



CIRCULAR ECONOMY ROUTE MAP FOR GLASGOW - 2020





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“Circular-economic thinking is based on the idea of the economy being restorative and regenerative – that is, economic activities should strengthen rather than break down social and environmental resources”

William McDonough and Michael Braungart,
Cradle to Cradle:
Remaking the way we make things

This Circular Economy Route Map sets out a framework to allow Glasgow to truly embrace a sustainable economic future. It presents a vision for a circular city and provides the context in which our local economy is seen as an engine for environmental and social regeneration.

There is a growing urgency to build upon the momentum created by the declaration of a Climate and Ecological Emergency, the impending United Nations Climate Change Conference (COP26) and the need for a green recovery in response to the Covid-19 pandemic. These major events have disrupted social norms across the city and on a national and global scale. We must now capitalise on the need for change to shape our city in a positive manner and provide the lasting legacy of a new economic model that is truly sustainable.

The circular economy must be at the very core of this green recovery to benefit:

- The environment – by reducing carbon emissions and the overconsumption of scarce valuable natural resources;
- The economy – by improving design and production methods and relying on materials that are already in use within the city eco-system rather than exploiting more virgin resources;

and

- Our Communities – by localising the economy to ensure it is based on social inclusion, justice and wellbeing and opens up opportunities for employment and wealth creation within those communities.

It is incumbent upon us to recognise that systemic change is necessary to address the changing global and local landscape. Infinite growth and long established wasteful practices of the western world are fundamentally incompatible with the finite natural resources of the planet. Communities around the world are facing environmental catastrophe.

We need to reduce carbon emissions, being mindful of the responsibility that comes with ecological stewardship, the health and wellbeing of citizens and the fragile eco-system in which we live. In this Route Map, we set out the guiding principles that can embed sustainability into our economy. These are key to ensure that resources are not wasted. We provide several local and international examples that can inspire this transformation.

Systemic change is required, no matter how small these changes may seem at a city level these are key steps. Each and every effort will help us to address our global challenge and will help to reduce carbon cumulatively worldwide.

The established economic system has until now operated upon the linear ‘take-make-waste’ model. It is widely accepted that this is both unsustainable and harmful. We need to retain the value in our materials to minimise

https://link.springer.com/chapter/10.1007/978-3-319-91971-3_8



1.0 Executive Summary

the dependence on scarce natural resources. We need to reduce the creation of waste, re-use those materials that are already available to us, and incorporate recycling as a norm in our everyday lives.

The circular economy values resources, changes the way we consume and supports localised production. Under a circular economy model, Glasgow can become a thriving centre for remanufacturing excellence, developing and embedding skills in our citizens to support this. We believe that the building blocks of a circular economy namely eco-design, sharing and reuse, repair, and remanufacture can focus our action and create the foundations of a circular economy in Glasgow. These actions can be embedded throughout the city to open up business opportunities as well as empowering communities.

We are mindful of the external influences which we cannot easily influence. Products must be designed to last longer, and behavioural change must be

influenced to reject the constant churn of new models which results in a disposable economy and throwaway society. To support these circular principles goods must be built from modular and universal parts to allow for repair and reuse to extend their lifetime. Realising these benefits will mean rethinking our approach to how goods are sourced and produced, how they are used, and what happens at the end of their lifetimes. We must influence this change.

This Circular Economy Route Map presents an alternative economy focussed on fixing and sharing as a gateway to stimulate civic participation. A localised economy will help establish a '15 Minute City' vision within Glasgow. Where everything you need is accessible to you on a local scale, within a 15 minute journey from home. Local communities can be re-energised to enhance self-sufficiency and build resilience as a necessary outcome of the response to the Covid-19 pandemic. Participation can create wealth, high quality

well paid and meaningful jobs, and it can also retain that wealth within communities through local commerce. Furthermore, the principles of the circular economy can also be a template to provide renewable solutions for a Just Transition towards a low carbon city, presenting a keystone in our city's future.

Glasgow City Council recognise our responsibilities to embrace circularity and use the influence of our organisation in shaping the city economy. We acknowledge that education will play a central role in tackling the cultural norms that encompass consumption. We understand the power of public sector **procurement** and the significance of developing a sustainable and circular approach, and the impact that planning and enforcement regimes can have to effect positive change across multiple sectors. We also acknowledge that we can do more to make the most of our assets, such as property and land. Those assets that are currently under-utilised can be a catalyst for

regenerative change. To move forward we must also establish the social, environmental and commercial baselines of the city because only through this type of analysis can we hope to measure progress.

As a post-industrial city Glasgow is going through another radical make over. In the 19th century, its economy relied on shipbuilding and heavy industry. In the 20th century the city went through a substantial realignment leading towards a transformation in the 21st century, whereby the city has become a centre for innovation, finance, education, tourism and culture. To deliver a circular economy in this new landscape will require dedicated collaboration. Glasgow's circular future will rely on innovators, business, academia, investors and the public sector to play their part in ensuring Glasgow becomes a sustainable, inclusive city for all.

<https://www.smartcitylab.com/blog/governance-finance/paris-15-minute-city/>
<https://www.youtube.com/embed/f7P-b0quECY>

1.0 Executive Summary

The business community have a key role to play in creating this systemic change, supporting the need to move away from a 'business as usual' model, to one that encourages and supports innovative approaches to sustainability. We see co-operation and collaboration as being vital to ensure that commerce plays a central role in this circular economy landscape. New market prospects will emerge through technological innovation and the expansion and advances in digitalisation. These new and exciting opportunities must embrace circularity whilst putting fair pay and fair work at the very core of future business models.

The Climate and Ecological Emergency demands urgent action. We need to act now.

This Route Map is presented as our next step on this journey, outlining action, key areas for improvement and illustrating how the circular economy is achievable. We must now take this bold step for the common good.

Only together can we create a truly sustainable Glasgow.



2.0 Circular Economy Mission Statement

The declaration of the Climate and Ecological Emergency has changed both society and the economy forever. Glasgow City Council declared our own Climate and Ecological Emergency in May 2019, emphasising our commitment to address this shared global challenge. Everyone now has to play their part and take action or implement measures to avert the most serious impacts of climate change and environmental catastrophe.

More recently the development of the Covid-19 Pandemic has forced us again to refocus our efforts to create a resilient and strong city. The road to recovery from this pandemic must be one which looks to place sustainability at its core. Whilst refocusing, we must ensure that this is done in a fair and just way. Now is the time for bold steps in our green recovery and we must use these challenges as a catalyst for real and impactful change.

The Circular Economy has been brought to the fore as a solution which presents multiple positive outcomes, namely;

- Designing out waste and pollution
- Keeping products and materials in use
- Regenerating natural systems

The need to develop and embed a sustainable circular economy within the city has never been greater. At a national level, Scotland has been a leading

light in the movement towards circularity. Building on the early work of Circular Glasgow we aim to reflect and shape a circular economy approach at a city wide level to continue this momentum.

Glasgow recognises our collective economic responsibilities but also the positive change that our collective action can effect. Proactive circular interactions between the public, private, third sector as well as civil society will allow us to begin to address the challenges that our city faces, from the reduction of carbon emissions and prevention of wasteful practices, through to the need to address the cultural and historical failings that have led to social inequality and injustice.

This opportunity allows us to redress the ideological shortcomings from **supply-side economics** exposed during the Covid-19 crisis with devastating social impact. As we move towards our target to become **Carbon Neutral by 2030** and adhere to the **Scottish**

Government's Greenhouse Gas Emission declaration to achieve Net Zero emissions by 2045, there has to be reflective and radical economic reconstruction. If these challenging targets are to be met we must fundamentally overhaul the culture that has regarded essential material, energy and human capital as mere financial commodities.

It is globally accepted that the "business as usual" model requires systemic economic change and this city must choose those new economic policies that best serve our collective purpose, represent our aims as the political and business leaders of the city, and reflect the key **values we hold** (such as those defined in the Glasgow City Charter). For the city to both survive and thrive it must meet the needs of our present citizens, support healthy and happy communities with quality spaces and a non-polluted environment.

It is with social inclusivity that we will ensure the success of any economic policy. Let us create an **inclusive circular economy**, that would actively involve citizens and one that integrates

2.0 Circular Economy Mission Statement

“... the end of inequality, unemployment and financial exclusion”. This vision must be a legacy for future generations that is both prosperous and beneficent. This model places social justice, the environment and commerce at the very core of the Route Map.

The circular economy that we envision must satisfy two concepts to ensure that the transition towards circularity does not disadvantage or leave any Glaswegian behind;

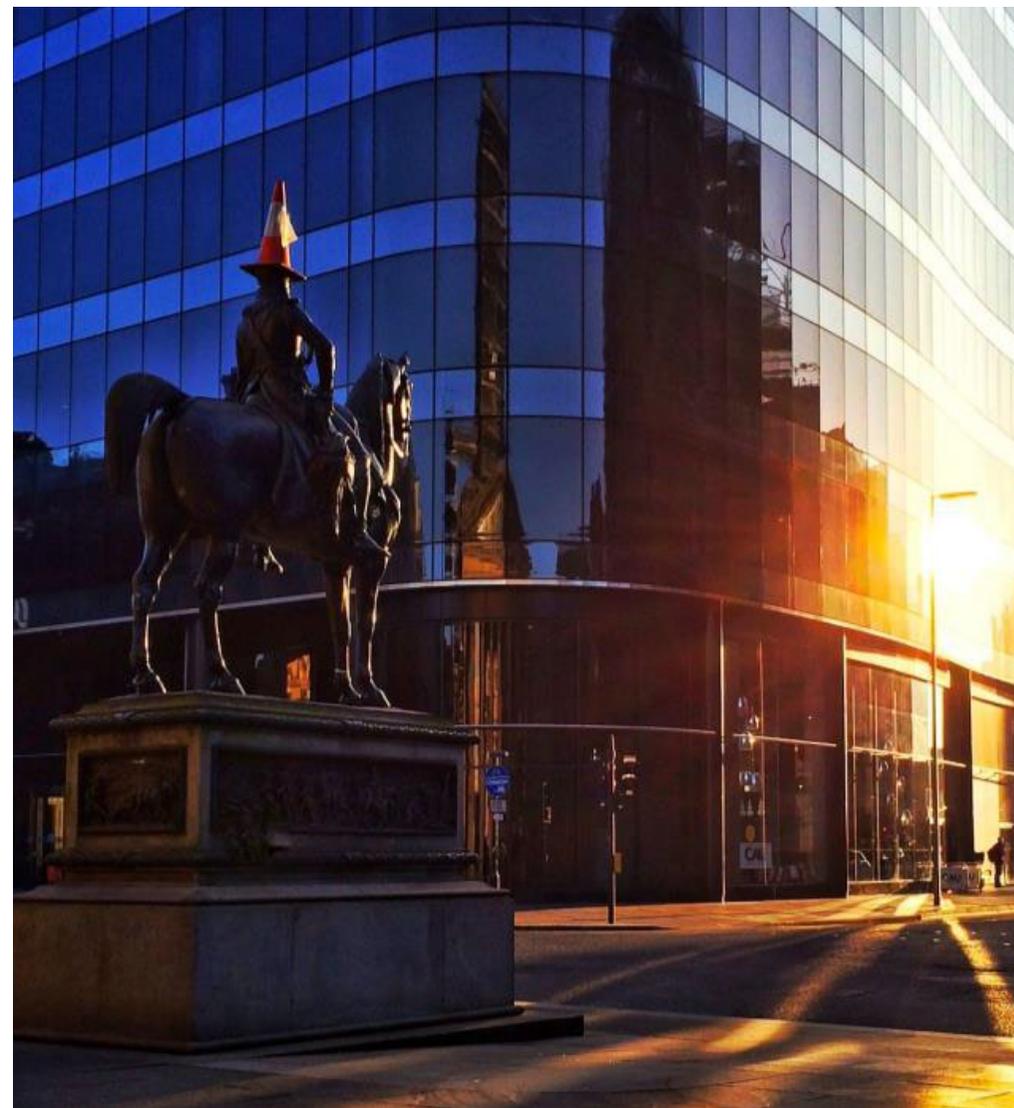
- Establish and mainstream the guiding principles of circularity. This includes environmentally regenerating the city through design, sharing, reuse, repair and remanufacture across the public, private and community sectors of the economy;

- Ensuring the economic model is based upon collaboration, education and co-operation to address social inequalities. This must strive to create opportunities to enhance our citizens' wellbeing

<https://www.glasgow.gov.uk/citycharter>
<https://www.ids.ac.uk/opinions/can-the-circular-economy-design-out-inequality-as-well-as-waste/>
 Huffington Post - Circular Economy 2.0

Glasgow
 now declares
 that it is
 committed
 to being a
 circular city
 by 2045.

<https://www.climateemergency.uk/blog/glasgow/>
<https://dictionary.cambridge.org/dictionary/english/supply-side-economics>
<https://www.glasgow.gov.uk/article/25066/Council-Sets-Target-Of-Carbon-Neutral-Glasgow-by-2030>
<https://www.gov.scot/policies/climate-change/>



Look to the horizon by Mark McPhelim (Breuk Art shop)



3.0 Where are we now?



In 1964 American author, Sheldon Silverstein, wrote a children's picture book called, *The Giving Tree*. It tells the story of a selfless and nurturing tree and her relationship with a small boy as he grows through life. The boy takes everything he needs from the tree in a selfish and unthinking manner leaving the tree as a mere stump. The story is a prescient metaphor for the depletion of nature by humankind. Without a regenerative and caring attitude Mother Nature can only provide humanity with so much before she is exhausted.

The circular economy recognises this degenerative relationship. It looks to reverse the selfishness of humanity and help restore Mother Nature to allow life to continue in a sustainable and caring manner forevermore.

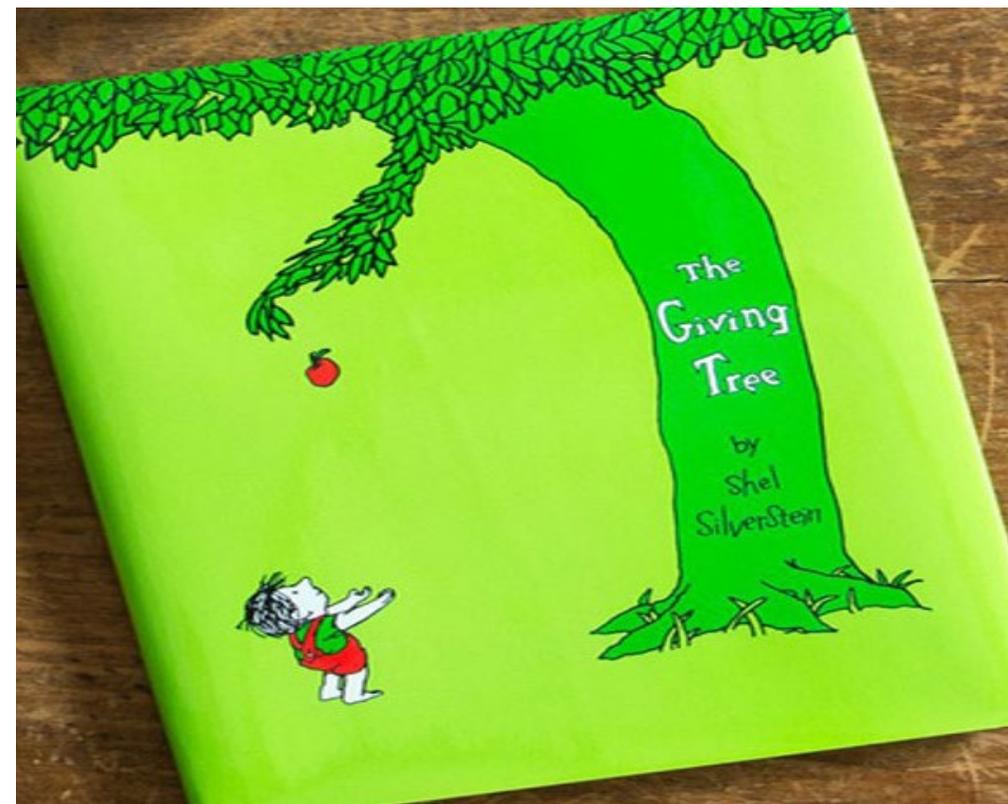
Silverstein may just have meant it to be a picture book but his representation succinctly reflected the damaging and lasting effect man has had, and continues to have, on planetary resources. This critique of governmental economic policy and the fears of resource depletion continued in the late 1960s with the formation of the influential **Club of Rome**, co-founded by the Glaswegian scientist Alexander King.

