Irish Bioeconomy Foundation is an example of a project fostering collaboration across industries which would not normally interact to create new value chains. This interactive map, which covers the island of Ireland, plots organisations and technologies operating in agri-health, food processing, forestry, distilling, dairy, waste to energy, fisheries, agri-tech, etc. It aims to link companies that have overlapping value chains to reduce waste. This is through collaboration across businesses to explore new markets, develop new products, processes and services to maximise synergies.

Circular food manufacturing

The following diagram shows the amount and complexity of collaboration required across the whole UK food supply chain to reduce food waste/emissions and increase sustainable water management. What it doesn't show is the human and environmental interactions and how they will be impacted if flows are modified. We have an innovative food manufacturing industry in Northern Ireland which will play a key role in our transition, and which will need targeted support to ensure growth, jobs and opportunities are maximised as the economy transitions.

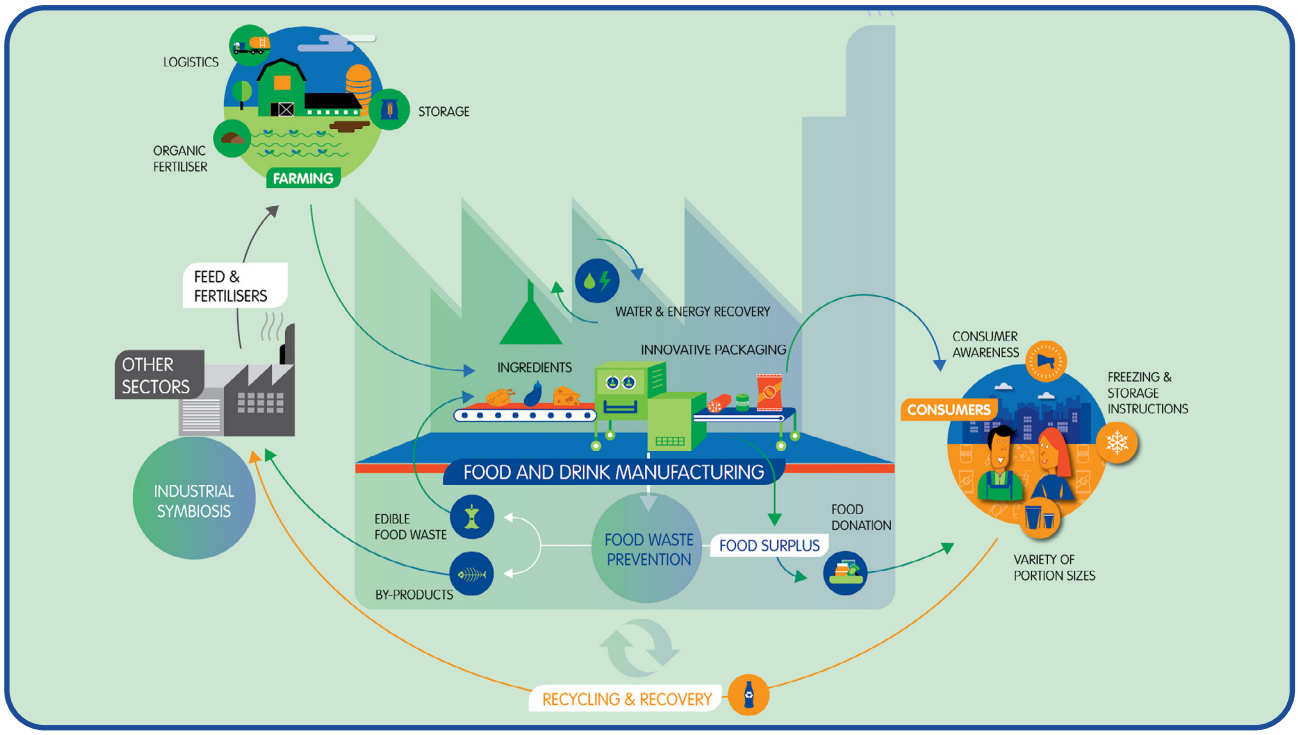


Figure 11: Ingredients for a Circular Economy, ©FoodDrinkEurope[44]

We will support businesses in the transition and encourage cooperative working and increased utilisation of existing programmes like Invest Northern Ireland's Resource Matching Service[45], which supports local companies with resource matching. Any clusters established as part of this strategy will complement the priority sectors and clusters identified in the 10X Performance Management Framework to enhance collaboration and maximise innovation.

Collaborate for system change

Proposal 3: Develop an outcomes-focused Circular Economy monitoring framework

To effectively measure the impact of this strategy and our transition to a Circular Economy, we will collect and analyse robust data.

The Circularity Gap Report has provided a baseline for key metrics such as our current circularity, material footprint and the number of circular jobs in Northern Ireland. It also highlighted the gaps in our information sources and the measurement and reporting of key data.

The Circularity Gap Report recommended developing metrics, setting goals and measuring progress. This strategy sets a target to halve our material footprint by 2050. To comprehensively measure progress, we need to improve collection and compilation of data, build capacity in measuring the flow of materials and adopt standards to account for carbon.

Working collaboratively to share metrics and data will be integral to developing a monitoring framework that aligns with the 10X objectives. Annual reporting on existing and new KPIs will also help us measure and monitor.

This will include:

- sharing the metrics and indicators developed as part of the measurement of the Climate Action Plan, departmental plans and Sectoral Plans
- aligning with metrics to measure and monitor delivery of the 10X Economic Vision.
- collaborating with Green Growth and ONS on developing the metrics for green jobs to include circular jobs.
- working with Northern Ireland Statistics and Research Agency, Ireland's Central Statistics Office, InterTrade Ireland and other cross-border bodies to align metrics and improve the collation of data on material movement.

Digital technology will be a key enabler to measuring circularity. Technologies like blockchain will become increasingly important tools to help us in these areas for improving efficiency, planning processes, quality control and quality assurances in supply chains. Material passports will also be necessary across sectors to track materials, so that use and reuse can be maximised.

Several mechanisms have been developed to measure Circular Economy performance at a business level. These include:

- the Circular Transition Indicators[46] by the World Business Council for Sustainable Development
- Ellen MacArthur Foundation's Circulytics[47] tool.

Over time the metrics will become standardised, and we will be able to see the impact we have had on reducing our overall material footprint and achieving the broader 10X objectives.

Design out waste

Proposal 4: Embed Circular Economy principles in public procurement

In Northern Ireland, public sector procurement has buying power in excess of £3 billion per annum. This provides strong potential to shape markets and behaviours towards a Circular Economy.

The Northern Ireland Executive has already approved new approaches to procurement that require a minimum 10% scoring for Social Value[48] in tenders above the UK Threshold for services and works contracts. This policy supports a range of themes including social, economic and environmental outcomes.

Government must procure products sustainably to ensure that public spending protects and does not harm our environment.

To do this, those responsible for the spend 'Commissioners' must ensure that as far as possible, specifications for products should:

- embody circular design
- contain recycled or bio-based content
- are renewable
- can be purchased as a service.

To procure in a circular way will involve looking beyond short-term needs and considering the longer-term impacts of each purchase. Business cases must consider Whole Life cost analysis – and consider whether a purchase needs to be made at all.