The first major report they produced was the document **The Limits to Growth** in 1972, which was a warning of resource exhaustion by the end of the 21st Century and a plea to address the degenerative exploitation of nature. That message has continued throughout the intervening decades up until today

with a passionate **open letter** published in July 2020 urging world leaders to act with haste to address climate change.

Climate change is a global problem, we know this, but local solutions contribute cumulatively to resolving the issue.

Scotland is at the forefront of this response and has accepted that the transition to a circular economy is essential to redress this environmental imbalance. A **Circular Economy Bill**, which is currently delayed by the pandemic, will be brought before the Scottish Parliament focusing priorities at a



3.0 Where are we now?

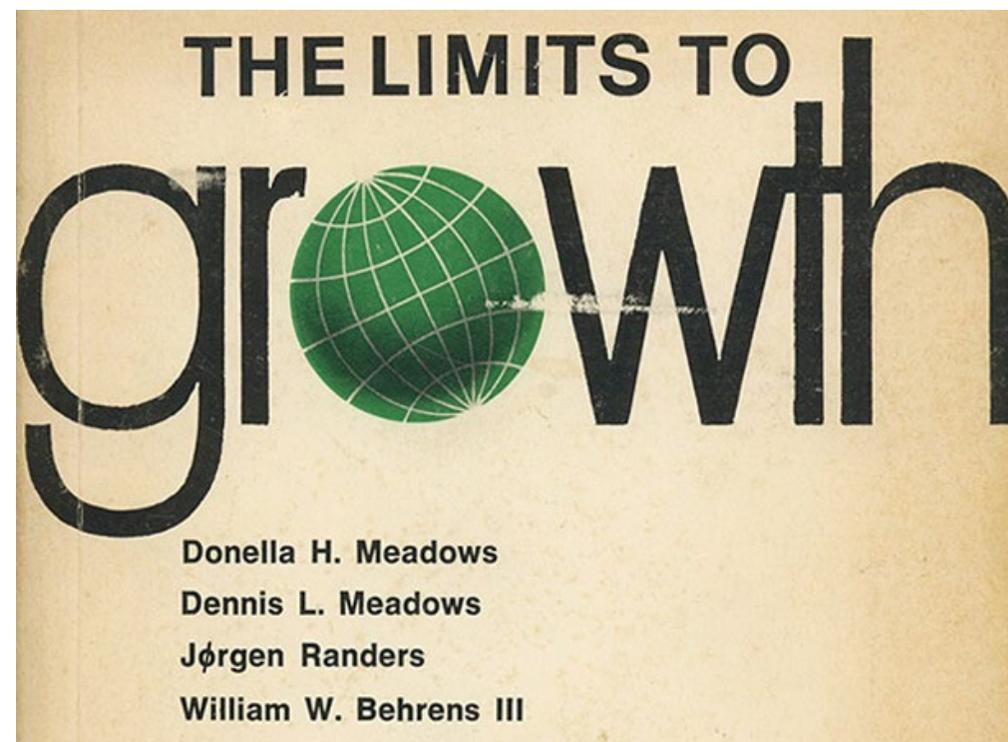
national level. This will build upon their influential strategy document, *Making Things Last*, which was published in 2016.

There is an urgency for Glasgow to react positively to the pressing issue of climate change and this Route Map provides a strategic plan for the city. This is illustrated by the **Ellen MacArthur Foundation** who have been at the vanguard of the circular economy movement and have championed the need to accelerate this shift based on the impact a regenerative economy can have on carbon emissions;

- Greenhouse gas emissions are not falling quickly enough to achieve climate targets and switching to renewable energy can only cut them by 55%.
- The remaining 45% of emissions come from how we make and use products, and how we produce food.

At a city level Glasgow has already acted as torchbearer for circular business practice through the campaigning work by the **Glasgow Chamber of Commerce** in a business led approach that has laid the groundwork for this Route Map. This Route Map marks the next step in Glasgow's city wide approach to a circular economy.

<https://www.youtube.com/watch?v=XFQZfeHq9wo>
<https://clubofrome.org/>
<https://clubofrome.org/publication/the-limits-to-growth/>
<https://climateemergencyeu.org>
<https://www.gov.scot/news/circular-economy-bill/>



3.1 Glasgow Chamber of Commerce

Circular Glasgow is an initiative of the Glasgow Chamber of Commerce supported by **Zero Waste Scotland** and Glasgow City Council.

The work carried out by the Glasgow Chamber of Commerce set out a programme for Glasgow's business sector. It outlined practical steps to work towards supporting economic development, innovation, increasing competitive advantage, resource recovery and reuse, and carbon emission reductions. The Chamber's outreach to its diverse SME membership is a vital component and inspires businesses of all sizes to future-proof their organisations by adopting circular strategies. To date, Circular Glasgow has engaged with over 650 business representatives through its activities and support mechanisms continues to influence, raise awareness and educate of the benefits of adopting circular business models. Circular Glasgow also offers Circle Assessments, workshops, open forum information events and stakeholder

engagement conferences – both locally and international. Circular Glasgow also delivers a programme of business engagement highlighting opportunities of the circular economy and have built a group of **19 ambassadors** from businesses across Glasgow to share their experience and knowledge of the circular economy.

In 2015 Circular Glasgow employed the not-for-profit Dutch economic researchers, **Circle Economy** to compile a city scan to quantify and understand in a tangible way how material flows through different sectors of the city. This Circle City Scan would also identify the key opportunities for implementing a circular economy approach. Circle Economy believe that embedding circularity could allow the city to move towards a Just Transition and help provide meaningful jobs, enhance wellbeing, contribute to a thriving society, and a more equal distribution of wealth, which aligns entirely with this Route Map. Their **Circle City Scan** showed action areas that could be targeted, noting sectors that are especially important from a business aspect:

- The Local agenda. The Circle City Scan identified three key sectors of economic importance to Glasgow: education, manufacturing and health. Combined, these three sectors provide over 117,500 jobs and over a quarter of Glasgow's economic value.
- Material flows. Mapping out the environmental impacts of those economic sectors with strong stakeholder links to the private business sectors, coupled with an economic value of circa £329.7 million, Manufacturing was identified as having the greatest circularity potential, particularly within the food and beverage sector.
- Circular innovations. Detailed opportunities were identified in the food and beverage sub-sector focussed upon;

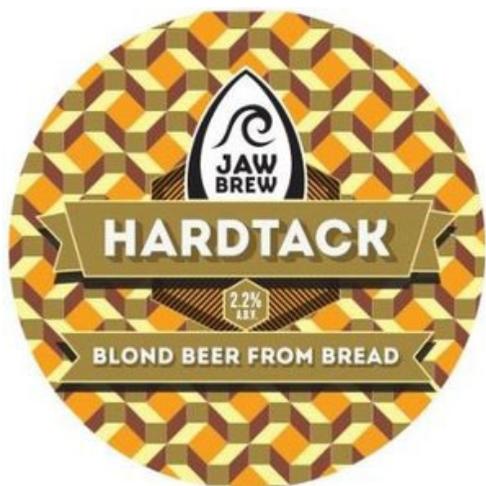


Heat Recovery: One key example demonstrated heat recovery from bakery ovens could save 15% – 30% of the energy currently used in the baking process.

Aquaponics: This combines aquaculture (the raising of fish) with hydroponics (soil-less crop production), leading to substantial savings in water use (90%) in comparison to traditional farming, and derives multiple benefits from local production, distribution, supporting jobs and resilience.

<https://www.ellenmacarthurfoundation.org/our-work/activities/climate-change>
<https://www.glasgowchamberofcommerce.com/>
<https://circularglasgow.com/>
<https://www.zerowastescotland.org.uk/>
<https://circularglasgow.com/circular-glasgow-ambassadors/>
<https://www.circle-economy.com/>
<https://circularglasgow.com/reports-and-publications/>

3.1 Glasgow Chamber of Commerce



Bread to Beer: This has become the most recognisable project from the Circular Glasgow initiative. Reuse of surplus and leftover bread rolls to create the central ingredient of a bespoke craft beer. This is an exciting example of two local businesses – Aulds the Baker and Jaw Brew joining in collaboration. **Case Study** This process is also possible as “Beer to Bread” where any spent grain from

the brewing process can in turn be used to replace up to 50% of the flour needed to produce bread in the baking industry.

The Circular Glasgow initiative has engaged widely with the business community and has led much of the work here, bringing partners to the table to raise the ideas of circularity and build capacity in the private sector. This has been

recognised internationally by groups such as the **World Economic Forum**, the **Ellen MacArthur Foundation**, **C40 Cities**, and the **European Investment Bank** which has elevated Glasgow’s status within this field.

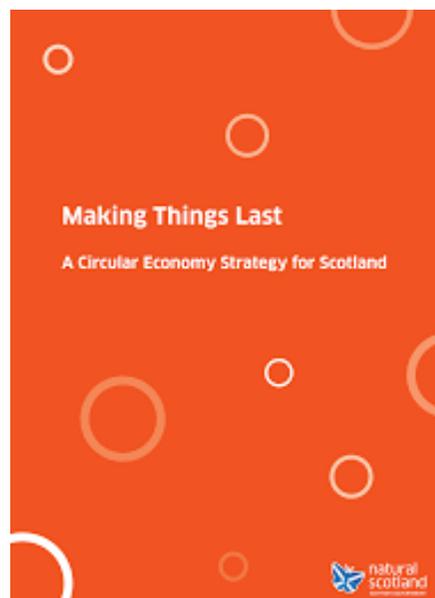
Further to this there has been a collaborative business to business knowledge exchange partnership developed with

Circular London. This will continue to support Glasgow’s ambitions to be a leading circular city and promote initiatives which will help businesses across the UK future-proof their operations by using circular economy principles.

3.2 Making Things Last

In 2016 the Scottish Government developed a strategy document entitled Making Things Last. This set out priorities for the nation, moving towards a more circular model, where products and materials are kept in high value use for as long as possible. It builds on Scotland's progress in the zero waste and resource efficiency agendas. The government believe that a more circular economy will benefit the environment by cutting waste and carbon emissions. That it can reduce reliance on scarce resources, improve productivity

and be a catalyst for business by opening up new markets. It can also improve resilience and help communities to access lower cost options for the goods we need and even to develop economic opportunities for social enterprise projects.



The Scottish Government are aware that realising these benefits will mean rethinking the approach to how goods are supplied, how they are used, and what happens at the end of products' lifetimes. With this in mind the strategy prioritised four sectors:

- Food and drink. This is a significant source of carbon emissions; a more circular approach to the beer, whisky and fish sectors, could lead to potential savings of half a billion pounds per year;
- Remanufacture, especially in the automotive, defence and electronics industries. This is already contributing £1.1 billion per year to Scotland's economy with potential to grow by a further £620 million by 2020;
- Construction and the built environment. This accounts for approximately 50% of all waste in Scotland and is a major influence on the efficient use of resources; and,

- Energy infrastructure. This offers considerable opportunities, such as the reuse of equipment and material from older generations of wind turbines and decommissioned oil and gas platforms.

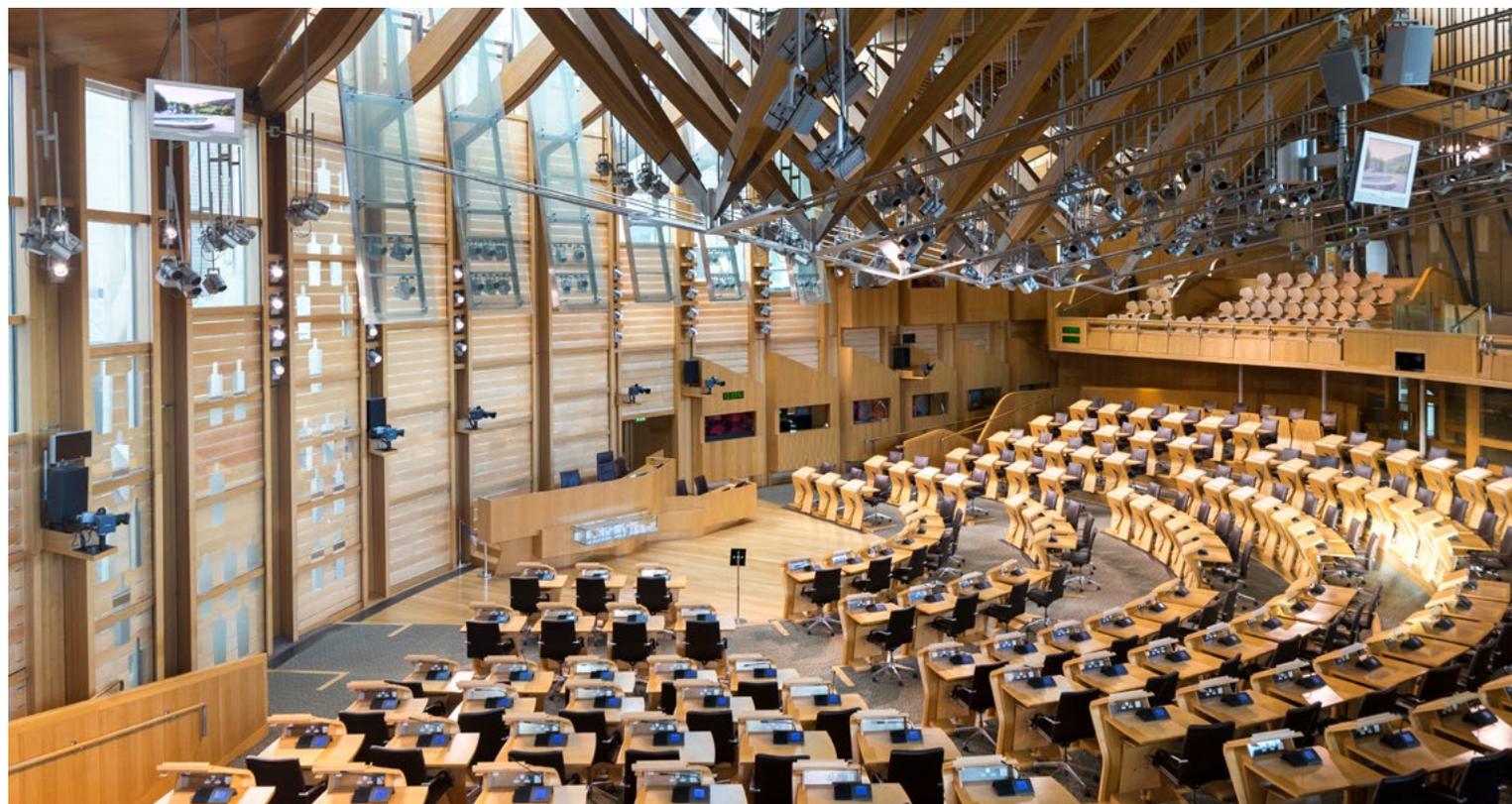
Two of the strategy's key elements are:

- To develop a more comprehensive approach to producer responsibility. This will be done by setting up a single framework for all product types that drives choices for reuse, repair and remanufacture, while more fully exposing and addressing the costs of recycling and disposal; and;
- To reduce all food waste by 33% by 2025. The first such target to be set in Europe.

<https://thecirculars.org/our-finalists>
<https://www.ellenmacarthurfoundation.org/our-work/activities/circular-economy-in-cities/case-studies>
<https://www.c40.org/researches/municipality-led-circular-economy>
<https://www.eib.org/en/about/initiatives/circular-economy/index.htm#>
<https://www.lwarb.gov.uk/partnership-between-glasgow-and-london-launched-to-help-the-uk-achieve-ambitious-year-of-climate-change/>
<https://www.gov.scot/publications/making-things-last-circular-economy-strategy-scotland/>

3.3 The Scottish Government - Circular Economy Bill

Due to the current ongoing pandemic the 2020 timeline for the Scottish Government to introduce the Circular Economy Bill into legislation has been delayed. The Bill, when presented, will build upon the influential strategy document, Making Things Last, detailed above.



The new bill is an additional response to the complex action required to address the Climate Emergency. This proposed legislation will sit alongside a variety of strategic measures being brought forward to tackle the Climate Emergency declared at both national and city levels.

The proposed bill was subject to a six week period of public consultation and concluded in December 2019. The responses will help shape the final piece of primary legislation that will be brought before the Scottish Parliament.

3.4 Sustainable Recovery

The Covid-19 global pandemic must be a touchstone for systemic change.

The pandemic has shone a spotlight on the failings of the prevailing economic system.

Delays and failures to provide essential medical supplies when critically needed was due to a structural dematerialisation of the public and healthcare sectors by successive governments. This was compounded by an addictive nationwide dependence on cheap imported products predominately from East Asia.

The pandemic undoubtedly highlighted the fragility of hyper-globalisation and its complex international supply chains. With government intervention required twice in a decade to prop up this economic model, it would be wise to take stock and consider returning to more localised equitable system. The forty year globalised neo-liberal project to reduce government, the chronic depletion of essential public services throughout the UK, to prioritise GDP, and promote consumer capitalism has presented us with a set of disastrous outcomes. The current economic conditions have resulted in widespread low paid and insecure jobs, enduring structural poverty, and social exclusion throughout the system. Wealth and income inequalities have grown and as a species we are facing a catastrophic international climate emergency. Health implications for citizens, consumers and producers

<https://www.friendsprovidentfoundation.org/library/resources/moving-beyond-neoliberalism/>
<https://www.euro.who.int/en/publications/abstracts/circular-economy-and-health-opportunities-and-risks-2018>

operating in the current model have also been mapped by the World Health Organisation whose findings fully support the shift to a circular economy and the societal benefits that it can bring transnationally.

Governments around Europe are using terms like “Green Recovery” and “Build Back Better”. This widespread re-evaluation of values and priorities must begin the process of embedding circular economic principles into everyday life. This determination to build back stronger and more resilient through the circular economy which would combine economic opportunity and benefit wider society and the environment has been publicly supported by 50 global political and industrial leaders led by the Ellen MacArthur Foundation.

A circular economy may not have halted the spread of the virus. However, with less complex local supply chains offering dependable sustainable material resources, secure food, and guaranteed

energy supplies it would help make communities more robust and self-sufficient from most types of external shocks, especially those that are climate triggered. A local production economy could provide fair paid meaningful jobs while building resilience into the city framework which is outlined in both the city’s climate change adaptation and resilience commitments.



3.5 Resilient Glasgow

practice across the city. This considers the importance of nature based solutions, tackling vacant and derelict sites as well as innovating to deal with the local impacts of global climate change.

- Innovating for Fair Economic Growth. This pillar highlights the importance of supporting a flexible and creative economy, which will in turn support new urban solutions, business development and new technological ideas and innovation. This includes supporting new and existing businesses to grow in a fair way. It also includes tackling in-work poverty, in-work progression, and creating meaningful work for Glaswegians.
- Fostering Civic participation. This pillar focuses on the importance of strong community cohesion, building capacity among citizens and decision-makers, enabling them to apply resilience thinking to their daily work and lives.

It also looks at community empowerment and enabling communities to take ownership of local assets and making local decisions. This pillar aims to tackle any mistrust and support the need for transparency between public agencies as well as transparency in our interface with citizens, ensuring that capacity building is delivered.



3.6 Climate Emergency

In response to the overwhelming scientific evidence indicating that the continuing rise in global temperatures is linked to carbon intensive human activity, Glasgow City Council declared a Climate and Ecological Emergency on 16 May 2019 and a Climate Emergency Working Group was created. After widespread public consultation the report from the working group passed through Committee and proposed 61 recommendations, some of which directly address the requirement of integrating circularity into the city

economy. The following recommendations from the climate emergency report are of particular note and have been incorporated into this Route Map:

Recommendation 1. The Council commits to working with the business community, third sector and Glasgow's citizens and communities to achieve a carbon neutral Glasgow by 2030.

Recommendation 3. Acceleration of the establishment of an energy services company takes place for the city as a necessary step towards producing more locally generated and distributed low carbon energy.

Recommendation 20. The Council engages with interested local authorities and other stakeholders to initiate a formal assessment of the potential for making the transition to a public transport system that is free to use.

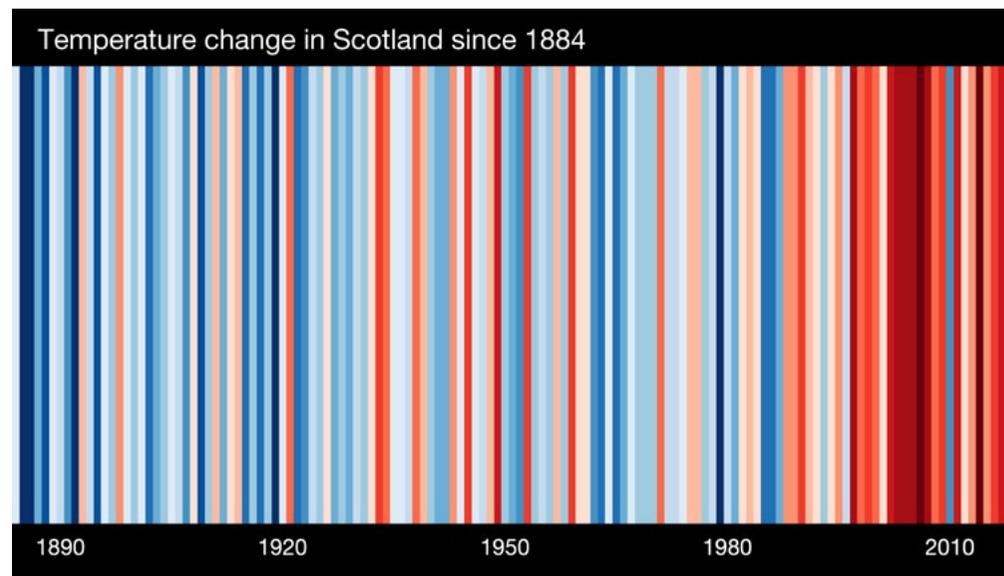
Recommendation 36. The Council and its partners publish a sustainable food strategy for the city within the next year and that the Council considers making space for food growing a requirement of new housing developments.

Recommendation 38. The Council and partners develop a local version of the Scottish Government's Just Transition Commission and plan actively for the shift to a carbon neutral economy.

Recommendation 39. The development of a Circular Economy Route Map for the city takes place and support is given for the Circular Economy Bill in this term of the Scottish Parliament.

Recommendation 61. The Council acts as an exemplar organisation for the city and develops a programme of carbon reduction measures for its own estate and activities in response to the target set in this report.

Figure 1. Temperature change in Scotland from 1884 to 2019



3.7 Challenges and Opportunities – COP26

The 2021 United Nations International Climate Change Conference, otherwise known as COP26, will take place in Glasgow between the 1 and 12 November 2021.

Postponed due to Covid-19, the Bureau of the Conference of the Parties to the UNFCCC (United Nations Framework Convention on Climate Change), along with its UK and Italian partners, agreed to reschedule this important event. The key purpose of this International Conference is to seek global action to safeguard the future of the planet and its inhabitants from global warming. This will seek to ensure that the commitments brokered in the [2015 Paris Climate Agreement](#) to keep any global temperature rise below 1.5 degrees centigrade are maintained. It is now even more pertinent for the world as national governments look to recover from Covid-19 and to reconstruct cleaner, greener economies. The conference will include participation from more than 1,000 observer organisations from the United Nations, third sector, and sub-national groupings. Each COP has also seen many thousands of citizen activists come to the host city to have their voices heard in formal and less formal ways. COP26 will see the largest



UN CLIMATE CHANGE CONFERENCE UK 2021

IN PARTNERSHIP WITH ITALY

gathering of world leaders ever experienced by Scotland or the UK.

On a local basis, the Council is also keen to ensure that it can achieve a lasting legacy from its place on the world stage in the run up to COP26 and during the event itself. Glasgow's story is, in many ways, the world's story. It charts a course from the carbon-intensive industries of the past to the emerging low carbon and sustainable developments of the present and future. More than half of the world's population now

live in cities, so the solutions to the global climate and ecological emergency will have to be delivered through its cities. As a result, Glasgow is ideally placed to host COP26 and, at the same time, the event will help to add momentum to the city's own low carbon ambitions and a raft of work that will be undertaken to address our climate and ecological emergency.

3.8 Zero Waste Scotland – Driving the Circular Economy Forward

Zero Waste Scotland exists to lead Scotland to use products and resources responsibly, focussing on where the greatest impact on climate change can be achieved. Through the Circular Economy Accelerator programme, Zero Waste Scotland informs and inspires businesses to move towards circular business models and resource efficiency, while offering support and funding to help with this transition. Support and funding mechanisms include:

- The **Circular Economy Business Support Service** - Delivers tailored, expert, one-to-one consultancy directly to small and medium sized businesses across all sectors in Scotland looking to develop circular business models. It's designed to help companies explore more circular ways of doing business that can result in resource efficiencies, improved profitability, higher quality products, increased customer base and alternative supply chains.
- The **Circular Economy Investment Fund** - an £18 million funding opportunity for small and medium sized businesses and organisations who have already tested their circular model, and are looking for investment to further develop this to create a more circular economy.



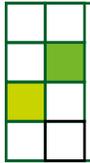
Zero Waste Scotland is also delivering support using a place-based approach, in addition to supporting key sectors, to nurture the development of the circular economy at a local level. Cities are ideal locations for new circular business models due to population and resource density in compact geographic areas. By concentrating on a specific location, it is possible to understand and raise awareness of the benefits of a circular approach, support opportunities in 'horizontal'

sectors, build relationships with local stakeholders and link with other relevant activity taking

Zero Waste Scotland works in partnership with Chambers of Commerce in four locations including Glasgow, as part of its Circular Cities and Regions programme, to deliver a tailored programme of business engagement to identify and exploit the key sectors and businesses for circular growth. The place-based approach to developing the circular economy in Scotland encourages and enables local flexibility to respond to issues and opportunities in different areas. It also helps overcome organisational and sectoral boundaries, encouraging collaboration and community involvement.

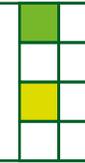
<https://www.ukcop26.org/>
<https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>
<https://ceaccelerator.zerowastescotland.org.uk/>





3.9 Organisation for Economic Co-operation and Development (OECD)

Peer Review



Glasgow City Council, in conjunction with Zero Waste Scotland and Circular Glasgow at the Glasgow Chamber of Commerce, have been collaborating with the OECD (Organisation for Economic Co-operation and Development). This will deliver a work package as part of their “Economics and Governance of the Circular Economy in Cities” programme, using Glasgow as a case study.

This will culminate in an in-depth case study identifying opportunities, barriers and solutions to drive the transition to a circular economy in Glasgow. The OECD will also be publishing a wider report on the findings of the overarching programme which will include a set of indicators. These indicators focus on the implementation and governance of the circular economy at city or regional level. It is expected that the full report will be published in autumn 2020 and the set of indicators can be adopted at city or regional level from this point.



Honey, I shrunk the kids by Sam Bates. Photo by Louise Miller Glasgow City Mural Trail

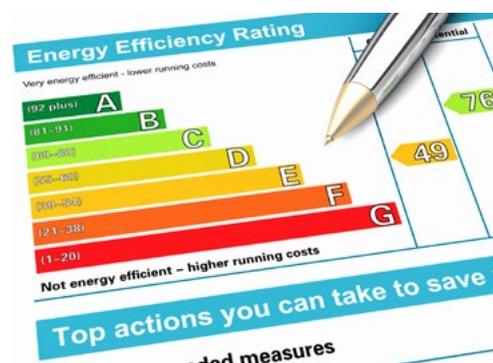
<https://www.zerowastescotland.org.uk/circular-economy/business-support-service>
<https://www.zerowastescotland.org.uk/circular-economy/investment-fund>
<https://www.oecd.org/environment/waste/recircle.htm>
See Appendix 1 for an interim report

4.0 Looking ahead – Circular Vision

Glasgow’s transition to a fully circular economy will take time and effort to establish. By declaring a vision to achieve city circularity by 2045, Glasgow also aligns with Scotland’s Greenhouse Gas Emission commitment to achieve net zero emissions by 2045.

As technologies and collaborative networks improve there will be many gains in our knowledge and understanding. Efficient design will also aid the ongoing evolution of the circular economy. It may be that some processes currently cannot fully close material loops between sourcing and production. In the interim and transitional phase, we will still consider a semi-circular approach as highly beneficial.

In many cases the benefits of the shift to a circular economy may not be obvious on a local scale. Where the products are produced overseas the impact may be completely invisible. This aspect of circularity needs to be transparent and more widely understood. The



existence of embodied carbon and consumption-based emissions is explored later in the document.

Our response to the existential threat of climate catastrophe must remain at the forefront of minds on our way forward. It is based on this sense of shared responsibility, global solidarity and the welfare of humankind that we must pursue bold action. Any improvements we can influence, encourage and implement represent small victories to be cherished in the knowledge that we are contributing to this global challenge.

The circular economy offers significant local opportunities that can directly benefit our citizens especially through education and upskilling prospects, diverse employment opportunities, better health outcomes, affordable and energy efficient housing solutions, and empowerment through an inclusive and participatory approach to economic structures.

This Route Map will remain a living document, and it is essential that it does so. Each step will uncover new actions, generate new ideas, encourage participation and support innovation. To this end we will not rest on our laurels and continue to address the next key actions in this journey. This document will form the strategy for 2020 to 2030 with a review document scheduled for 2025 to quantify the journey we have been on, analyse the successes and identify areas for improvement.

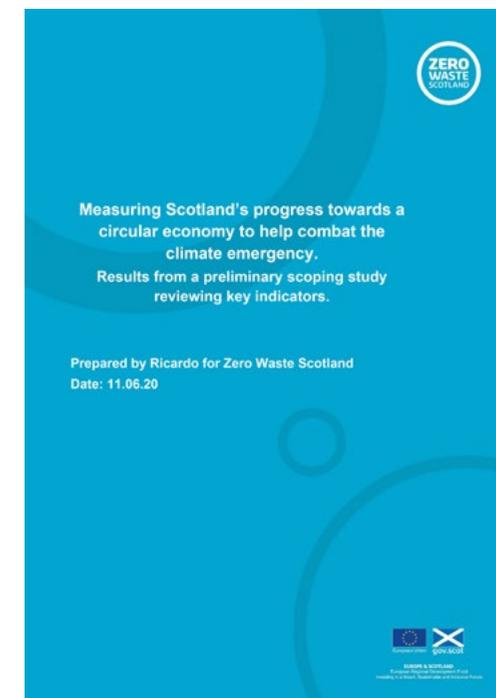
We eagerly anticipate the production of the OECD, detailed response into building a circular economy in Glasgow, and expect that this will uncover additional actions for us to collectively address. Should it be necessary, this document will be revised to reflect this independent and in-depth study to ensure that Glasgow is pushing ahead and continuing towards a sustainable future.

4.1 Metrics and Indicators

Measuring and monitoring progress and the impact of our actions is essential. It is important to any work programme, and our ability to evaluate the transition to a circular economy is no different.

Given the importance of evaluation, the development of circular economy metrics and indicators is being researched at a number of levels and by many organisations. This is recognised internationally as a challenging issue, however there is work being undertaken to develop a robust, consistent, valuable and practical regime. The development of metrics to measure the impact of circular economy is an area which is being extensively explored by organisations such as ACR+ (Association of Cities and Regions for sustainable Resource management) and by Zero Waste Scotland at the national level. Zero Waste Scotland recently published a report⁴³ which assessed the value of existing metrics and found that no single regime (of those currently available) could be used to adequately measure Scotland's progress on adopting a circular economy. The authors did identify that a range of metrics could be developed and used collectively, and that two datasets in particular (Scottish material flows accounts

and Scotland's carbon footprint) will be key to this. The most recent thinking is that at the city or regional level, monitoring should initially focus on the governance underpinning the transition with impact measured nationally once a robust and realistic set of indicators has been established. It is recognised that there is a need for a consistent approach to measuring impact and there is a considerable amount of work currently being undertaken in this area as previously stated. Subsequently, there will be a need to consider how an impact metric can be extrapolated for the local level and there is an opportunity here to connect with the big data and smart cities agendas in terms of understanding data sources, data availability and gaps.