The Green Growth Strategy also recognises the role of public spending to improve our environment and includes a commitment for government to lead by example and develop a green public procurement strategy. We will work with the DAERA Green Growth team and the Department of Finance to help shape this.

The UK, EU and ROI are all reviewing their procurement processes to consider the opportunities for reducing emissions. Local government can also drive change through use of Sustainable Procurement Toolkits[49] to effectively mobilise public spend to deliver relevant local priorities. Those priorities include targets to achieve 'net zero' or be 'carbon neutral', reducing consumption and waste, and inclusive local economic development.

In June 2022, Scotland introduced a new procurement policy note[50] to consider CE and climate change, signposting sources of support to embed this policy in practice.

Design out waste

Proposal 5: Work with businesses to increase circular design

Government will need to support businesses to scale up established Circular Economy operating models that build sustainability into design, improve material efficiency, utilise secondary materials and reduce waste.

In moving to more circular designs, each of our focus areas will be affected in different ways.

Built environment

Figure 12 below was produced by The London Energy Transformation Initiative (LETI)[51]. It provides a helpful hierarchy for the built environment sector to prioritise circularity, with maintenance and prolonging the life of a building, its components and materials at the top of the hierarchy.

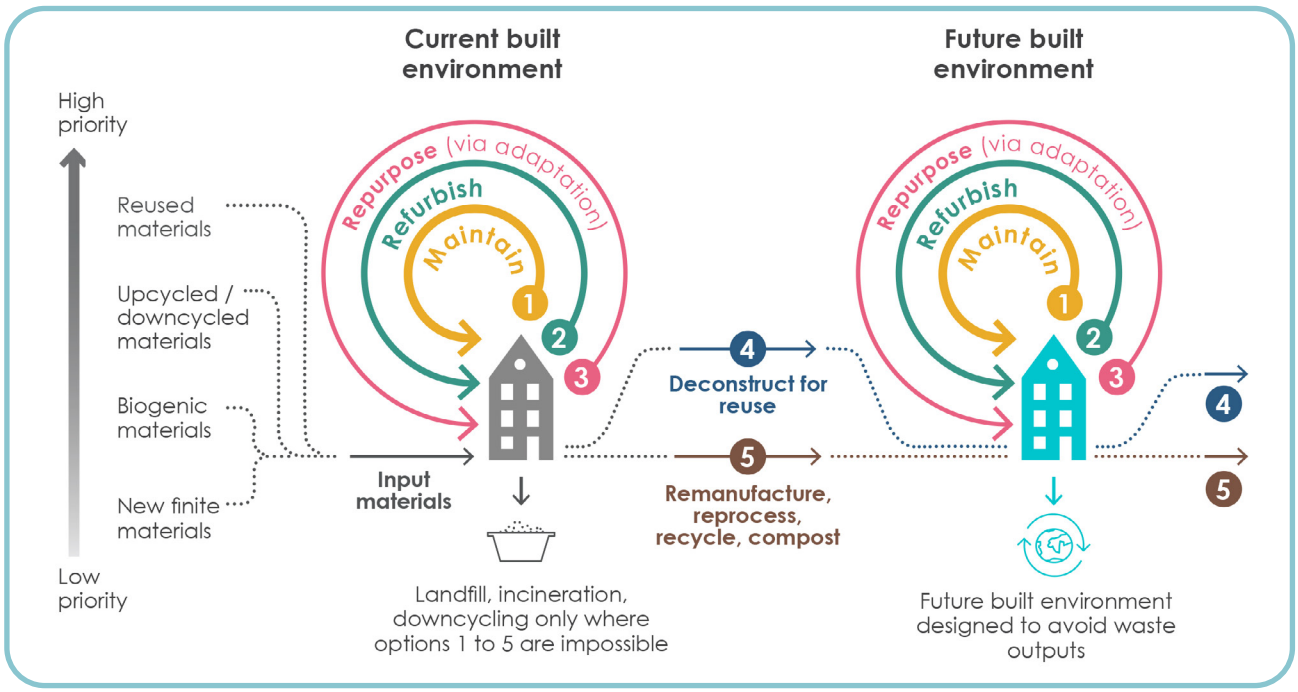


Figure 12: LETI London: CE for the build environment: A summary

Advanced manufacturing

This is a fast-growing sector, and its technologies are crucial to increasing circularity across all sectors. These technologies include Artificial Intelligence (AI), big data analytics, cloud computing, internet of things and 3D printing.

Electronics and electrical equipment

In the last twenty years the growth in electronics and electrical equipment has grown exponentially. The UN has referred to the situation as a 'tsunami of E-waste rolling across the world' caused by growing consumption, short product lifespans, difficulty of repair and inadequate recycling.

The components themselves are also problematic, as they include valuable rare earth metals and materials. The mining, crushing and grinding of these has caused significant biodiversity loss and water stress globally. Some of the materials would be classed as Critical Raw Materials[52], such as cobalt used in lithium batteries and indium used to make touchscreens and solar panels.

Other materials are hazardous, difficult to process and must be handled very carefully, such as arsenic, cadmium, lead and mercury.

The methods of managing E-waste can range from large-scale shredding technologies to smaller scale, manual or automated disassembly processes. We need to work with manufacturers and reprocessors to optimise the use of these devices through better design and to ensure we retain the value of the various materials they contain.

Packaging

Packaging can be made from a variety of materials including metal, aluminium, glass, paper, card and plastic. New packaging solutions are coming to market to increase use of reusable packaging, recycled content in packaging as well as using biodegradable or compostable forms of packaging.

Research and development will be essential to increase circular design and create demand for more innovation active firms. This can be generated through challenge funds, engaging universities and innovation centres, running competitions to stimulate discussion and action in relation to behavioural change and technological innovation. We can incentivise entrepreneurs, and start-ups in this sector to embrace circular business models.

Designing circular packaging is a lucrative business to pursue. According to the EMF, converting just 20% of plastic packaging into reuse models could provide a business opportunity worth 10 billion USD[53]. We need to be supporting these initiatives and considering introducing a sustainable packaging certification programme.

Manage resources to retain value

Proposal 6: Create and support platforms and hubs to share goods and materials

To improve the use of resources and retain their value, people and businesses need to know what is available, where it is and what condition it is in.

We want to create more platforms and hubs to retain the value in resources. This information can be provided through online platforms for typical fast-moving consumer products e.g. food, as well as industrial materials.

OLIO sharing platform

OLIO is an app (online platform) that connects people to surplus goods, including food and other household items, that can be borrowed for free. It has over 30,000 'Food Waste Heroes', who collect unsold or unserved food from businesses such as Costa Coffee and Tesco for listing on the app. Users then request the items and arrange collection. OLIO has grown fivefold over the last year – demonstrating a step change in attitudes.

Industrial materials

To create a platform for industry, coordination, collaboration and information sharing is required across projects, sectors and country borders. Planning and capital investment is also needed to create regional and national hubs to store the materials until required.

The Welsh Government has committed to the development of regional 'eco-park' hubs and town centre hubs which would be places for people to practice repair and reuse activities.

To support greater circularity in construction, platforms would provide material passports for all the materials, capturing information for all stakeholders including architects, suppliers, clients or future users to access. The passports would contain data on production, maintenance, reprocessing, refurbishing or recycling of materials and give them a value for future recovery and reuse.

Northern Ireland has expertise in material handling which needs to be utilised to help deliver these hubs. Government, building contractors and the waste and resource management sector will need to work together to create, populate and support the ongoing operation of these sharing platforms and hubs.

International Synergies (IS) provides another type of platform for businesses to share resources. It supports industrial symbiosis, a process by which wastes, or by-products of an industry or industrial process, become the raw materials for another. IS worked with Seagate Manufacturing in Derry/Londonderry, who had identified a surplus stock of Aquasol sodium chloride due to a change in service provider. IS was able to match Seagate with Belfast company Chempar, who agreed to take the stock for future resale as part of its boiler water treatment service. This ensured the secondary material was kept in use and avoided disposal of the chemical waste. This service could be developed to create a shared platform where you can see all the materials available in one place.

Manage resources to retain value

Proposal 7: Maximise the value of materials locally

When products and materials are kept in beneficial use, they retain the maximum value of those materials and components – reducing the overall demand for material extraction to make new products.

Repair and reuse

We need to see this sector grow, normalising reuse and repair and removing any stigma attached to it. Many of the organisations already operating in the sector are charities or social enterprises, which highlights the importance this sector plays in growing skills, creating jobs, keeping materials and products in use, and lowering our overall material and carbon footprints. Other businesses are also seeing commercial opportunities to operate in this space. In Doncaster and across Surrey County Council, Suez has opened Reuse Shops alongside Household Recycling Centres, selling recovered goods to local residents.

The Rediscovery Centre[54] in the Republic of Ireland is working on metrics to measure the value of repair and reuse activities.

The Northern Ireland Resource Network has been tasked to grow and support a network of reuse and repair organisations across Northern Ireland. Its core objective is to mainstream reuse and repair. It supports over 30 member organisations including:

- Belfast Tool Library, which offers a range of hand tools and power tools including drills, sanders and gardening tools for people to borrow as opposed to buying their own.
- the 4Rs project in Derry/Londonderry that collects, repairs and repurposes furniture and laptops.
- the Repair Café Belfast, which works with volunteers to refurbish a wide range of household items including small electrical goods, clothing, furniture and bicycles.
- Restore, East Belfast Mission, which collects, refurbishes and restores furniture and other household goods for resale in charity shops or to be donated to those in need.
- FareShare and Foodbank, both involved in food redistribution to tackle food waste and food poverty.

Bio-based materials

Bio-based materials are made from substances derived from living organisms. We need to maximise resource efficiencies by using biological resources within product development to create economic value over multiple lifetimes. We must prioritise higher-value products such as the production of fine chemicals and biological pharmaceuticals followed by food, and feed for animals cascading down to higher volume but lower value products such as energy crops.

We need to maximise the value of resources we have on our doorstep, but this will require collaboration with nations close by to plan and deliver additional infrastructure to support homegrown industries e.g. wool, paper, barley. The Circularity Gap Report recommends exploring options to produce bio-based materials and composites that could support decarbonisation of sectors such as construction. For example, hemp could be used to create hempcrete as a substitute low-carbon building material.

Along with innovation, there will be increased need and demand for digital skills to capture, monitor and control data used to manage animal production, crop growth and environmental improvement schemes. To comply with regulations and receive subsidies, businesses already need to do this, but it will grow. Those employed must understand both the manual activities associated with the bioeconomy and have the technical skills needed to digitise data.

Bio-Marine

Bio-Marine in Killybegs, Donegal, has developed value-added products from fish by-products. It has started to produce high-value proteins, minerals and nutraceuticals for sale to Asia and Europe. With its turnover doubling annually, Bio-Marine has raised institutional funding and will be investing in the construction of a new £50m plant employing 100 people.

Reprocessing

Reprocessing is a vital means of keeping materials in use, and while some value may be lost in the processing, it is still preferable to landfill, recovery or exporting the waste elsewhere.

Currently councils across Northern Ireland are exporting recyclate materials collected from households, through waste management companies, overseas for onward processing. This means the domestic value of these materials is lost. In order to increase reprocessing, the sector has asked for government intervention, in particular targets to reduce export of waste and investment to increase reprocessing infrastructure.

Several local companies are reprocessing packaging materials including plastic, glass, paper, metal and card. These material flows, along with garden waste and food waste, account for nearly 80% of the recyclable waste collected by councils from households. Many of these reprocessors are importing recyclate materials to feed and grow their business processes but they are also importing the material because the local supply is not of sufficient quality.

The latest report from the Circular Economy Collaborative Network, funded by Invest Northern Ireland, highlights the opportunity and growing need for an expanded reprocessing sector in Northern Ireland, in terms of capability and capacity. To make this happen the report recommends:

- Enhanced collaboration and transparency across the supply chain.
- Establishing a Recyclate Reprocessing Circularity Hub.

The Hub would be expected to help address the current mismatch in the quality of local recyclate collected and the quality specifications required by the local reprocessing companies. While DAERA is developing a draft Common Collections Guidance document, the Department may need to consider mandating quality specifications to increase the supply of quality recyclate which will in part come through the Extended Producer Responsibility schemes.

Huhtamaki

With 560 employees, Huhtamaki Ltd in Armagh is the biggest reprocessor of recycled paper in Northern Ireland. It uses the material to manufacture egg cartons, egg trays and coffee cup carriers. Supported by Horizon2020, Huhtamaki has started to manufacture its fresh ready-meal trays, which are made from natural wood fibres – making them fully recyclable and certified for home composting.

Encirc Ltd in Fermanagh is another major reprocessor, taking glass cullet that is melted to create a range of different glass bottles. Encirc has identified opportunities to grow and expand if higher quality glass recyclate was available locally. It has been working with *Glass Futures to use bio-fuel in one of its furnaces. This could reduce carbon emissions at its manufacturing site by up to 90% when compared to fossil fuels.*

Reprocessing Electronic Equipment

In Northern Ireland, we have an opportunity to increase value retained from Waste Electrical and Electronic Equipment (WEEE).

Recycling of WEEE is important not only to reduce the amount of waste requiring treatment, but also to promote the recovery of valuable materials. UN report: Time to seize opportunity, tackle challenge of e-waste advises that globally, electronic waste is worth at least $62.5bn annually, the equivalent of the GDP of Kenya, largely from value of incorporated gold, silver, copper, platinum, and palladium.

Northern Ireland has seven Approved Authorised Treatment Facilities (AATFs) for WEEE materials. However, with the demand for critical raw minerals housed in electrical goods, there is an opportunity for more businesses to specialise in dismantling and reprocessing these goods to extract the minerals. The UK Government's strategy[55] on minerals advises that we will need four times as many critical minerals by 2040 as we do today. Through innovation, financial support and regulations, it is committed to increasing recovery, reuse, recycling and resource efficiency to alleviate pressure on the primary supply of critical minerals.

Northern Ireland could get ahead of the market and scope out the feasibility to develop capabilities to capitalise on this opportunity to create a Circular Economy for critical minerals.