People Make Glasgow



5.0 What are the Guiding Principles of a Circular Economy?

The circular economy is an industrial system which has significant implications for society as a whole. Building a circular economy is a complex and intertwined process. Making changes to the established status quo or “business as usual” approach requires a robust and consistent framework. There are a series of guiding principles (explained in section 5.3) that have been central to the development of this strategy and will serve as the basis for future decision making and key action planning.



5.1 Definition of a Circular Economy

The Ellen MacArthur Foundation, a charity founded 2010 to accelerate the transition to circularity, has become a leading influence on business, government, and academia. They define the circular economy as; “... a systemic approach to economic development designed to benefit businesses, society, and the environment. In contrast to the ‘take-make-waste’ linear model, a circular economy is regenerative by design and aims to gradually decouple growth from the consumption of finite resources. Based on 3

principles - Design out waste and pollution, Keep products and material in use, regenerate natural systems”

Ellen MacArthur Foundation, Circular Economy in Detail

This represents a necessary change in the manner in which our society values, produces and consumes. The circular economy refers to a regenerative and restorative economic system that mirrors natural cycles of biodegradation. There is no real waste in nature because waste products become the constituents of new life. Circularity aims to

optimise resource usage, reduce waste and offers potential to innovate novel sustainable creation opportunities.

Accelerated improvements in technology have led to the ever reducing financial costs associated with producing items which has become the catalyst for a

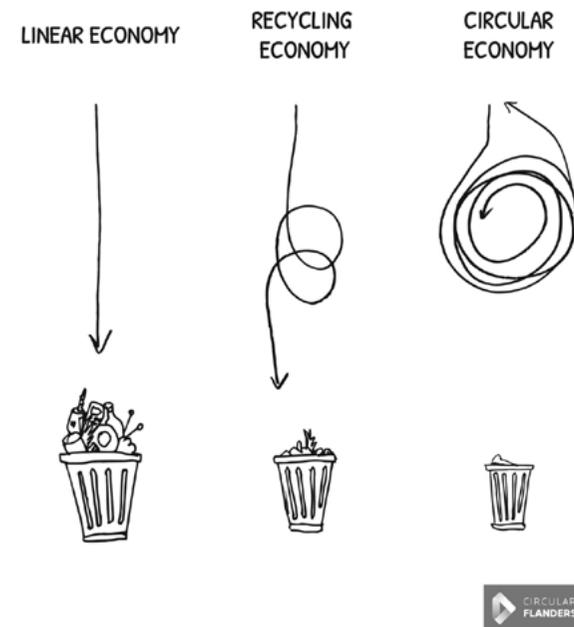


Figure 2. – The circular economy by Circular Flanders

<https://www.ellenmacarthurfoundation.org/explore/the-circular-economy-in-detail>

5.1 Definition of a Circular Economy

disposable society. Convenience has fuelled and devalued precious environmental resources and developed wasteful habits that permeates all of society from individuals to major corporations. To meet climate targets, a fundamental shift is required in the way the economy functions and creates value. It will require education to create a culture change, raising both awareness and skill levels to move away from today's "take-make-waste" linear model towards an economy that is regenerative by design, and sustainable in practice.

The diagram (right) developed by the Ellen MacArthur Foundation indicates, not only the differing sectors and diverse processes but also the overall complexity of the circular economy.

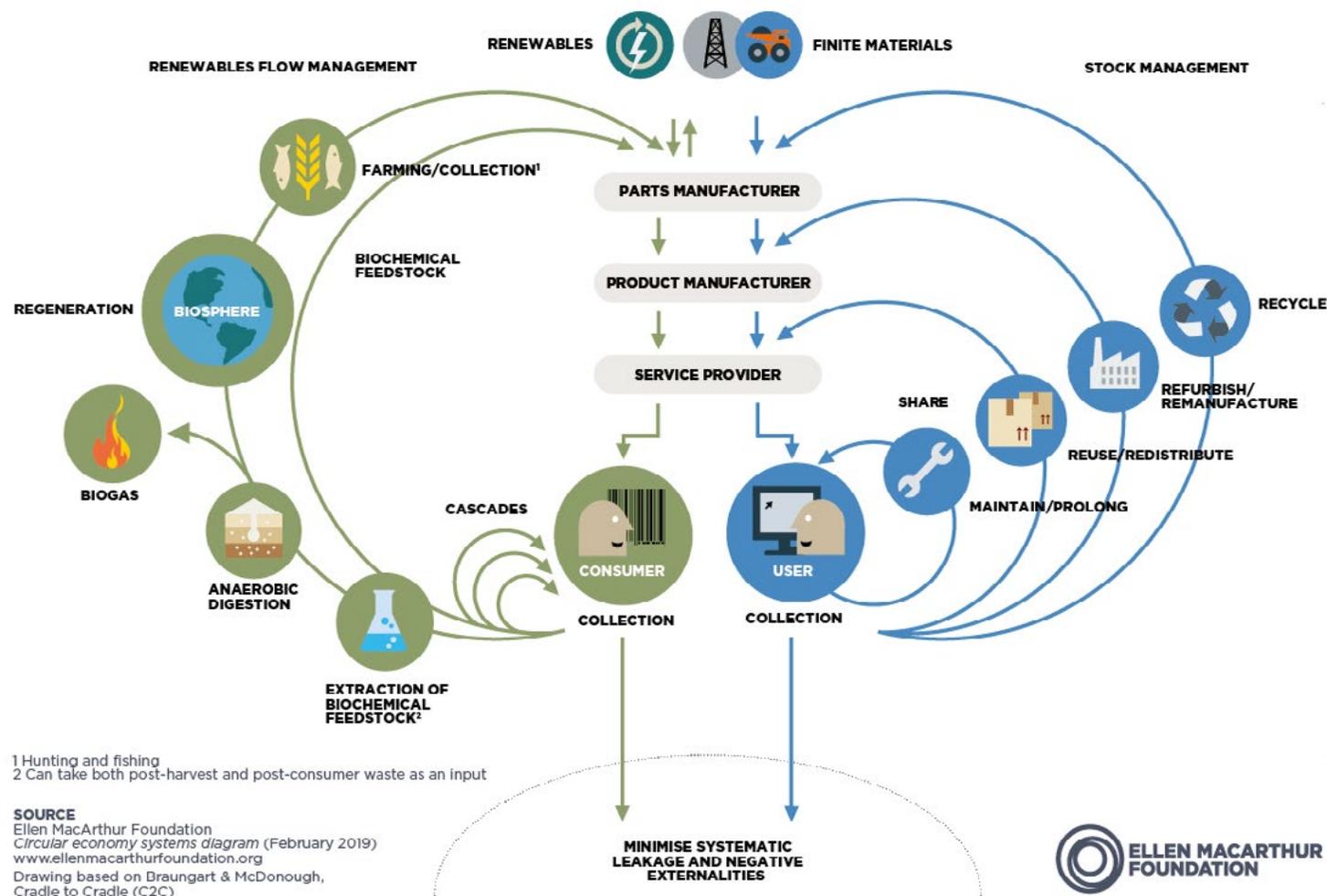


Figure 3 - The circular economy systems diagram

5.2 Circular Economy at a City Level

For Glasgow, the circular economy and the challenge to preserve and regenerate natural resources cannot be seen in isolation.

It is the solution to accelerate systemic change and deliver a Glasgow as a sustainable city. The benefits for the social fabric of the city is without question from job creation, educational opportunities, social welfare and advancement to significant environmental improvements that can all be achieved through a circular approach. As we have seen the circular economy is already a national priority and we can build on this momentum to drive strategic changes forward at a city level. The advantages to establishing the circular economy are numerous and achievable. The potential economic windfall from circularity in the city is an attractive incentive for innovative public/private business creations. A shift to a circular economy will be complex and challenging, which will involve multiple stakeholders.

Therefore, through collaboration and co-operation opportunities can be opened up for business with new ways of working and new supply streams that could breathe life into a diversified city economy

that would be a sustainable alternative to “business as usual”.

By taking advantage of the manageable size of the city, the compact population, the physical layout and technological connectivity Glasgow is already well positioned to accelerate circularity into public sector and business development. With an established infrastructure and commitment to sustainability, nurturing the concept of the circular economy within the city's institutions will undoubtedly require a systemic change, which can be achieved through;

- further embedding sustainability and circularity into public policy, procurement and planning strategies, using public finances effectively to ensure that circular principles are prioritised and promoted within every viable project
- raising awareness of wasteful practices in the public and private sectors and promoting the decoupling of economic growth

from the consumption of finite resources

- revaluing and redirecting material waste back into manufacturing processes and away from landfill
- facilitating and inspiring eco-design and circular innovation to effectively design out waste from the city economy
- educating business leaders and citizens on the urgent need to think sustainably and recognise the positive impact of considerate consumption and low carbon circular work practices
- providing a city environment that attracts sustainable development, regenerates communities and builds economic, natural and social capital
- develop a lasting and transformative transition to renewable energy sources and champion the increased use of

5.2 Circular Economy at a City Level

renewable materials in industrial processes

- nurturing the relationships and active participation and collaboration between political bodies, public sector, businesses both small and large and local communities
- empower citizens, social enterprises, SMEs and co-operatives to grasp the opportunity to create and share the benefits of this economic transformation

A truly circular economy can have a major impact on all layers of society. Improving the sustainability profile of the city through many means including new markets where the opening up of new opportunities could be a motor for environmental change, commercial success and social improvement. The main themes that uphold the principles of the circular economy on a practical level from the smallest of craft industries to the largest manufacturing factory are diverse

and varied but they mostly follow functions such as sharing, eco-design, reuse, repair and remanufacture before reaching recycling. For this to be realised there must be a fundamental culture change within all sectors of the economy including financial support for circular business initiatives.

Innovation will also play a major role in how the city adapts to a circular economic model. This will require not just entrepreneurial initiative it will also require financial support, access to facilities and a skilled workforce. Due to the reductive pressure of the free market, Glasgow currently ranks in the bottom five cities UK-wide for **business start-up survival, with only 37.5% of businesses surviving the first five years.**

Circular businesses will face this same challenge if the current economic arrangements are not altered to prioritise sustainable initiatives. If we demand a commitment and adherence to circularity and sustainability

from small innovative or community businesses we must ensure financial and property arrangements to prioritise circular business plans and develop new flexible and long term arrangements to allow for their growth and maturation in Glasgow.

We also see the circular economy as a function of localising the economy and fostering community trust and participation. Through this model we can go some way to create a city of villages, establishing a similar concept to the **"ville du quart d'heure"** (15 Minute City) as proposed by Mayor Anne Hidalgo in Paris. Mayor Hidalgo sees this pillar as a major tool to decarbonize the economy, reduce vehicle usage and emissions, and make Paris a healthier city. She also identifies the prospects of creating more facilities and commercial opportunities within local communities to enhance self-sufficiency and build resilience. In the recently published Programme for Government from the Scottish Government, **Protecting Scotland,**

Renewing Scotland there is a similar commitment as a response to the effect of the Covid-19 pandemic. To support the idea of Liveable Neighbourhoods there is a commitment to create accessible places where people can meet their daily needs within a 20 minute walk from their house enabling people to live better, healthier lives, with thriving local economies, and supporting net zero ambitions. All of which are aligned to this Route Map.

5.3 Guiding Principles of a Circular Economy





5.3 Guiding Principles of a Circular Economy



Recognising the intrinsic worth of materials, not just focusing on financial worth.

It is important to understand that value doesn't always have a definable financial worth that can be measured easily on a balance sheet. For Glasgow we must promote the intrinsic values to be achieved from;

- Environmental improvement by reducing carbon and pollution levels
- New local resourcing, "one man's rubbish is another man's treasure"
- Enhanced, secure and shortened supply chains ensuring continuity of business practice
- Social improvement in creating new opportunities for employment
- Enhanced wellbeing from the creation of life opportunities through education and new career prospects

- Substantial reputational value to be gained from conducting business in a sustainable and considerate manner

One important field of expression where residual value can create transformational change by bringing people together to challenge social, political, and ecological issues is the arts. From time immemorial the arts and cultural expression have played an integral role in binding communities, developing common heritage and underpinning societies. The arts help to convey difficult and challenging messages to society and the shared experience of how artwork is consumed can also inform as well as entertain. Artwork in the form of the written word, music, graphics, sculpture, film and TV are all intrinsic to our global response to climate change and can play a vital role in the circular economy too. Artists can help citizens filter the torrent of data and information they face each day and empower

individuals who are normally fragmented into a cohesive movement. The importance of the arts was apparent throughout the Covid-19 lockdown and it will be vital to harness that dynamism to engage citizens in what will be a collective challenge against climate change and to encourage the widespread adoption of the circular economy in Glasgow.

https://www.understandingglasgow.com/indicators/economic_participation/overview

<https://www.smartcitylab.com/blog/governance-finance/paris-15-minute-city/Protecting Scotland, Renewing Scotland>



5.3 Guiding Principles of a Circular Economy



Reforming the concept of ownership under the circular economy to maximise the use of products.

Known informally as the sharing economy, leasing or servitisation, there is the prospect of treating products as assets that can be used by multiple customers, multiple times. Manufacturers can retain ownership and provide shared access, or access can be leased under a service agreement. Customers pay regularly for continued use of a product over an agreed time span, after which they return the product so that it can be remanufactured, repaired, re-used or recycled. The manufacturer retains ownership and responsibility for delivery, maintenance and take-back, which encourages circular design and ensures products are thought of as long-term asset investments.



Figure 4 - Schiphol Airport internal lighting.

- Schiphol is thought to be one of the most sustainable airports in the world. When they underwent a large refurbishment project they saw an opportunity for making further progress with sustainable LED lighting. Working alongside Philips, the airport is now **leasing their lighting** from the Dutch multinational. The benefit is they have relinquished the ownership liability and don't require to constantly upgrade, maintain or manage their own lighting waste streams. The circularity aspect comes from the service provider and manufacturers having to ensure durability, reliability of service and improve design for future reuse or remanufacture to maximise value of their asset.

<https://www.philips.com/a-w/about/news/archive/standard/news/press/2015/20150416-Philips-provides-Light-as-a-Service-to-Schiphol-Airport.html>



5.3 Guiding Principles of a Circular Economy

A sharing approach enables localised community projects to thrive.

Figure 5 - Community Fridge in Dundee



These show the concept of sharing and circularity can be a caring model to help reduce waste and reduce consumption while raising social consciousness and community solidarity.

- The **community fridge** project which started in Germany and Spain and has spread throughout Europe is one such initiative that shows the social benefits of sharing. It enables food to be shared within a

community minimising food waste and supporting people facing hardship to have easy access to free, fresh, nutritious food. Community fridges are normally situated in social spaces that enable people to connect to their communities.

The Community Fridge in Dundee



5.3 Guiding Principles of a Circular Economy



To fully realise a sustainable future, consumption must reduce.

We cannot continue to plunder scarce natural resources to satisfy our current demands as a consumerist economy. Overconsumption has resulted in modern life requiring 1.6 planets for us to exist based on current consumption patterns. It is estimated that 60% of humanity's ecological footprint is carbon emissions and this is expanding daily.

The United Nations make it clear in their Sustainable Development Goal 12 that fundamental changes are urgently required "in the way societies produce and consume... for achieving global sustainable development".