Stimulate system change with funding, incentives and penalties

Proposal 8: Establish a Circular Economy funding programme

To unlock benefits at scale, we need to create economic incentives that enable Circular Economy solutions to succeed.

Finance is essential for business to help share risk and the investment costs associated with adopting CE business models, such as installing more resource-efficient machinery, rethinking logistics and distribution. Invest Northern Ireland, International Synergies (IS) and others are currently providing specialised support for embryonic CE projects. However, a lot more will be required.

A Circular Economy funding programme is necessary to address current barriers and incentivise regenerative, resource-efficient practices. This funding will be jointly developed with DAERA and ALBs but coordinated and delivered by a central CE delivery body that will also be responsible for providing signposting and offering expert support to assist in making funding bids that will unlock CE at scale in Northern Ireland.

While virgin materials remain cheaper, secondary materials cannot compete. However, with the correct economic incentives, secondary materials can compete and grow. The introduction of some tax relief for retrofitting existing buildings or using recycled content in buildings and reducing or removing tax relief for new build needs to be considered.

Nature-based solutions will also be an investment priority to increase resilience, reduce environmental impact and improve sustainability of our built environment (e.g., SUDS[56] and green roofs[57] to reduce flooding).

Other UK jurisdictions, and our neighbours in RoI and EU, have initiated CE programmes and have allocated funding to support projects and plans – the amount provided depends on the scale of ambition – but as success becomes evident, more support is being provided.

Until a dedicated CE funding programme is designed, it will be necessary to provide signposting and support to access other sources of available funding.

Stimulate system change with funding, incentives and penalties

Proposal 9: Create a regulatory framework that supports and incentivises greater circulation of goods and materials

Regulations, taxation and enforcement can further reduce waste and improve resource efficiency.

Many of the circular regulatory initiatives came from EU legislation that was already underway prior to UK exit from the EU. One example is European Commission rules to **establish the 'right to repair' for consumers**. For household appliances, the rules currently apply for dishwashers; washing machines and washer-dryers; refrigeration appliances; televisions and other electronic displays. Similar regulations were introduced for Great Britain[58]. This means manufacturers of these electrical goods are required to ensure their products are repairable for at least ten years through providing repair manuals and making parts available. These regulations will affect the design, manufacturing and distribution of all applicable goods in Northern Ireland and will facilitate greater reuse and repair of such products.

Government regulations need to be linked to the waste hierarchy that will maintain and optimise the value of materials by refocusing activities towards prevention, reduction and reuse as opposed to end-of-pipe waste management. Over time we can measure the success of this intervention by seeing if the level of imported virgin material falls as the economy grows.

Schemes and legislation in the UK

As part of a UK-wide drive to bring forward circular solutions, Northern Ireland has been working to introduce and further develop several schemes and legislation, including:

- **Producer Responsibility schemes** which apply to electrical goods, batteries, vehicles and packaging, where the producers of goods contribute to costs of recycling and/or disposal at the end of a product's life. There is now a large shift to Extended Producer Responsibility (EPR) which is a powerful environmental policy approach through which a producer's responsibility for a product is extended to the post-use stage. It forces producers to design their products to be capable of reuse, easily dismantled and/or recycled at end of life. EPR also impacts other parties in the value chain including retailers, the public and waste operators.
- **Waste Electrical and Electronic Equipment Regulations (WEEE) 2013 (updated in 2018) –**These regulations currently require 65% of the weight of EEE placed on sale to be reused or recycled every year. From the limited data available, most of it is recycled into low grade components as opposed to being kept in use through reuse or repair. The UK government is expected to consult on reforms to these regulations in 2023, at which time the emphasis is likely to be on eco-design, product labelling and increasing household collections for reuse and recycling and also adding obligations for online retailers.

- **Packaging Extended Producer Responsibility (EPR) scheme** – A new scheme is due to be introduced in 2024, when producers will be required to pay the full net costs of dealing with waste packaging materials. This will in turn incentivise changes from design to production, increasing the uptake of reuse and refill business models. The new scheme will increase reprocessing capacity to deal with recyclable material and support the development of solutions to deal with non-recyclable material.
- **Deposit Return Scheme (DRS)** – DAERA is working with English and Welsh governments to introduce a Deposit Return Scheme (DRS) for single-use drinks containers to increase the circulation of the materials used. A customer will pay a small deposit when they buy a drink in a container and will get the deposit back when they return the container for recycling. Some schemes elsewhere have seen return rates of 90% as well as increases in the quality of recyclate collected and reducing the amount of littering.
- **Textiles Extended Producer Responsibility Scheme** – Currently under consideration, the EPR for textiles would seek to create minimum requirements for eco-design, support re-use and closed-loop recycling, and require producers to provide more information and labelling, helping consumers to understand the environmental and human impact of their choices. Several large multi nationals like M&S[59] and H&M[60] have already made commitments to become more circular and consider the whole life cycle of their products.
- **A UK-wide Digital Waste Tracking Service** is currently being developed to track all waste movements within the UK. It is anticipated that the improved accuracy and availability of data on waste and potential resources will assist the functioning of a Circular Economy.
- **Plan to Eliminate Plastic Pollution** – DAERA is leading the development of a Northern Ireland Executive Commitment for a Plan to Eliminate Plastic Pollution[62] and is collaborating with the Department of Finance to implement a Single-Use Plastic Reduction Action Plan within the government estate.

Examples of regulations being used elsewhere:

- The EU-wide Single-use Plastics Directive has been in operation since July 2021 (including in the Republic of Ireland) banning 10 common single-use plastic items such as straws, cotton buds, plates and cutlery that have readily available non-plastic alternatives. The ban includes all oxo-degradable plastic products, i.e. plastics that fragment following exposure to air and sunlight. Labelling requirements on other products containing plastic have also been introduced across the EU through the same Directive.
- Scotland has become the first part of the UK to implement a ban on many of the most problematic single-use plastics, and the Republic of Ireland is following suit. The Scottish ban, which came into force on 1st June 2022, makes it an offence for businesses to provide plastic cutlery, plates and stirrers. Around 700 million of these single-use items are currently used in Scotland every year.
- The Republic of Ireland government is considering legislation that would require supermarkets to allocate 20% of their floor space for the sale of loose products to be purchased by people using reusable containers. This will reduce excess buying and reduce plastic packaging.
- France has banned supermarkets from throwing away unsold food and requires them to donate it to charity.

Outside the legislation and regulations currently in development, we have identified several other opportunities that would help enable circular solutions to become the norm.

Waste Regulations

The UK exports approximately 16.3 million tonnes of materials for recycling per year[61] and this is partly because of the lack of markets for this material domestically. According to some stakeholders, it is our current definitions of waste that are preventing the valorisation of many materials. When a product or material is classified as waste, there are strict rules about how it can be treated to ensure that human health and the environment are protected. However, these current definitions and associated regulations are considered a barrier to innovation and keeping products and materials in use.

If we revise the end of waste regulations, it creates opportunity to localise supply chains, making more material locally available. If secondary materials are present and easily accessible then supply chains are shortened and Northern Ireland PLC performs better. If the regulations make it easier to reuse and repair products, social enterprises can grow and provide services in partnership with Councils and waste operators to off-load particular products to extend their lifetime and provide jobs.