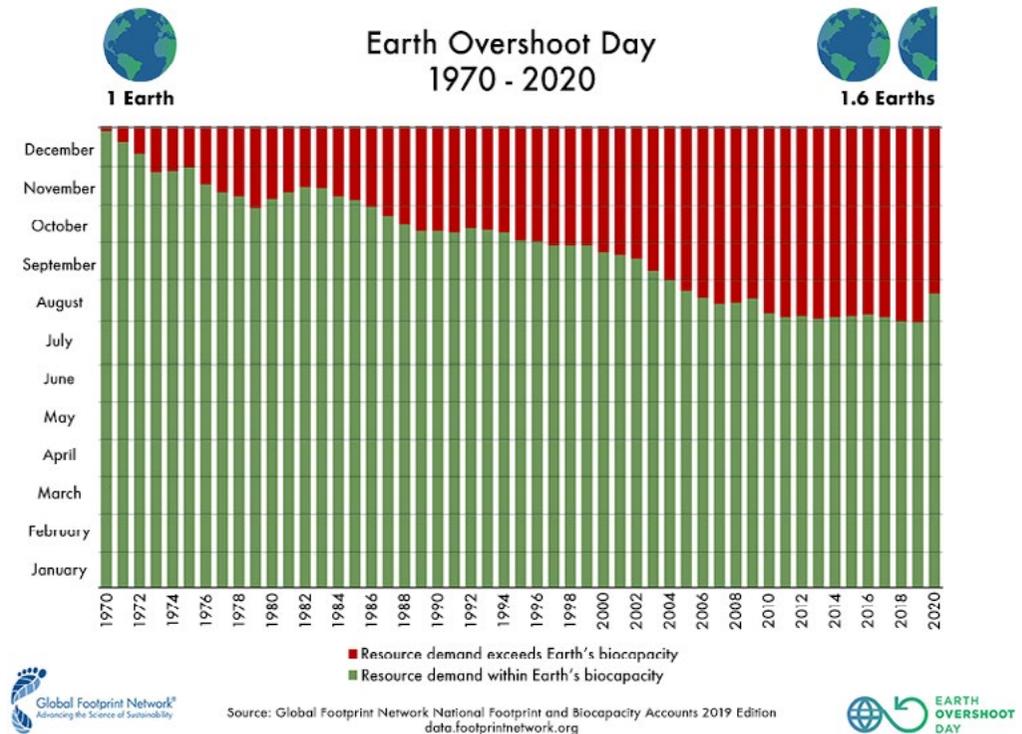


Figure 7 - Earth Overshoot Day from 1970 until today (Aug 2020)

Earth Overshoot Day from 1970 until today (Aug 2020)

- <https://www.co-wheels.org.uk/>
- https://www.ellenmacarthurfoundation.org/assets/downloads/Amsterdam_-Case-Study_Mar19.pdf
- <https://www.overshootday.org/>
- <https://www.overshootday.org/newsroom/past-earth-overshoot-days/>



5.3 Guiding Principles of a Circular Economy



“In 2017, worldwide material consumption reached 92.1 billion tons, up from 87 billion in 2015 and a 254 per cent increase from 27 billion in 1970, with the rate of extraction accelerating every year since 2000. This reflects the increased demand for natural resources that has defined the past decades, resulting in undue burden on environmental resources. Without urgent and concerted political action, it is projected that global resource extraction could grow to 190 billion tons by 2060”.

UN (Progress of Goal 12 in 2019)

There requires to be an economic re-evaluation based on need and utility. Although this may seem to be a far more philosophical debate, the Covid-19 crisis has shown the stark reality of realigning the economy to satisfy transient consumption desires. It is clear that the urgent need for properly resourced services and essential healthcare equipment has a greater benefit to society than any disposable fashion item ever will. Overall, building resilience into our city may have little bearing on economic indicators like GDP but in developing the circular economy the local authority has a moral requirement to elevate the debate and raise the importance of the wellbeing of all our citizens.





5.3 Guiding Principles of a Circular Economy



There needs to be a realisation that we must retain products for as long as possible.

A paradigm shift not just in consumer culture but also production is required and education is essential to embed this sustainability awareness within our current citizens and help influence future generations. If the business community is committed to playing its part in the decarbonisation of the environment then it has to adapt to this changing landscape and circular practice must be adopted. Fashion fluctuations and in-built planned obsolescence by manufacturers must be challenged as wasteful practices and rejected. In general, current business plans are built on reducing the inherent value of useful products. Keeping a product or component in use for its original purpose extracts a far higher ongoing value than the disposal for a new version. Essentially the call to reduce both consumption and production will have an impact on established business models, this cannot be avoided. The current retail economy is influenced by active

<https://sustainabledevelopment.un.org/sdg12>

<https://www.theguardian.com/sustainable-business/2016/aug/20/greenwashing-environmentalism-lies-companies>

encouragement of conspicuous consumption as customers chase aspirational fashion trends and accept a throwaway culture. To change this established model is a huge commitment which will require a wholesale realignment of working practices, business plans, and product design from sourcing and manufacturing to shipping. For the business community this will require a long term strategy to realign and resource sustainably because the current model, which actively promotes a linear disposable culture has to fundamentally change. One major issue that has existed for many years is **Greenwashing**, the process of providing misleading information about a company's profile and products to convey the impression that they are environmentally considerate. This is often displayed in unfounded or manipulated Corporate and Environmental Responsibility Statements to project a certain image to enhance their reputation. Going forward in these early stages

of the circular economy when consumers require transparency and assurances about sourcing and disposal it is vital that honesty and openness are practiced throughout to ensure genuine information exists.





5.3 Guiding Principles of a Circular Economy



Always buying new is expensive and quickly depletes stretched resources.

Employment in the **second hand** retail market has doubled in the UK over the last 10 years to a high of 36,000 in 2018 and Zero Waste Scotland have confirmed that Revolve certified stores have

shown annual sales across the network of £33.4m, with average sales income across a sample of the longest certified stores doubling in four years.





5.3 Guiding Principles of a Circular Economy



The **Community Resources Network Scotland (CRNS) Reuse Consortium** is one organisation that has made great in-roads in establishing the reuse sector and changing the procurement culture of local authorities. CRNS provide an alternative for Scottish Welfare Fund customers, who are people on low incomes in need of support to establish or remain in their homes in their communities. This support can be provided with the main household essentials such as white goods and soft furnishings. Traditionally these items have been supplied as new which is expensive and quickly depletes stretched resources. By sourcing these goods from high quality reuse items the councils can effectively support more people in need. This type of service can be essential in:

- raising the exposure to reuse and may encourage people to consider reuse in the future, potentially discouraging them from using high street weekly payment stores and pay day lenders.

- helping to ensure that local authority budgets are spent in a local social enterprise organisation providing the reuse furniture, contributing to their financial viability
- contributing to the financial viability of reuse organisations which are an integral part of the local community support network that provides

opportunities for employment and volunteering to those who are furthest removed from the job market

Another reuse facility long-used by Glasgow City Council is the **Warp-It** network which is an online peer to peer redistribution network for organisations. Warp-It makes it easy for organisations to share or give surplus items to individuals

inside the same organisation in the first instance. If items are not required within the primary organisation they can be passed onto partners. Warp-It brings the unused into use, saving money, avoiding carbon emissions and landfill. Currently Glasgow has avoided 84 tonnes of waste going to landfill and also saved 242.8 tonnes of CO₂.



Figure 8 - Warp It savings since 2013

Cumulative savings made by the Warp-It project since 2013.
<https://www.statista.com/statistics/408658/second-hand-goods-stores-employment-in-the-united-kingdom-uk/>
<https://www.zerowastescotland.org.uk/press-release/new-figures-show-shift-scots-second-hand-culture-revolve-network-provides-greater>
<https://www.crns.org.uk/>



5.3 Guiding Principles of a Circular Economy



Eco-design reduces resource waste, and challenges engineers to think creatively and resource sustainably.

Changing the way in which designs are produced, designers and developers must be influenced to think consciously and construct carefully. This should be done with an understanding of micro levels of modular planning and assembly, which could allow the components to be reused in a meaningful way in the future. This would include for example avoiding glues and brittle and fragile components which would discourage disassembly. The **Triodos Bank** building in the Netherlands is a fine example of sustainable and circular construction. Architects refer to this building a temporary material bank because everything can be removed and reconstructed. The entire building has been sustainably designed with future planning in mind to ensure the materials retain their intrinsic value to guarantee suitable repurposing at the end-of-life.

For the city our planning and economic development plans are accommodating eco-design at a

meso- level. We must ensure that we incorporate infrastructure provision, support technologies and facilities that will allow for collaboration and co-operation between organisations. This also requires convenience and accessibility for businesses which will allow the city to gain the maximum value from land use when establishing industrial or innovation parks.

To guarantee a product that is truly sustainable, an understanding of its entire lifecycle is required. This encompasses quantifying the impact of embodied carbon which is extremely difficult to do. It underlines the challenge of designing out consumption-based emissions and ensuring that eco-design consists of integrating and minimising the overall environmental impact of manufacturing, using and disposing of products. The main intention is to extend the life of the product and ensure product durability and value beyond its original use where

components can then be reused without creating waste.

Establishing the technical control over eco-design products and methods in the city economy may be limited for the local authority but it opens a unique opportunity for innovation and educators. At a national and transnational level eco-design can be championed through the lever of legislation and regulation which would empower councils. However, business can be, and in some cases like the Triodos example above, is ahead of that curve by instituting these circular methods into their own creative processes. This circular principle can have a significant impact on reducing carbon emissions, designing out waste and open up the possibility of business future proofing at the same time.

<https://www.warp-it.co.uk/>
<https://www.archdaily.com/926357/triodos-bank-rau-architects>



5.3 Guiding Principles of a Circular Economy



This is an unwritten strategy to stimulate commerce.

Planned obsolescence uncovers a huge challenge for eco-design on a global scale. In the current economic system this becomes embedded in the business plans of many production companies. It is an unwritten strategy to stimulate commerce.



In recent years it has been uncovered that Apple, the largest company on the planet with a market value of \$961.3 billion, builds time limited value into its products and actively interferes with the operating ability of components. This ensures that consumers notice a reduction in performance and soon become a captive audience for renewal and

upgrades. Numerous lawsuits have been filed and won against Apple since this was uncovered but it would be naive to believe that Apple stand alone in using this approach.

This cannot be used a viable business model any longer it must be discouraged and regulated against, as it has been noted that judicial rulings and potential reputational damage do not appear to be influencing changes to product design.

Figure 9 - Electronic waste in Accra, Ghana



<https://www.telegraph.co.uk/technology/2020/03/02/apple-agrees-pay-500m-iphone-slowdown-lawsuit/>
https://eur-lex.europa.eu/resource.html?uri=cellar:9903b325-6388-11ea-b735-01aa75ed71a1.0017.02/DOC_1&format=PDF



5.3 Guiding Principles of a Circular Economy

In response to the prevalence of planned obsolescence the European Commission released its [Circular Economy Action Plan](#) in March 2020⁷⁰ with the intention of tackling the throwaway culture. The commission found that less than 40% of electronic waste in the EU is recycled and it has confirmed that it will introduce laws to halve the amount of waste produced by 2030. The commission says that the extraction and processing of mined resources accounts for nearly half of our greenhouse gas emissions and is prioritising initiatives and regulate to extend the entire life cycle of products, from design and manufacturing to consumption, repair, reuse, recycling, and bringing resources back into the economy.



An antidote to planned obsolescence is the impressive work done by the [Cradle to Cradle](#) institute in championing a regenerative and restorative

economy. They have a certification scheme that assesses products and “provides a framework for designing and manufacturing safe, and “provides a framework for designing and manufacturing safe, circular and responsible products and materials that maximize health and well-being for people and planet.”

Their assessments are currently based on driving innovation to satisfy five significant factors:

- Material Health
- Material Reutilization
- Renewable Energy and Carbon Management
- Water Stewardship
- Social Fairness

Products that meet this criteria are then globally recognised as being Cradle to Cradle Certified™. The certification itself is categorised into five different levels of Basic, Bronze, Silver, Gold, and Platinum. Further to this Cradle to Cradle provide a [registry of products](#) for

<https://www.lensculture.com/articles/renee-c-byer-electronic-waste-dumpsite>
https://ec.europa.eu/environment/circular-economy/first_circular_economy_action_plan.html

consumers to use that meet these stringent standards offering some piece of mind with regards to sustainability and the wider environmental impact of their choices.



<https://www.c2ccertified.org/>
<https://www.c2ccertified.org/get-certified/>
[cradle-to-cradle-https://www.c2ccertified.org/products/registry](https://www.c2ccertified.org/cradle-to-cradle-https://www.c2ccertified.org/products/registry)



REPAIR AND
MAINTAIN



CHALLENGES TO
REPAIR



REMANUFACTURE



CHALLENGES TO
REMANUFACTURE



RECOVER AND
RECYCLE



RECYCLING IN
GLASGOW



6.0 Materials Flow - Building Blocks



Extending the life of products by maintaining or improving them is integral to preserving natural resources, utility and value in products. The need to replace a broken device should not be an automatic option and this comes down to changing the culture of the consumer. Modern technology has created an expected model where scarce natural capital is exploited and eventually disposed of in a common and unsustainable manner. In many cases products are disposed of long before the end of their usefulness and these could be maximised through repairing or upgrading.

Planned obsolescence and deliberate design limitations to fulfil business planning play a major part in this practice, whereas repair and maintenance could provide a sustainable alternative.

The Öko-Institut in Germany, a non-profit private-sector environmental research group, have specifically investigated sustainable resource management. They have uncovered that although there is increased awareness of the importance of sustainability and natural resource preservation, product life spans are actually decreasing and their journey from consumption to landfill is accelerating. Even the practice of replacing an older model, which is still in working order, for a new energy efficient product offers no environmental benefits whatsoever. The manufacturing of some items such as washing machines are energy and resource intensive, and have substantial environmental impacts that could result in their ecological payback time being up to 40 years, substantially longer than some of the short term models that

are designed to last for 5 years. These products need to be kept in service for as long as possible. If it develops a fault, it should be repaired to extend its useful life.

The repair of household goods, especially ones that are constructed and assembled under open source data conditions using universal parts would open up the possibilities for more local

repair workshops, creating jobs opportunities, upskilling and new career options. The reuse and refurbishment of electronics makes more efficient use of scarce materials, it reduces the carbon impact of transportation of new replacement products, and on a societal level a repair economy can re-energise Glasgow's local communities and help retain wealth.



<https://www.oeko.de/en/>

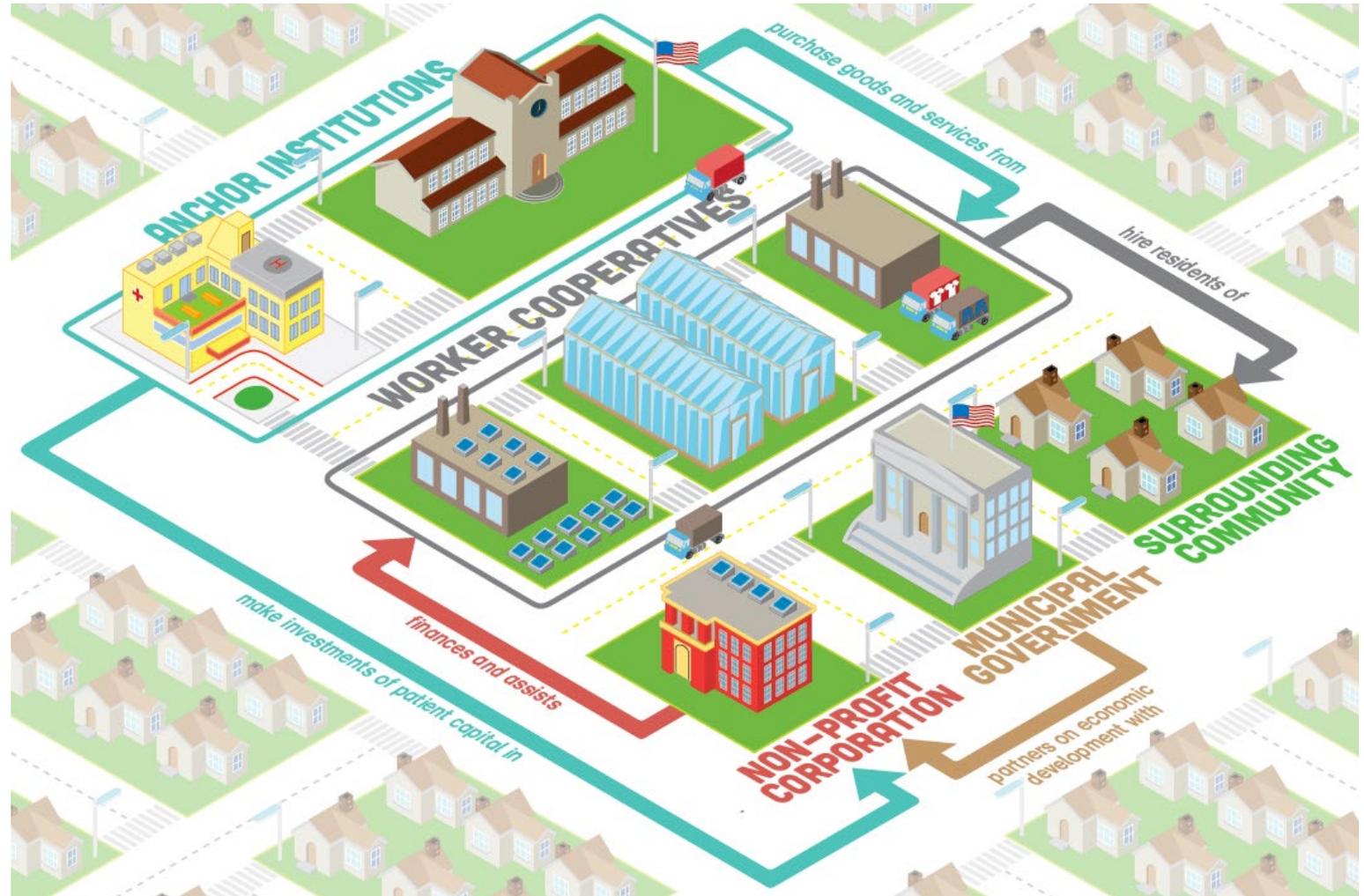
https://www.oeko.de/fileadmin/oekodoc/FAQ-Extending-life-span-of-home_apps.pdf



6.0 Materials Flow - Building Blocks



Job creation within the repair sector can offer an expansion of the co-operative movement in the city. As a city council, Glasgow is committed to becoming a Co-operative Council which involves devolving power to our residents. Co-operatives operate like any other business but often have a strong and clear social ethos which directly benefits their members and the wider local community. Alternative democratic ownership models are not new and can provide different means of employment opportunity and empowerment for citizens by creating a self-sustaining local economy that is resilient and thriving. The Preston Model in Lancashire has been held up to being an exemplar of democratic ownership and this is based on the empowering and transformative work in Cleveland, USA. The relationship between co-operatives and the public sector has been developed in an innovative and challenging manner opening up prosperous business relationships and successfully bringing wealth to the deprived local communities in that American city.