All of this should be considered as part of the Regulatory Transformation Programme (RTP) which is a reform of legislation and operation by DAERA. This will be critical if we are to create a regulatory framework that supports the Circular Economy. Its aim is to integrate environmental protection and economic growth by reducing the regulatory burden for businesses through a more streamlined and effective system. It will make it easier for regulators to assess and, where necessary, enforce compliance. As part of this, DAERA will develop policy proposals for, amongst other things how waste management activities should be regulated.

Building Regulations

We must also consider if building regulations could provide a means to enable and unlock opportunities for reuse, repurposing and reprocessing of building materials. The building regulations set standards for building work and recent uplifts have improved the energy efficiency and emissions performance of buildings. We will need to consider embodied carbon and the full life-cycle assessments of material, align methodologies with other UK jurisdictions and develop market capability, before we could introduce regulations requiring recycling and re-use within construction. The Department of Finance will soon be gathering evidence in a discussion document to inform any next steps.

Taxation

Tax is not a devolved matter for Northern Ireland, but it is important for us to feed into the design of new or revised UK-wide and Northern Ireland-specific regulations and taxation interventions that will support value retention of products and materials.

At present over 40% of UK public tax receipts come from labour tax (income tax and National Insurance) and only 5% comes from tax on goods (fuel, tobacco and alcohol)[62]. This creates little incentive for high carbon producers to change their operating models. Consideration should be given to the possibility of shifting some of that burden to taxing non-renewable resources.

Circular activities including repair, refurbish and remanufacture are often labour intensive which, given it is heavily taxed, makes it difficult for businesses involved in those activities to compete. At present the tax system provides more of an incentive to build a new house as opposed to renovating an existing house. Therefore, we need to rethink how labour is taxed when it comes to circular activities as well as how we reduce VAT on circular goods and activities.

Plastics Packaging Tax

The Plastics Packaging Tax is an example of how tax can be used. It is designed to provide a financial instrument to encourage businesses to use recycled plastic in the manufacturing of plastic packaging. The tax came into effect in April 2022 and levies £200 per tonne on plastic packaging that contains less than 30% recycled plastic. The aim of the tax is to drive increases in recycling infrastructure especially for plastics that are currently not usually recycled due to the low cost of virgin material.

Enforcement

Government needs adequate resources to enforce and take appropriate action against waste crime and to ensure sufficient deterrents are in place. Stakeholders have called for action including the introduction of enforced targets to reduce waste across the food industry, agriculture and the construction sector.

Food

In terms of food, we need to:

- enhance enforcement of the food waste regulations
- consider use of a mandatory food waste reporting system
- consider eliminating biodegradable waste from industry going to landfill.

The final measure alone would make a significant contribution to reducing waste sector emissions given 8-10% of the world's GHG emissions relate to food[63].

The Welsh Government has set a target to halve avoidable food waste by 2025 and reduce it by 60% by 2030. The Republic of Ireland has set a target of 50% reduction by 2030, and Scotland has pledged to reduce food waste by 33% and end the landfilling of biodegradable municipal waste by 2025.

Role of Householders

Other opportunities are missed when people fail to put their recyclable plastic, paper, card, tins and glass in the recycling bin. This can be tackled through effective communications from stakeholders including councils, education through the Eco-Schools Programme, and monitoring and potential consequences for persistent non-compliance.

Invest in innovation, research and skills

Proposal 10: Invest in research and development to support the valorisation of material

The aim of valorisation is to move materials up the value chain. Materials that are by-products of a process or currently thrown away can be reprocessed to produce more valuable materials. Finding these pathways will take intensive research and development. Our businesses and people will all need support from the public and private sectors to create enabling frameworks for this to happen.

Examples of valorisation include:

- using discarded plastics to infill potholes on roads[64]
- deriving fuel from coffee grounds[65]
- waste from plant-based protein manufacturing used for textiles, packaging, building materials (e.g. hempcrete), biofuel or pet food.

This innovation will be underpinned by high levels of collaboration across business, academia, government and civil society. Investment in research and development will be key to drive growth. The 10X Economic Vision commitment to increase total research and development expenditure by 55% from a baseline of £1,167m in 2020 will be key to delivering this proposal.

To increase local reprocessing, discussed in Proposal 7, we will need research to assess feasibility of local reprocessing and closed-loop recycling, including the technology needed to retain the value of material flows. This will involve working closely with local, national and international research institutions, forging research collaborations that will lead to the commercialisation of this research and the adoption of new innovations. This approach will drive growth across the economy into direct and indirect supply changes.

There are excellent research projects ongoing in Queen's University Belfast and Ulster University on the development of waste and by-products into less expensive and less carbon-intensive solutions for Northern Ireland industries[66].

There are significant opportunities to be explored and the Northern Ireland government will play its part in catalysing and supporting this vital work. At present there are numerous financial supports available throughout Northern Ireland, UK, EU and from private financing. The CE delivery body will assist and signpost business in accessing finance, both public and private by providing advice on the risks and rewards of various financial products.

Queen's University Belfast partnership with ReGen

QUB in partnership with ReGen[67] has been researching a manufacturing process for waterglass suitable for producing 'cementless' concrete products. Waterglass (sodium silicate) is a much sought-after chemical, also used in processing textiles and lumber, and in the manufacture of ceramics, and other materials. It can be created using by-products namely glass cullet and by-products from cement and steel production. The end products will have a significantly lower environmental impact than those currently on the market.

It requires a lower process temperature (around 150°C vs >1100°C) which is less energy-intensive and can utilise waste glass cullet rather than virgin material. Furthermore, the production cost is estimated at £100 per tonne (about 95% cost being sodium hydroxide) in comparison with the market price of commercially available sodium silicate at £450 - £900 per tonne.

The Belfast Region City Deal will see the establishment of a national Advanced Manufacturing Innovation Centre (AMIC) which plans to build upon existing research centres of excellence leading research and development into technological solutions to unlock greater growth.

New technologies will be needed to track material movements, and researchers must consider the opportunity to develop and utilise Radio Frequency Identification Devices (RFID), which are small, battery-less microchips that can be attached to consumer goods, cattle, vehicles and other objects to track their movements. We need to miniaturise products and reduce the production costs to promote mass uptake.

Invest in innovation, research and skills

Proposal 11: Embed Circular Economy principles at all levels of education

Our transition to the Circular Economy is dependent on how we learn to innovate and apply our learnings to all sections of our society. We need to develop our education system and skills to become more circular in our thinking and behaviours.

The pathway will be led by networks and clusters of Circular Economy leaders and champions, but we need everyone to be aware of the part they can play.

We need people to learn about the Circular Economy, the benefits it can provide and how to get involved. They need to be able to make the connection between material use and how it impacts on carbon footprint. Education programmes at all levels will be required so that the idea of a Circular Economy is better understood and becomes part of everyday life. It will also start to address over-consumption and production patterns to reduce resource scarcity.

This work will support the 10X Economic Vision to increase the proportion of the working age population with qualifications at level 3 and by increasing the proportion of individuals leaving higher education with qualifications in STEM subjects. This is essential to ensure our society is ready to maximise opportunities and grow our economy.