<https://www.glasgow.gov.uk/co-operativeglasgow>
<https://www.preston.gov.uk/article/1339/What-is-Preston-Model->
<https://community-wealth.org/content/cleveland-model-how-evergreen-cooperatives-are-building-community-wealth>



6.0 Materials Flow - Building Blocks

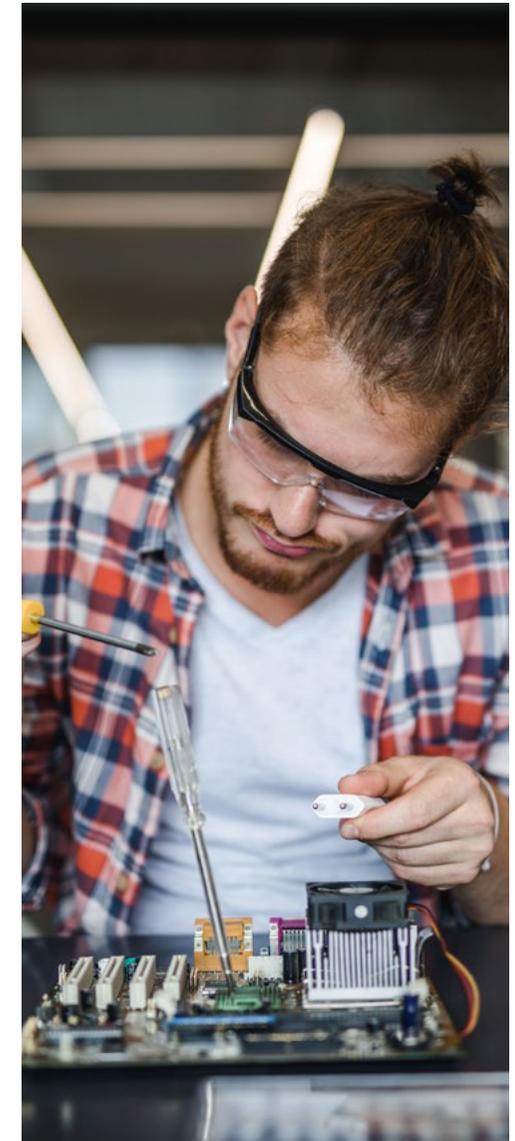


Challenges to Implementing a “Repair and Maintain” culture

Obstacles that create a barrier to repair and maintenance are both technical and systemic. Some of the main issues that need to be addressed on a macro to micro level range from:

- Governmental intervention to tackle planned obsolescence where parts are discontinued to create compatibility problems
- Skills and training require to be provided to enhance confidence and competence to the workforce and general public
- The need to form a coalition of cities across Europe and the globe that campaigns for products to be constructed using open source data
- Address the resistance created by the desire of consumers to possess the latest and newest version in favour of a product that is equally good but may have been refurbished
- Establishing core premises to mainstream the repair and upskilling options in society
- Spare parts controlled, distributed and expensively priced by manufacturers to ensure a new purchase cheaper than a basic repair.
- Product design is often a decisive barrier and determines to what extent and how easily it can be repaired for example, sealed components that use proprietary screws, are glued, or soldered to make it impossible to disassemble without causing irreparable damage to the product.
- Manufacturers using “Warranty Void If Removed” Stickers on products which is specifically designed to discourage independent repair options and ensure expensive returns.

Repair and maintain should be the mainstream and the go-to option to rectify a problem with an existing product prior to any consideration of disposal and replacement.





6.0 Materials Flow - Building Blocks



The circular economy can be the catalyst for Glasgow's historical manufacturing industrial prowess to be resurrected in order to re-industrialise Scotland through remanufacturing. It is an activity that is closely aligned to both repair and reuse. The Scottish Institute for Remanufacturing estimates that the remanufacturing market is worth approximately £1.1 billion to the Scottish economy employing over 19,000 people in highly skilled jobs. Zero Waste Scotland predicts

that there is potential to expand the industry further to nearly £1.7bn and drive sustainable economic growth in Scotland.

"The remanufacturing sector in Scotland has a growth potential of £620 million, generating an additional 5700 jobs if a number of activities are undertaken to support the existing and new sector".

Remanufacturing is a process that returns a used product to a new condition, with a warranty, that matches the quality of the original product. The product is dismantled and refurbished, with its components repaired or replaced to produce a new product extending the life and inherent value of the product without the need to wholly discard and replace with a new item. Remanufacturing is a key part of a well-functioning circular economy. This conserves energy and materials, whilst creating genuinely sustainable economic growth and high quality employment.

- Retaining the high value of components to avoid unnecessary wastage
- Allows organisation to upgrade products to meet modern specifications such as energy efficiency without the need to replace
- Reducing carbon impact especially from locally sourced materials
- Extending product lifespans to avoid new replacements and disposal of useful items
- Preserving valuable natural resources through reducing resource over consumption

Zero Waste Scotland

<https://www.scot-reman.ac.uk/about-remanufacturing/circular-economy/>
80 <https://www.zerowastescotland.org.uk/circular-economy/remanufacturing>

6.0 Materials Flow - Building Blocks

Challenges to the remanufacturing industry exist and assurances are required to build confidence to make it a natural option when companies and consumers are considering purchasing a product. The [Scottish Institute for Remanufacturing](#) understand there are challenges around combating consumer myths such as “second hand is second best” and that remanufactured products are inferior. Consumers may

perceive that it is a false economy to rely on a remanufactured product because of doubts over provenance or durability compared to a warranted new product. And similar to the repair economy, remanufacturing is fundamentally dependent on product design and has to navigate the obstacles erected by companies’ intent on protecting their creation under a “made to break” strategy.

Other issues also exist to hamper the industry on a logistical scale especially sourcing materials. Supply chains for remanufacturing are different to traditional manufacturing and material flows where the quality of components can be a challenge. Infrastructure may be needed to establish a return mechanism to ensure a viable waste/resource stream which is a great opportunity for

further economic development. This could be beneficial too, with shortened and secure supply chains established there is the possibility to avoid market price volatility that would be experienced when sourcing virgin materials.



<https://www.scot-reman.ac.uk/about-remanufacturing/circular-economy/>



6.0 Materials Flow - Building Blocks



Recycling is a function of the circular economy which depends on waste, and waste is the outcome that the circular economy intends to reduce and eventually eliminate. Therefore, circularity is a redefinition of not just the waste hierarchy but the waste management industry as a whole. A circular economy should always endeavour to keep materials in use for as long as possible and it is now accepted that recycling should be the last link in the chain before the ultimate destination of disposal. Recovery and recycling still play a crucial role

during the transitional phase of the circular economy and new initiatives like the Deposit Return Scheme for drinks containers can open a new level of possibilities to retain valuable materials within the economy.

Retaining materials in a localised environment where waste from one process can be the feed stock for another industrial process also reduces the carbon impacts of exploitation of virgin resources and global transportation. According to the Ellen MacArthur Foundation this decoupling could result in a substantial 48% global reduction in carbon dioxide by 2030. This

concept can apply to every sector of modern industry where the most sustainable practices will result in “closed loop” cycles and materials remain in a constant cycle of re-use. Diverting waste from landfill or incineration and recirculating back into industrial and manufacturing processes necessitates co-operation, knowledge and sharing alliances.





6.0 Materials Flow - Building Blocks

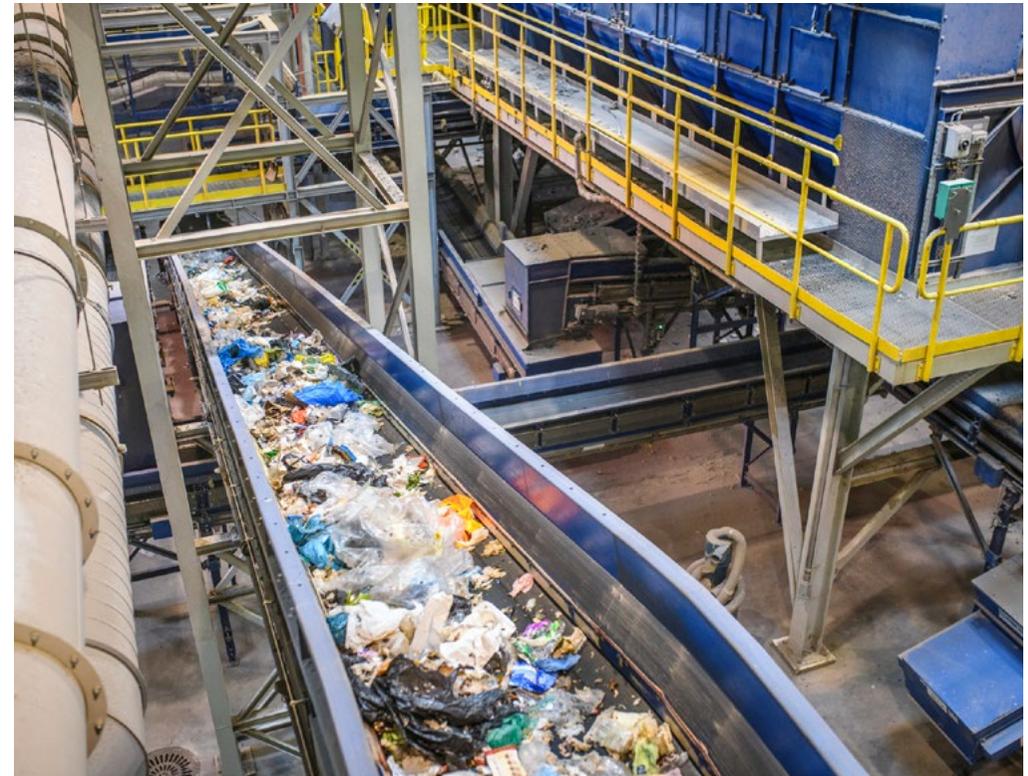


The council provides a network of over 650 sites across the city where materials can be deposited for recycling which covers materials such as paper, glass and plastics. Textile banks are also located at some of these locations although all textile banks are owned and operated by external textile recycling companies. There are also numerous privately operated waste disposal plants around the city dealing mainly with commercial and food waste.

Glasgow operates four household waste recycling centres (HWRC) in the city and one large Materials Reclamation Facility at Blochairn. Shieldhall and Dawsholm HWRCs have dedicated storage areas/bays for placing household items that are suitable for re-use. Collection partners have been appointed for furniture, bikes and electrical equipment and only these partners are permitted to remove items from the sites for re-use.

The Blochairn MRF council manages approximately 23,000 tonnes (per annum) of comingled dry mixed recyclables (CDR), collected by the council from the blue bin recycling collection service consisting of newspapers and magazines, mixed papers and cardboard, plastic bottles, steel and aluminium cans. Recyclables produced by the MRF are marketed by the council. These materials are typically purchased by the re-processing markets for further refinement and ultimately for use in the manufacturing industry as a replacement for virgin materials. Glasgow, in a public/private

collaboration with Viridor also operates a new, state-of-the-art recycling and sustainable waste management facility at its long-established waste treatment plant at Polmadie.



<https://depositreturnscheme.zerowastescotland.org.uk/>
<https://www.ellenmacarthurfoundation.org/news/circular-economy-would-increase-european-competitiveness-and-deliver-better-societal-outcomes-new-study-reveals>
<https://www.glasgow.gov.uk/CHttpHandler.ashx?id=31357&p=0>

7.0 Innovation Opportunities

Through the ages innovation has played a pivotal role in advancing societies and economies. Going forward into a new circular age innovative and disruptive design will contribute to this shift. Eco-design will play a key role in this and given that Glasgow has a world leading reputation for design there are opportunities to advance this thinking. More widely, technology such as digital blockchain, artificial intelligence, robotics, nano-technology, and hydroponics and aeroponics are tangible areas that can be developed to boost business innovation.

In recent years the internationally recognised *Glasgow School of Art's Innovation School* has been working and researching the concepts around sustainable and *circular design*. Their innovation school has been developing students to tackle real world problems studying the relationships between people, places and things. Through their human-centred, research-driven design approach they are exploring, what they term as the "near future" and "next now" in search of actionable innovations. Their concepts are challenging traditional perceptions of design to promote new ways of thinking, doing and designing, which can be applied in diverse and complex real-world contexts. Projects

**INSTITUTE
OF DESIGN
INNOVATION
THE GLASGOW
SCHOOL OF ART**



have included creative economic innovation and participatory design practice for the circular economy in areas such as textiles. And more recently in collaboration with the University of Glasgow they showcased a summit focused on future scenarios in the field of Precision Medicine & The Future of Cancer.

The *Glasgow City of Science and Innovation* is focused on promoting cross-disciplinary projects that use science and innovation to tackle real-world challenges. More than 50 partners including universities, public sector bodies, the *Science Centre* and industry, will aim to raise the profile of Glasgow and the West of Scotland as a world-class science destination. One of the major activities of the Glasgow City of Science and Innovation is *Venture Jam*, the official youth strand of *VentureFest*, Scotland's year-long festival of discovery and innovation. In 2019, there was a particular emphasis on understanding the circular economy and developing pioneering principles to real world problems around food waste.

Theoretical and practical innovations in the construction sector are already being developed in the Innovation School at Glasgow's *Kelvinside Academy* and at the *Construction Scotland Innovation Centre*. According to DEFRA in 2019 the construction sector was responsible for

approximately 60% of total UK waste generated from construction, demolition and excavation. Research in the



<https://www.gsainnovationschool.co.uk/programme/creative-economy>
<https://gsadesigninnovation.com/re-mantle-fashioning-circular-economy/>
<https://glasgowcityofscienceandinnovation.com/>
<https://www.glasgowsciencecentre.org/>
https://glasgowcityofscienceandinnovation.com/core_programmes/venturefest/
<https://youngscot.net/observatory/venturejam-2019>
<https://www.kelvinside.org/innovation-school>
<https://www.cs-ic.org/>
<https://www.ukgbc.org/ukgbc-work/circular-economy-guidance-for-construction-clients-how-to-practically-apply-circular-economy-principles-at-the-project-brief-stage/>

7.0 Innovation Opportunities

technological sector has the potential for significant resource savings through reuse, new material development and adaptive constructive techniques. Replicating the designs in the Netherlands with a shift to sustainable materials, modularity and future reuse through planned deconstruction becomes more urgent for the built environment. Good quality, energy efficient, healthy and affordable housing is especially required for the city as part of a green future and modern and disruptive technological improvements are vital for this transformation.

Glasgow's first **City Innovation District**, launched in February 2019, has brought together 18 major research centres and organisations and over 30 companies. This is seen as a hub for entrepreneurship, innovation, and collaboration with the University of Strathclyde and their Technology and Innovation Centre (TIC) at the heart of the district offering diverse courses to in sustainability and environmental studies which includes focus on the circular economy.

Glasgow City Innovation District

Science and innovation can be the catalyst to unlock essential solutions to provide a circular and sustainable future. Glasgow can continue to build on this drive for innovative solutions by supporting and enabling business and academia through collaborative projects focused on sustainability and circularity. In 2023, the **Glasgow Riverside Innovation District** phase 1 will be complete which will be an Interdisciplinary Innovation Zone at the University of Glasgow and the Clinical Innovation Zone on the Queen Elizabeth University Hospital campus are the focal point for smart campus, precision medicine and chronic diseases, the nano and quantum world, and cultural and creative economies.

For other sectors such as food and drink, as part of the Covid-19 response, there has been an increased focus on the widespread use of digital technology. Further to this there is the importance to promote educational programs to embed circular thinking in future designers, where digitalisation appears to be a significant field of interest. This was borne out by the **Data Lab Innovation Week** which ran a challenge to stimulate 150 MSc data science students to re-imagine Glasgow as a world leading circular city and many of the concepts were digital based solutions.

Some further areas of innovation that are currently being developed at home and abroad and some that could provide inspiration for Glasgow include;

- Expansion of the bioeconomy in line with the **UK national**

<http://investglasgow.com/innovating-the-future/>
<https://www.gla.ac.uk/explore/grid/>
<https://circularglasgow.com/data-lab-innovation-week/>
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/761856/181205_BEIS_Growing_the_Bioeconomy__Web_SP_.pdf
<https://www.sccs.org.uk/>

strategy promoting bioscience to boost new forms of clean energy from waste and industrial by-products. Producing smarter, cheaper materials such as bio-based plastics and composites for everyday items as part of a more circular, low-carbon economy. Manufacturing medicines of the future and research into creating sustainable high value industrial chemicals and developing a new generation of advanced and environmentally sustainable plastics.

- Exploration of carbon capture techniques within the city which could be a solution for the Just Transition. Innovative proposals from the academic research team at **Scottish Carbon Capture and Storage (SCCS)** propose a set of technologies that can reduce CO2 emissions across the economy from industry, transport, and heat and power generation preventing them from

7.0 Innovation Opportunities



escalating climate change. Carbon sequestration used with sustainable biomass can actually provide "negative emissions" and can have a role in producing clean hydrogen for heat and transport.

- Another school of thought is the development of innovation through **biomimicry** or biomimetics. This is the finding of solutions to design problems in the natural world. The purpose behind this is not to just mimic nature, it is to complement and emulate solutions from nature. Some examples of biomimicry in the circular economy context are emissions absorbing concrete barriers inspired by bamboo to protect cyclists and an anti-bacterial surface, called **Sharklet**, which is used in hospitals and is based on sharkskin which is resistant to organisms.

Sharklet microtechnology (right) replicating sharkskin denticles (left)

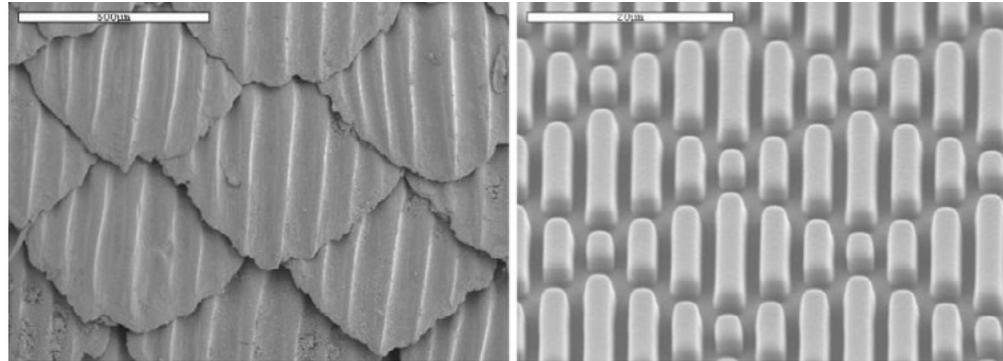


Figure 10 - innovative material

CuanTec's Process

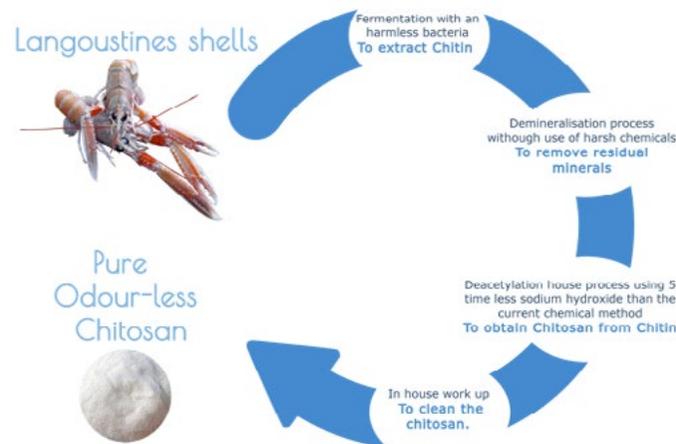


Figure 11 CuanTec processes

- On a local level, Motherwell based **Cuantec** are embarking on an innovative use for food waste. Their bioeconomy concept would allow them to extract useful products such as chitin from shellfish which can be used to make a food packaging material that is a replacement for plastic. The product is fully compostable and returns its natural components to the environment, without leaving a trace. Their aim is to be a zero waste company and the remnants from their processing technique allows them to supply the fisheries industry with a high protein feed.
- More tangibly there is the opportunity for the council to invest in infrastructure to reignite city property stock lying empty or under-utilised. The project in New Jersey by **AeroFarms** has created a new urban agricultural industry. To introduce vertical farming powered by renewable energies

<https://biomimicry.org/>
<https://www.sharklet.com/>
<https://www.cuantec.com/>

7.0 Innovation Opportunities

could provide affordable, fresh, locally grown, organic and nutritious food throughout Glasgow and create jobs to enhance life chances.

The influential economist **Professor Mariana Mazzucato** is explicit in her support of the influence that the public sector has in developing innovative projects. She makes the case that the most visible symbol of technological innovation, the iPhone, couldn't function without public funding. The internet, cellular communication, GPS, the touchscreen even Siri were all developed through public subsidies. This is an example of the leverage that the public sector can facilitate. However, maybe Glasgow can do more than just facilitate, Glasgow could actually shape and influence the market and allow the city to enjoy the rewards for these risks. This is something that could be explored in the dynamic relationship with the private sector, academia and community partners. For Glasgow the combination of science, technology, academia and entrepreneurial spirit can add

to the already existing toolbox to accelerate the shift from the traditional disposable economy to a regenerative circular one. Examples of diversification already exist throughout industry and this realignment of established businesses is an important feature of spreading good practice.

Innovation, however, requires to be nurtured. In many cases the outcomes we enjoy today did not begin that way on paper. Only through research, development and trial could that learning process give us the technology for modern life. These ideas need space and facilities, resources and funding to develop.

Projects will succeed and should be incubated to allow time for them to mature and be scaled up and although some may fail, which is to be expected, this should be looked upon as part of a positive learning experience. Innovation hubs can be the places to enlighten and expand knowledge. We can learn from cities like Vienna that have established **Impact Hubs** and **Les Canaux** in Paris that provide facilities, help, and support to social enterprises.

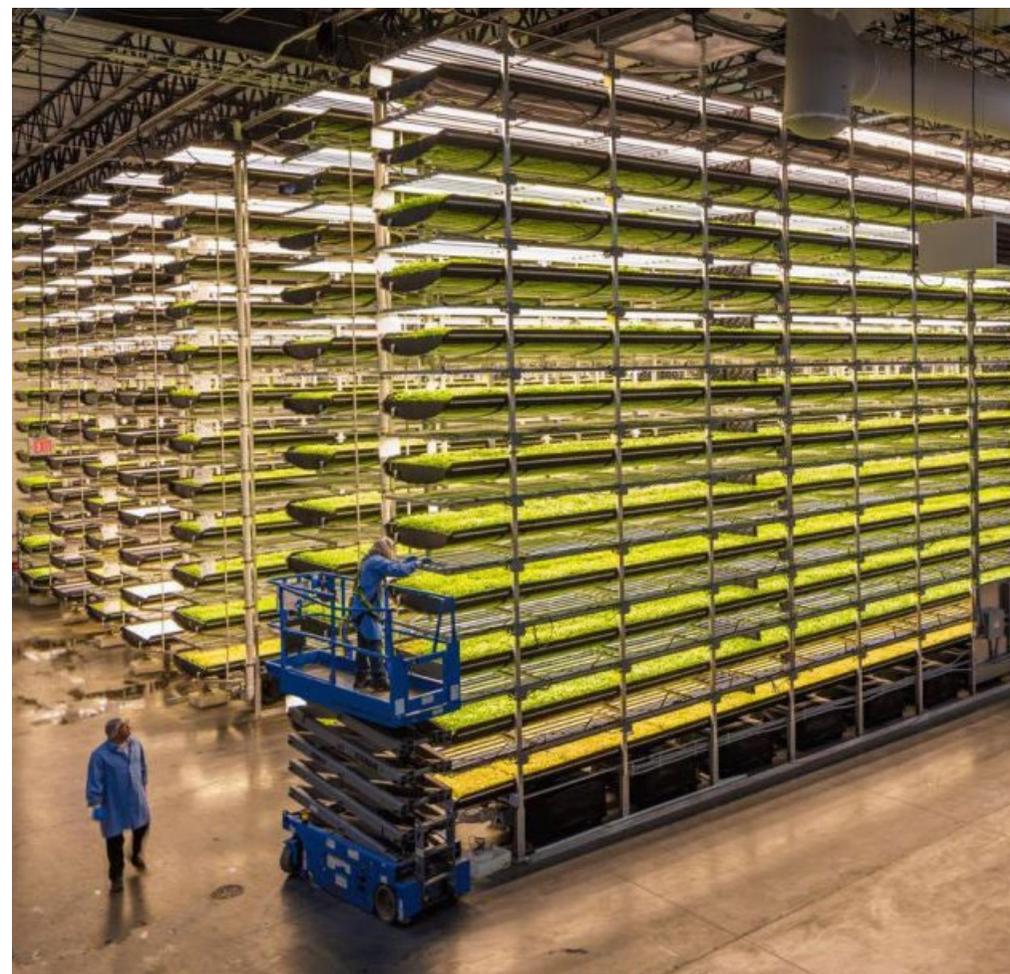


Figure 12 AeroFarms in New Jersey, urban vertical farming

<https://aerofarms.com/>
https://www.ted.com/talks/mariana_mazzucato_government_investor_risk_taker_innovator/discussion#t-820234

7.0 Innovation Opportunities

Glasgow can establish its own version, a Basecamp for example. Circular economy project spaces are vital in the advancement of innovation in the city. Facilities like this with low or no rental burden, office and retail resources with social spaces and the provision of high quality equipment can be the very catalyst for experimental projects, circular businesses and communities grow and thrive.

ARUP and the Ellen MacArthur Foundation published a report recently concentrating on real estate and through it they identified the untapped potential of underutilised space;

“Improved financial performance of up to 18% over 12 years is available to investors and construction clients who unlock the potential of underutilised space in their portfolios. This is one of five new business models for real estate presented in this report, each of which offers better returns than business-as-usual. They demonstrate the potential of circular economy principles to improve the resource productivity



<https://vienna.impacthub.net/>
<http://lescanaux.com/>
 Arup - Realising the Value of Circular Economy in Real Estate
<https://www.tontineglasgow.co.uk/>
<https://www.zerowastescotland.org.uk/circular-economy/investment-fund>

of real estate while contributing to the decarbonisation of the sector.”

ARUP and the Ellen MacArthur Foundation: From Principles to Practices: Realising the Value of Circular Economy in Real Estate

If we want to encourage innovation in Glasgow we have to provide a safe and secure economic environment for it to develop. The Tontine Incubator is a great example of this and should be replicated throughout the city in smaller units to make it more accessible and localised. As the Covid-19 pandemic makes home working more prevalent and has the potential to render citywide office spaces redundant, there is the opportunity to open smaller units to innovative projects.

the potential to render citywide office spaces redundant, there is the opportunity to open smaller units to innovative projects.

As an addition to the Basecamp idea, BaseBox could be a similar concept. These would be incubator

8.0 Economic Systems and System Change at a City Level

The Guiding Principles (outlined in Section 5) are a practical framework to support the need to adopt and mainstream the circular practices and to enhance city circularity.

Change is necessary to achieve environmental gains and avoid a climate disaster, therefore the notion of voluntary participation from all sectors does not appear to be the most robust course of action.

According to the Circle Economy Group, the global economy is currently now just 8.6% circular.

V.2 - 23 SEPTEMBER 2019

COMPLETING THE PICTURE
HOW THE CIRCULAR ECONOMY
TACKLES CLIMATE CHANGE

Competing the picture



ELLEN MACARTHUR
FOUNDATION
MATERIAL
ECONOMICS

The most concerning aspect here is that this has fallen from 9.1% in the two years since Circle Economy first launched their reports in 2018. Without systemic change at a global, national and city level the prospect of Glasgow achieving full circularity by 2045 is very difficult.

“There are powerful economic forces behind the damaging increase in GHG emissions. The trend has been driven by the rapid industrialisation of emerging economies and mass consumption in developed economies. This pattern is set to increase in future. By 2050, the global population is projected to reach 10 billion. It is predicted that an emerging-market middle class will double its share of global consumption from one-third to two-thirds, and the world economy is expected to quadruple..... recent studies have demonstrated that around 1 million species of animals and plants are already at risk of extinction, with

climate change one of the threats to their survival. Overall, resource extraction and processing are responsible for more than 90% of land- and water-related environmental impacts (water stress and biodiversity loss) with agriculture being the main driver.”

Ellen MacArthur Foundation, Completing the Picture

For around 40 years the predominant economic system in Glasgow and Scotland has been one based on capitalist consumerism. It is a system dictated by a principle of market regulation and a seemingly insatiable requirement for consumption growth. The system requires industries to create demand for their products to gain a foothold in a crowded marketplace and in many cases manipulate the consumer's desire through a programme of planned obsolescence to capture and retain a future customer base. The result

<https://www.circle-economy.com/news/our-world-is-now-only-8-6-circular>
<https://www.ellenmacarthurfoundation.org/publications/completing-the-picture-climate-change>
https://www.ted.com/talks/tim_jackson_an_economic_reality_check/transcript?language=en#t-892097

8.0 Economic Systems and System Change at a City Level

is a culture where the vast majority of the population do not need the items that are either produced or indeed consumed. The [economist Tim Jackson](#) eloquently describes this phenomena as being:

“persuaded to spend money we don't have on things we don't need to make impressions that won't last on people we don't care about”

Since the current model relies heavily on imported products Glasgow consumers have no social relationship to the people who make those goods or the manner in which they are produced. Therefore, this social detachment from production has generally resulted in consumers only having a relationship with the objects they with no regard for the means or the social and environmental cost of that production. What we should be doing instead, and what Glasgow has to do, is to challenge this reductive and damaging economic model and provide the capabilities and infrastructures to enable people and communities

to flourish and to protect and regenerate nature.

“Studies have shown that as a global population we are depleting natural resources faster than the earth can replenish them, and at an accelerating rate. As a society, we have effectively grown financial capital in large part through the use, exploitation, and degradation of natural capital.”

Unilever, Sustainable Living

As this system has developed globally the production and transportation costs have reduced and products have become cheaper and more disposable. This has culminated in the linear waste model that has become widespread throughout society. The cycle of producing novel versions and the ease at which disposal occurs is threatening the planetary ecosystems with the depletion of precious resources and the over-abundance of atmospheric carbon. It is widely accepted that this wasteful system

has to change and the circular economy is regarded as a system that can create a paradigm shift to tackle to the current climate crisis. Natural and social capital have degenerated under this system and the wealth inequality gap has widened for [70% of the global population](#). The system change to circularity will help to reduce the production of carbon emissions and potentially alleviate climate catastrophe but it also has the potential to address endemic social inequalities and injustice.

Climate and social justice won't happen naturally, it requires intervention and action. It is agreed internationally that the “business as usual” model that has brought us the brink of climate and ecological catastrophe cannot continue. The system has to be re-evaluated and fundamentally changed into an economy that can evolve and adapt to future shocks, become resilient through disruptive innovation and self-organisation and be guided by responsible and ethical political stewardship.