Eco-Schools initiative

The Eco-Schools initiative[68], which is an environmental education programme, has been very successful at embedding sustainability into the ethos and curriculum of schools, covering topics such as waste, marine conservation, transport, climate action, biodiversity and water. This could be expanded to consider material use and promote circular living, utilising technology and gamification to increase the reach of messages.

The Southwest Regional College has some excellent courses and projects[69] running which will facilitate capacity building, knowledge transfer and technology development within Advanced Manufacturing and Renewable Energy as well as sustainable construction.

Zero Waste Scotland[70], the Ellen MacArthur Foundation (EMF)[71] and Sitra (Finland)[72] all have innovative programmes to encourage Circular Economy thinking from an early age right through to higher and further education programmes – not just limited to the classroom but to wider life skills. We hope to emulate and use these resources in our own learnings.

Invest in innovation, research and skills

Proposal 12: Design of future skills programmes and reviews of current programmes to support a Just Transition

Unless we plan, anticipate and resource for the transition to a Circular Economy, skills shortages could derail long-term goals for circularity and jobs growth.

As we progress into the 4th Industrial Revolution[73], some jobs will be lost in old sectors and the demand for new skills will increase. For example, the need for diesel engineers will be replaced by those who specialise in electrical vehicles. Jobs may be lost in agriculture, fossil fuel extraction and processing but new jobs will emerge in sectors such as design, disassembly and biorefinery processing. In the event that the transition is not managed, the Climate Change Committee[74] has warned Northern Ireland that social upheaval can be expected including significant job losses in carbon-intensive industries, growing fuel poverty and an increasingly unaffordable housing stock that doesn't meet energy standards.

Skills for a 10X Economy

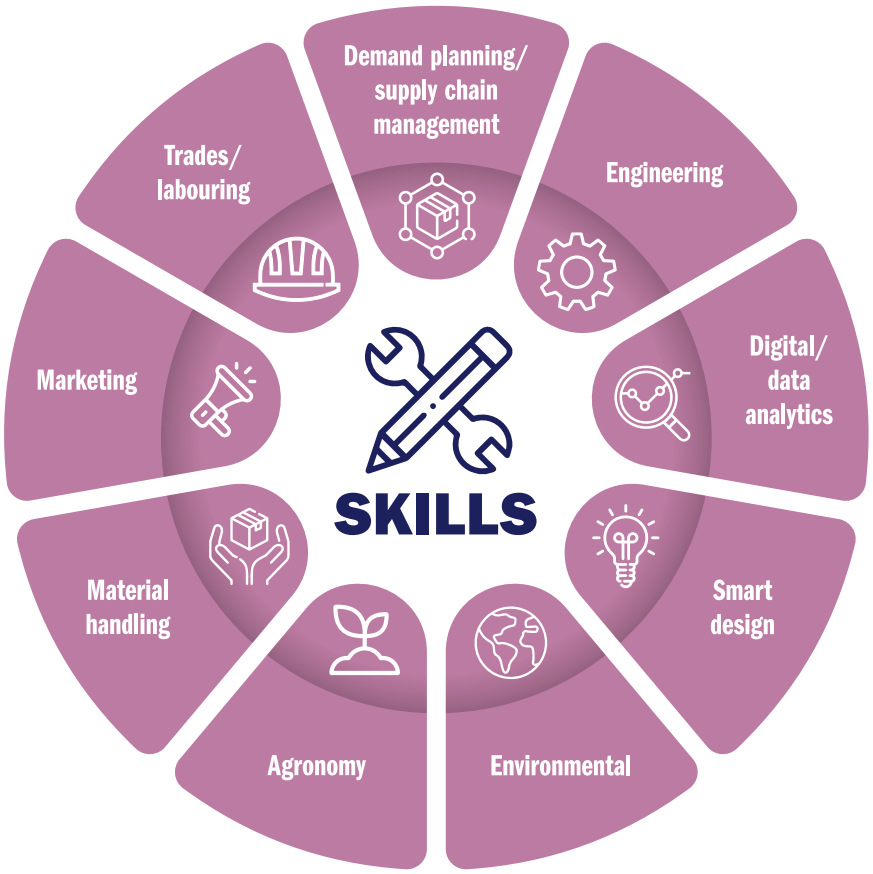
The Department's new Skills Strategy "Skills for a 10x Economy" was published in March 2022. The Strategy sets a strategic framework for the development of our skills system to 2030 making[49] recommendations for various actions to be taken across government, business and wider society.

The strategy recognises that *"it is imperative that work begins immediately to fully understand the short, medium and long-term requirements of our education and training sectors that will enable us to maximise the economic opportunities from the global drive to tackle climate change, deliver a just transition for individuals across our society and to meet our carbon reduction commitments."*

We will work closely with the DAERA Green Growth Team, the DfE Skills and Education Group and the Just Transition Commission (which is to be formed as part of the Climate Change Act) to incorporate the need to support a Just Transition into our wider skills delivery across multiple programmes. The Just Transition Commission and Just Transition Fund is being established to specifically manage the effects of change and reduce inequalities.

A focus on skills and material life cycles

Workers and employers will be required to retrain and develop new skills to adapt to changing environments. Activities and services will become focused on reusing materials and closing material cycles—processes that require diverse skills in design and engineering as well as practical labour-intensive roles. The diagram on the following page provides a selection of skills that will be needed.



Skills training and Further Education colleges will continue to play a crucial role in providing the skills and delivering traineeships, apprenticeships and sector partnerships to drive changes through revised industry standards and qualification requirements. By growing these skills, we will address the current skills imbalances, enhance digital skills and create a culture of lifelong learning which are objectives of the 10X Economic Vision.

In future, the principles of a Circular Economy (materials, remanufacturing, eco-design, recyclability, and practices that extend product lifetimes) will be integrated into all our lives, but especially in design, engineering, construction, industrial processes and customer service.

Examples of 'new' jobs

- Construction and Built Environment – retrofitters, heat pump engineers, insulation specialists, digital designers, disassembly and material handling.
- Advanced Manufacturing – reprocessing experts, bioengineers, logistics specialists, digital and blockchain for material tracking.
- Agriculture, Food Manufacturing and Bioeconomy – chemists, researchers, animal nutritionists.
- Tourism – digital specialists, procurement specialists, transport specialists (air/ferry/ cruise travel).

6.
Monitoring and measurement

6. Monitoring and measurement

We are demanding more resources from the earth than it has to offer us. In the UK the average person is consuming *almost three times* the natural world's productive capacity[75]. We urgently need to address this alongside reducing emissions.

How will we know we have succeeded? The Green Alliance[76] recommends the need for an ambitious target to halve resource use in the UK and bring resource consumption within planetary boundaries by 2050.

The following list provides an overview of the ambition and targets of other countries pursuing the Circular Economy:

- France intends to increase resource productivity by 30% by 2030, using 2010 as the baseline.
- Austria aims to reduce domestic material consumption to 7 tonnes per capita per year by 2050.
- Spain aims to reduce national consumption of materials by 30% by 2030, using 2010 as the baseline.
- Wales has set an overall target to reduce resource use needed for one-planet living by 2050[77].
- England aims to double resource productivity by 2050.
- The Netherlands is aiming to be 100% circular by 2050, with an interim target to reduce 50% raw material use by 2030.[78]
- Circular Flanders, Belgium, has set a target to reduce its material footprint by 30% by 2030.

The Climate Change Act and the Green Growth Strategy are rightly focused on achieving net zero by 2050. We have set out in this strategy how Circular Economy helps meet this target with a reduction in our material footprint providing the greatest impact.

With a clear legislated target for net zero by 2050, Northern Ireland will begin to align reporting on progress within the UK carbon budget periods, as recommended by the Climate Change Committee. We will also align circularity metrics within the 10X Performance Management Framework to measure performance in-line with the three core themes of innovation, inclusion and sustainability.

By 2050 we will have reduced our material footprint to 8 tonnes per person per year.

This target is derived from the Circularity Gap Report insight and various pieces of scientific research[79] suggesting between 6-8 tonnes per capita per year is the sustainable footprint target we need for long term survival.

The Circularity Gap Report gives us a baseline and the 'what if' scenarios provided us with various interventions which, if implemented could theoretically reduce our material footprint by half. The target above and the proposals for change provide a strategic vision and direction, but it will take time and collaboration with all stakeholders to agree on a realistic roadmap to success. Such collaboration will be essential in setting any interim goals and developing sector and material specific action plans that support and complement the Climate Action Plan.

The EC has found measuring the Circular Economy difficult due to the numerous material streams and emission sources affected. It has created a Circular Economy Indicator Framework,[80] which complements the Commission's 'Resource Efficiency Scoreboard'[81] and 'Raw Materials Scoreboard'.[82]

The UN has also established a Task Force[83] to produce practical guidelines for measuring Circular Economy by June 2023.

In addition to the Circularity Gap Report baseline, we will develop a broader suite of indicators and metrics to measure sustainable performance in alignment with the Climate Action Plans, the 10X Performance Management Framework and the Investment Strategy for Northern Ireland.

Some indicators of success will increase, and others decrease, as set out in the table below. Some of these indicators are already being measured but others will require improved data collection. These will provide an overall picture of performance in terms of the impact of interventions on people, planet and business.

CE Indicators that will decrease	CE Indicators that will increase
• Material footprint • Waste generated from Households and sectors • Waste exported • Waste landfilled • Fly-tipping incidents • Virgin materials imported • Water use • Water pollution incidents • GHG emissions across sectors • Extractive industries • Overall energy use • Number of derelict buildings and empty homes	• Recycling • Reuse and repair enterprises • Greater awareness of Climate Change and Circular Economy • Companies publishing sustainability reports • Green/circular Jobs • Water, soil and air quality • Biodiversity • Public money spent on circular procurement • Patents for circular products and materials • Retrofitted homes

In the short term we might see an increase in our material footprint as the energy, waste and water transitions will require material and carbon-intensive infrastructure to be imported and constructed in Northern Ireland. Such development is essential to reach net zero in the longer term, but these short-term trade-offs will need to be factored in.

During this transition stage, we must focus on designing circularity into major infrastructure projects to ensure the full lifecycle of material has been considered, e.g. the repurposing of steel and apparatus from wind turbines when they are decommissioned.

7.
Next steps

7. Next steps

If we are to ensure that Northern Ireland meets its net zero target and reduces its material footprint by 2050, we need to adopt a Circular Economy mindset in everything we do.

Lord Deben, Chair of the UK Climate Change Committee, in a recent letter to the Department of Agriculture, Environment and Rural Affairs[84] said:

"Northern Ireland is already playing catch-up with the rest of the UK in many areas. The new (Climate Change Act) targets will quickly lose credibility if the policy focus does not shift quickly to implementation and success is seen in delivery of outcomes."

Likewise, we are playing catch-up in terms of circularity, but DfE has committed to take the following actions to initiate progress:

1

We will examine options for a delivery unit, in partnership with DAERA, to translate the proposals for change into action plans.

The delivery vehicle to be established by 2024 will lead a whole-system approach across government to deliver agreed actions, while continually measuring and monitoring progress to ensure success. This will require investment in research, infrastructure, new technologies and circular business models.

2

We will embed Circular Economy principles in the development of the Climate Action Plan, Departmental and Sectoral Action Plans.

To align reducing our material footprint with reducing GHG emissions we will work across government to promote Circular Economy principles in all climate action plans.

3

We will raise awareness of Circular Economy and increase circular thinking.

By engaging across government, business and society we will use our channels to promote, educate and communicate the benefits of Circular Economy.

The goal of this strategy is to adopt a circular model and reduce our material footprint to live responsibly, build resilience and exploit new opportunities. This will secure future prosperity for business, people and our planet. We have set out our vision and direction of travel in the proposals for change and our commitment to change through these next steps. It is important to note, however, this strategy will be dependent on securing sufficient funding to take it forward. Budgets beyond 2022/23 have not yet been allocated and are expected to be challenging.

We invite you to respond to this consultation and provide your feedback on our plan to transition to an innovative, inclusive and competitive economy, with responsible production and consumption at its core. The outcome of this consultation will also inform the next steps taken to implement the 10X Economic Vision, to create a more innovative, inclusive and sustainable economy.

Glossary

10X Economic Vision

The 10x Economic Vision represents a bold and ambitious new vision for the Northern Ireland Economy based around a decade of innovation acting as an engine for growth.

The vision sets out that growth will also be inclusive, providing better opportunities and wages to more people, and sustainable, by playing its part in tackling climate change and other environmental issues. The 10X Economic Vision focuses specifically on clusters and technologies where Northern Ireland has world class potential including cybersecurity, advanced manufacturing and engineering, and life and health sciences.

Carbon Footprint

Carbon footprint is the amount of carbon dioxide released into the atmosphere as a result of the activities of a particular individual, organisation, or community. It is expressed as carbon dioxide equivalent (CO_2e), which is the sum of all greenhouse gas emissions rolled into one. In the UK the average carbon footprint is 6.25 tonnes CO_2e per year.

CE strategies:

- Reuse - Reuse products by transferring them to another user.
- Repair - Repair components and parts so that products can be used longer by the user.
- Remanufacture – is the rebuilding of a product to specifications of the original manufactured product using a combination of reused, repaired and new parts.
- Reprocess – to deal with waste materials so they can be used again.
- Recycle - is the process of taking a component material and processing it to make the same material or useful degraded material.
- Recovery - the process of removing or extracting an energy source (e.g. battery) or industrial chemicals/materials for use, reuse, or waste treatment.

Circular Economy

A Circular Economy is a systemic approach to economic growth that reduces overall demand for resources. It requires us to rethink what we understand as economic success and, in the process, redesign our economic model. It entails gradually decoupling economic growth from the consumption of finite resources and designing waste out of the system. Underpinned by a transition to renewable energy sources, the circular model builds economic, natural and social capital.

Circular Economy principles

The Circular Economy is a framework of three core principles, driven by design:

- Eliminate waste and pollution
- Keep products and materials in use and
- Regenerate natural systems

It is based increasingly on renewable energy and requires us to rethink our relationship with materials/resources. It is accelerated by digital innovation. It is a resilient, distributed, diverse, and inclusive economic model.

Circularity

It is the process in which value is retained e.g. by-products from manufacturing being reused. Circularity increases when the value of resources and materials is recognised and maximised.

Circular jobs

A circular job is any occupation that directly involves or indirectly supports one of the principles of the Circular Economy.

Climate Change

The impacts of global warming on the Earth's weather patterns.

Closed–Loop economy

A closed-loop economy is an economic model in which no waste is generated; everything is shared, repaired, reused, or recycled. What would traditionally be considered 'waste' is instead turned into a valuable resource for the creation of something new.

Consumables

Consumables are goods used by individuals and businesses that must be replaced regularly because they wear out or are used up. They can also be defined as the components of an end-product that is used up or permanently altered in the process of manufacturing such as semiconductor wafers and basic chemicals.

Critical Raw Materials

Critical raw materials are raw materials of high importance to the economy and have a high risk associated with their supply (for example, China provides 98% of the EU's supply of rare earth elements). Raw materials are crucial to our economy. They form a strong industrial base, producing a broad range of goods and applications used in everyday life and modern technologies. Reliable and unhindered access to certain raw materials is a growing concern within the EU and across the globe.

Consumption

Consumption means the amount of something that people and other entities use. It is also the process of using something, often so that there is less of it available afterward

Decarbonisation

Decarbonisation is the term used for removal or reduction of carbon dioxide (CO2) output into the atmosphere. Decarbonisation is achieved by switching to usage of low carbon energy sources.

Deposit Return Scheme (DRS)

A deposit return scheme is an example of producer responsibility. Producer responsibility is about making sure businesses that manufacture, import and sell certain products also deal with the end-of-life environmental impact of those products.

Ellen MacArthur Foundation – EMF

Launched in September 2010, the Ellen MacArthur Foundation is a non-governmental organisation (NGO) most well-known for its heavy promotion and influence within the Circular Economy, a system designed to keep a material in use for as long as possible.

Extended Producer Responsibility (EPR)

A policy approach in which producers are given significant responsibility – financial and /or physical for dealing with post-consumer products. It is intended to incentivise producers to design out waste and increase the value of resources.

Focus Areas

Areas of concern or where impact would be highest. For the purposes of this Strategy, it was decided that we needed to identify the most critical sectors and material flows which should be targeted with policy interventions aimed at addressing market and regulatory failures. These were Construction and Built Environment, Tourism and Hospitality, Bioeconomy, Advanced Manufacturing, Food, Textiles, Electricals and Packaging.

Global warming

Global warming is the long-term warming of the planet's overall temperature. Though this warming trend has been going on for a long time, its pace has significantly increased in the last hundred years due to the burning of fossil fuels. As the human population has increased, so has the volume of fossil fuels burned.

Green economy

A green economy is defined as low carbon, resource efficient and socially inclusive. In a green economy, growth in employment and income are driven by public and private investment into such economic activities, infrastructure and assets that allow reduced carbon emissions and pollution, enhanced renewable energy and resource efficiency, and prevention of the loss of biodiversity and ecosystem services.

Green Growth

The Green Growth Strategy is the Northern Ireland Executive's multi-decade strategy, balancing climate, environment and the economy in Northern Ireland. It sets out the long-term vision and a solid framework for tackling the climate crisis in the right way.

Green jobs

Jobs in areas of the economy engaged in renewable energy, producing goods and services for environmental protection purposes, as well as those engaged in conserving and maintaining natural resources[85].

Greenwashing

Greenwashing is the process of conveying a false impression or providing misleading information about how a company's operations are more environmentally sound. Greenwashing is considered to be an unsubstantiated claim to deceive consumers into believing that a company's products are environmentally friendly.

HWRCs

Household Waste and Recycling Centres (HWRCs) are where you can take everyday household items for reuse, recycling or disposal.

Innovation Active Firms

Enterprises that pursue opportunities focused on innovative products or services that will be tradable on regional or global markets.

Linear economy

A linear economy traditionally follows the 'take-make-use-dispose' approach. This means that raw materials are collected, and then transformed into products that are used until they are finally discarded as waste. Value is created in this economic system by producing and selling as many products as possible.

Low Carbon Renewable Energy Economy

Businesses are considered part of the Low Carbon Renewable Energy Economy if they report activity in one of 17 defined sectors, when surveyed by ONS. The Low carbon and renewable energy economy survey estimates the scale of such businesses including turnover and employment.

Material Footprint

Material Footprint (MF) is the attribution of global material extraction required to meet the domestic final demand for goods and services of residents in a country.

Material Flows

A material flow is the description of the transportation of raw materials, pre-fabricates, parts, components, integrated objects and finally products as a flow of entities. Analysis of material flows allows us to track materials throughout the economy.

Nature-based Solutions (NbS)

An umbrella term which covers a range of solutions to protect the environment, create habitat and offer alternative, low-carbon solutions to traditional grey infrastructure. NbS provide valuable natural capital e.g. SUDS

Precision Farming

An approach to farm management which applies technology to ensure crops and soils receive what they need. It can be used by famers to increase soil quality as well as optimising and increase productivity.

Production

The process of making or growing goods to be sold or the amount of something that is made or grown by a country or a company.

Raw Material Equivalent

Raw Material Equivalent describes the amount of raw materials which are embodied (over the whole production chain) in the products of domestic final uses of an economy. For instance, Chile exported 5.84million tonnes of copper in 2020 but the raw material equivalent was 580 million tonnes of ore – 99% of the resource dug out of the ground is left in Chile as waste.

Recyclate

Post-consumer goods and products which are collected for recycling.

Socio-economic cycling

This is the share of secondary materials in the total consumption of an economy and this is also the measure used for the Circularity Metric – which shows how circular our economy is.

Socio-economic outcomes

Outcomes that relate to or are concerned with the interaction of society and the economy.

Small Medium-sized Enterprises – SMEs

The UK definition of a SME is generally a small or medium-sized enterprise with fewer than 250 employees.

Sustainable Urban Drainage Systems (SUDS)

SUDS are drainage systems that are considered to be environmentally beneficial, causing minimal or no long-term detrimental damage. They provide a means of efficiently and sustainably draining surface water, while minimising pollution and managing the impact on water quality.

Supply Chain

A supply chain is a network between a company and its suppliers to produce and distribute a specific product to the final buyer. This network includes different activities, people, entities, information, and resources. The supply chain also represents the steps it takes to get the product or service from its original state to the customer.

Value Chain

Value Chain is the process or activities by which a company adds value to an article, including production, marketing, and the provision of after-sales service.

Value Creation

Value creation is taking inputs (resources, capital) and turning them into outputs (outcomes, profits). For an output to be valuable, there needs to be a stakeholder that values the output. The aim of CE is to provide value to things that are currently wasted/thrown away/discarded and find a market for them.

Valorisation

Valorisation is the act or process of maintaining the price of something, usually through government action and can also be described as the act or process of giving, assigning, or enhancing value.

Waste and Resources Action Programme - WRAP

WRAP is one of the globe's leading sustainability charities. Based in the UK and with projects around the world, it works with businesses, governments, citizens, and charities to make the planet a healthier, safer place. Its vision is 'A world where resources are used sustainably.'

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