Localising the economic system should be the goal of circular economy project in Glasgow. It should seek to build on citizen participation levels and strengthen relationships between business and community. It should develop a culture of co-operation and collaboration across sectors to increase trust and create a fertile and nurturing commercial environment for diverse research, development and implementation of projects that will benefit society and the ecosystem.

8.1 Doughnut Economics

Wealth inequality and social deprivation is widespread across developed nations and Glasgow is no different. The development of a circular economy can alleviate the endemic inequalities that the current consumerist system has created.

City and national governments must be advocates for our citizens and demand an economic system that elevates humanity, environment and wellbeing above profit and unsustainable infinite growth. *Doughnut Economics*, a seminal work by Kate Raworth an English economist working for the Universities of Oxford and Cambridge, has highlighted the interconnected balance of social and planetary boundaries. This approach which quantifies the economic impact in a holistic manner identifying the social foundation and ecological ceiling which establishes the case that social inequality atrophies economies, creates stagnation and fragile systems. As Raworth explains, economists now understand that poverty and social exclusion are structural, they exacerbate;

“ecological degradation... because inequality erodes social capital – built on community connections, trust and norms – that underpins the collective action needed to demand, enact and enforce environmental legislation”.

Kate Raworth,
Doughnut Economics.

According to the 2020 Scottish Index of Multiple Deprivation¹¹⁸, Glasgow has areas ranked first in Scotland with the lowest income (Possil Park), the poorest health (Possil Park), the lowest employment opportunities (Shettleston), and most deprived

housing stock (Strathbungo). Such deprivation and exclusion is a huge problem in representative democracies and can hamper civic participation levels. If citizens feel included in the decision making of the system they recognise the

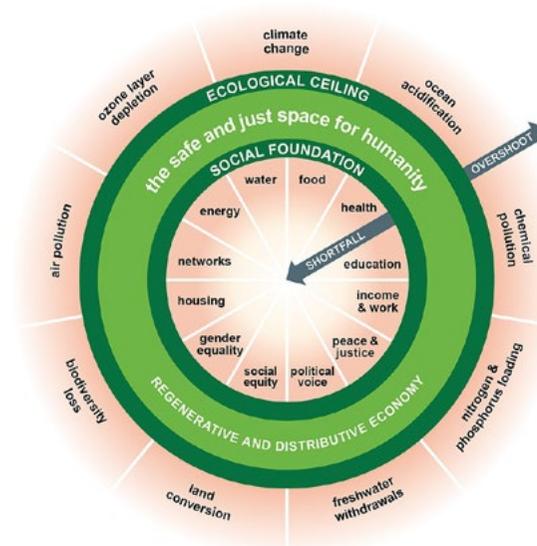


Figure 13 The Doughnut tool used to measure social and ecological impacts

<https://www.unilever.com/sustainable-living/reducing-environmental-impact/natural-capital/>
<https://www.theguardian.com/global-development/2020/jan/22/wealth-gap-widening-for-more-than-70-per-cent-of-global-population-researchers-find>
<https://www.kateraworth.com/doughnut/>
 Raworth, Kate. *Doughnut Economics: Seven Ways to Think Like a 21st-century Economist*. (London: Random House, 2017) pp. 659-660.
<https://www.gov.scot/publications/scottish-index-multiple-deprivation-2020/>

8.1 Doughnut Economics

reasons for change and will regard it as something they can influence. However, beyond these aspects people will feel alienated and dictated to and ultimately they will disassociate themselves from the matter, and not participate in the agreed political interventions, which will render change at a city level impossible. Amsterdam led the early advances in circular city strategies with specific and pioneering concepts and their technical work put them at the forefront of the circular economy strategy in European terms. It is of note that, in April 2020, the Amsterdam city authority announced that it was realigning its circular economic focus to incorporate social inclusion and welfare as integral features of its strategy moving forwards. Amsterdam worked in collaboration with Kate Raworth and in April 2020, this also coincided with the publication of the first *City Doughnut* strategy. This work develops a balanced overview of the impact the economy has on both planetary and social conditions within the city and

provides measurable metrics. This is a process Glasgow could look to replicate. A formalised City Doughnut would allow the city

to establish social and ecological baselines to measure future progress against.



8.2 Glasgow's Strategic Plan

Glasgow has already made a commitment to travel along this path of social inclusion. The council's Strategic Plan 2017-2023 outlined various ambitions to enhance the economic landscape of the city and forms the backbone of this circular economy strategy. Almost half of Glasgow's residents (292,000 people) reside in the 20% of most deprived areas in Scotland. In 2017, one in three of our children live in poverty and we have significant long term health challenges which stop our citizens from achieving their full potential. The city

strategy intends to tackle these endemic issues, it states;

Without inclusive growth the city cannot flourish or tackle the challenges it faces. Our priority is inclusive growth that creates jobs, helps us to tackle poverty and improve the city's health. We need to demonstrate that our thriving economy benefits the city, its citizens and businesses. This is detailed in numerous outcomes and priorities:

- A resilient, growing and diverse city economy where businesses thrive.
- The city and its citizens benefit from inclusive economic growth and are involved in economic decision making through participatory budgeting.

<https://www.circle-economy.com/insights/the-amsterdam-city-doughnut-a-tool-for-transformative-action>
<https://www.glasgow.gov.uk/strategicplan>
<https://www.understandingglasgow.com/>
<https://www.glasgow.gov.uk/citycharter>

- More Glaswegians are in work or training.
- Glasgow is rated highly for its business innovation and digital skills.
- Creating the conditions to improve the manufacturing sector in the city and opportunities for small indigenous Glasgow businesses to thrive.
- Increasing support for business start-ups, particularly in the most disadvantaged areas of the city by looking at changes to business rates and around concessionary rents guidance.
- Maximise what the council can do through its community benefit clauses to secure jobs and training opportunities for Glaswegians and Small businesses and look at ways that these clauses can be strengthened.

This commitment was further strengthened in May 2018 when Glasgow City Council produced its first City Charter. The City Charter122 is an informal agreement between the council and citizens that lists shared commitments, aims and standards. It was created through dialogue and consultation with citizens to develop a joint commitment for the city. The Charter identifies some key areas that specifically influenced the direction of the Circular Economy Route Map, namely;

- Social Justice and Inclusion - Be fairer and more equal giving everyone in Glasgow the chance to flourish and improve their life chances and choices.
- Community Empowerment - People are actively involved in their local community, volunteer and come together to help one

8.2 Glasgow's Strategic Plan

another and improve community spirit and local pride.

- Sustainability - A sustainable and low carbon city, with good active travel options.
- Employment - The city and its employers are proactive in promoting and upholding employees' rights, and work to increase employment opportunities.
- Collaboration - The Council works in effective partnerships with a range of public and business partners across the city, and citizens, third sector and community groups.



The emerging circular economy sees Glasgow perfectly positioned to grasp the challenge of the Climate Emergency. From its manufacturing past to a remanufacturing future the city has the genuine potential to not only contribute to the fight against carbon emissions but it also has an opportunity to regenerate and re-energise local communities,

Glasgow has a highly skilled workforce, yet many people living in Glasgow still struggle to access high quality, fairly paid employment, this strategy outlines some of the ways that the council will seek to support those furthest from the jobs market back in to work.

Supporting community enterprises can be the key to unlocking this economic potential which can only be realised if there is a fundamental acknowledgement that social justice in terms of distribution of wealth, opportunities, and privileges within our society are integral to the success of any economic system change. From an industrial city, like so many across the UK, that contributed massively to the climate crisis we can help rectify that damage and provide a solution to make a positive impact for future generations.

Glasgow's desire to be a truly sustainable city has developed over the past two decades and is firmly ingrained in the ambitions of

the council's future direction. The declaration of a Climate and Ecological Emergency and the rapid commitment to embracing a Plastic Reduction Strategy with a challenging suite of actions are examples of that determination. For Glasgow City Council sustainability means tackling a range of objectives, achieving carbon neutrality by 2030 and contributing positively to the global environmental movement through fundamental changes in organisational working methods. But, it also depends on significant urban regeneration, delivering meaningful jobs and training, grasping the notion of a Just Transition to the renewable energy sector, re-vitalising communities and confronting endemic poverty. The Circular Economy Route Map can help meet that challenge of delivering Glasgow's ambition to be that truly sustainable city.

https://www.understandingglasgow.com/indicators/poverty/in-work_poverty
<https://www.glasgow.gov.uk/article/25330/Glasgow-Set-2030-Target-To-Be-Free-Of-Unnecessary-Plastics>



	6.0 Route Map Action Plan: What's to be done?	
	10.4 People Action	



Shared mobility options, expanding car sharing schemes and the successful Next bike scheme and potentially introducing e-scooter options could provide healthy solutions to local travel and also positively impact on emissions and congestion. We believe this could open up opportunities for local business and also to reskill citizens using technology for public benefit in the transition to a low carbon city. With the Council expanding its own fleet of renewable low carbon vehicles such as electric and hydrogen synergies between different transport energy requirements are essential in terms of production and access, we must therefore consider infrastructure gaps if this type of technology is to be mainstreamed.

16 Pilot Projects

Economists believe that many stimulating diverse pilot projects can help test innovation quickly and measure the environmental,

social and economic impact they could have. Some may fail but failure should be expected as we step tentatively into new uncharted territories, and every project no matter its level of success should be regarded as a positive learning experience to reassess and adjust actions for future initiatives. Those projects that succeed should be accelerated, proliferated and scaled up as exemplary models of circular practice.

17 Facilitate

Circular Glasgow must continue to engage with the business community to develop partnerships and linkages to identify material flows and identify waste streams for the purpose of establishing semi-circular and closed loop processes.

The Chamber of Commerce have undertaken an impressive and informative business-led approach and this must be developed further to see large





	6.0 Route Map Action Plan: What's to be done?	
	10.5 Private Action	



and identify clothing drop-off, pick-up storage facilities around the city. Since this is a pressing requirement for Scotland too, the city should consider dedicated facilities for recover and even returning garments to their constituent materials which could develop a brand new clothing remanufacturing sector in the city. Furthermore, textiles also refers to carpets, upholstery, furniture and mattresses which requires a whole new approach to reclaim and refurbish and extend the life of these products.

Entertainment wise Glasgow is one of the first recognised [UNESCO World Music Cities](#) and is a notable destination for major international artists.

Each of these events can create a significant carbon impact as well as economic boost to the city. It would be advisable to gather exiting information and create a baseline map of each major event and to help create metrics and provide sustainable solutions to either decarbonise or offset with assistance from organisers and participants.

ages and facilitate access to practical instruction on how to repair and reuse products. Apprenticeships will be crucial to embed enhanced technical skills will allow citizens to access the workforce with a knowledge and willingness to champion eco-design. It would be beneficial to include a form of certification/open badge scheme to ensure a legacy of this education and develop a workforce to build the local economy. It is an important aspect to promote circular economy principles in partnership projects with business, community and local authority and provide training and reskilling at workshops to build capacity in the city.

City of Glasgow College and Glasgow practical instruction on how to repair and reuse products. Apprenticeships will be crucial to embed enhanced technical skills will allow citizens to access the workforce with a knowledge and willingness to champion eco-design. It would be beneficial to include a form of certification/open badge scheme to ensure a legacy of this education and develop a workforce to build the local economy. It is an important aspect to promote circular economy principles in partnership projects with business, community and local authority and provide training and reskilling at workshops to build capacity in the city.

20 Events

The events sector in Glasgow is a significant attraction for the city. Currently ranked fourth on the [Global Sustainable Destinations Index](#) it reveals that Glasgow is a major hub for international conferences and events. This sector creates meaningful jobs and has a substantial impact on the city economy from tourism to inward industrial investment.

21 Reskilling

Reskilling will play an essential role in the future of the city as the city moves from traditional hydrocarbon based jobs towards a low/zero carbon employment sector, through a Just Transition. We must use all available resources from within the council family and support from other bodies such as Zero Waste Scotland to help develop educational resources for all

Zero Waste Scotland are currently collaborating with Circular Amsterdam are developing a [Circular Economy Jobs & Skills](#) research project which will provide vital learning and guidance opportunities for Glasgow. Zero Waste Scotland are also working with

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<https://www.gds.earth/2019-results/>
<https://citiesofmusic.net/>
<https://www.zerowastescotland.org.uk/content/education-and-skills>
<https://www.cityofglasgowcollege.ac.uk/circular-construction>



	6.0 Route Map Action Plan: What's to be done?	
	10.5 Private Action	



developing a **Circular Economy Jobs & Skills** research project which will provide vital learning and guidance opportunities for Glasgow. Zero Waste Scotland are also working with **City of Glasgow College** and **Glasgow Caledonian University** to develop Circular Economy modules for construction and are developing core competencies with **Lantra**, the training provider, for apprenticeships.

It has to be understood by the general public that the circular economy and sustainability are more than a recycling policy, in fact recycling should be the final stage before anything at all ends up in landfill. Waste materials have residual value and must be redirected, broken down into constituent components, recovered, repaired or reused before the recycling aspect occurs. This is why it is essential for the populace to be educated and participate for the common good. In light of the Covid-19 pandemic there

has been a greater emphasis throughout society to digital delivery. This allows a blended learning approach in terms of convenience and availability at suitable times, which can work for many people during the current disruption and facing an uncertain future.





	6.0 Route Map Action Plan: What's to be done?	
	10.6 Public Action	



challenges and the circular economy for primary schools is underway. Education packs have begun to be rolled out and have been welcomed by educators for their intention and message. Sustainable behaviour change is required for the city to not only achieve its targets but ensure a legacy of the Route Map Action Plan. We have to consider how to link this learning with how it is applied to create a whole system approach connecting education and skills across sectors, businesses, communities but also through their hierarchies and structures. This includes executive leadership training for decision makers, circular economy apprenticeships and developing the young workforce in Glasgow.

Zero Waste Scotland's Circular Economy Education & Skills Hub partners already include Skills Development Scotland, Education Scotland, and Young Enterprise Scotland (YES) and they have begun to develop Circular Economy Support



<http://www.naestrawataw.org/>



		6.0 Route Map Action Plan: What's to be done?		
		10.6 Public Action		



the Climate Change Bill to end our contribution to climate change by 2045 at the latest. The shift of focus in operations, manufacturing and workforce from the existing industry to a new green economy is an historic undertaking. Glasgow in its Climate Emergency declaration has also committed to playing its part in this transition by developing a local version of the Scottish Government's Just Transition Commission and plan actively for the shift to a carbon neutral economy.

A just transition from the hydrocarbon industry and its ancillary economy can be a catalyst for creating new opportunities to enhance the wellbeing of our citizens. The EU has recently developed a plan based on a **European Green Deal** which echoes Glasgow's commitment through this Route Map – to overcome climate change and environmental degradation by transforming the European Union to a resource-

efficient partnership where economic growth is “decoupled from resource use and making the transition just and inclusive for all”.

The opportunities for the city to develop a circular economy in Glasgow based on a sustainable and inclusive concept of a Green New Deal must champion and fund the best circular designs. Efficiently using the resources available to create a better standard of living for all. Working with business, government and trade unions to develop plans and create strong and enduring social capital throughout the city. Capital projects to enhance our citizens' quality of life through more energy efficient housing, cleaner energy systems will build community resilience. Improvements to infrastructure and extending public ownership in services and the transport system can create jobs and careers and also provide a positive legacy for our city.

28 Healthcare

Glasgow shares health

responsibilities with the NHS and in light of the Covid-19 pandemic it would be advisable to establish a connection with the Greater Glasgow and Clyde Health Board to investigate areas of environmental commonality.

This may include a medical waste impact report for Glasgow or the development of material circularity in collaboration with the NHS and local authority. There may also be capacity building opportunities for the NHS and city council to explore such as a secure and reliable PPE stream within the city to facilitate the city hospitals.

29 State Entrepreneur, Co-operatives and community development

The local authority is in a unique position to drive the circular economy within Glasgow. By adopting the principles of state entrepreneur the council can play the combined part as employer, commercial partner,

investor and enabler within the economy. Glasgow already fulfils some of these aspects but to catalyse the circular economy these need to be accelerated and scaled up to meet the commitments of the Climate Emergency and pressing requirements of the 2030 net-zero carbon target year.

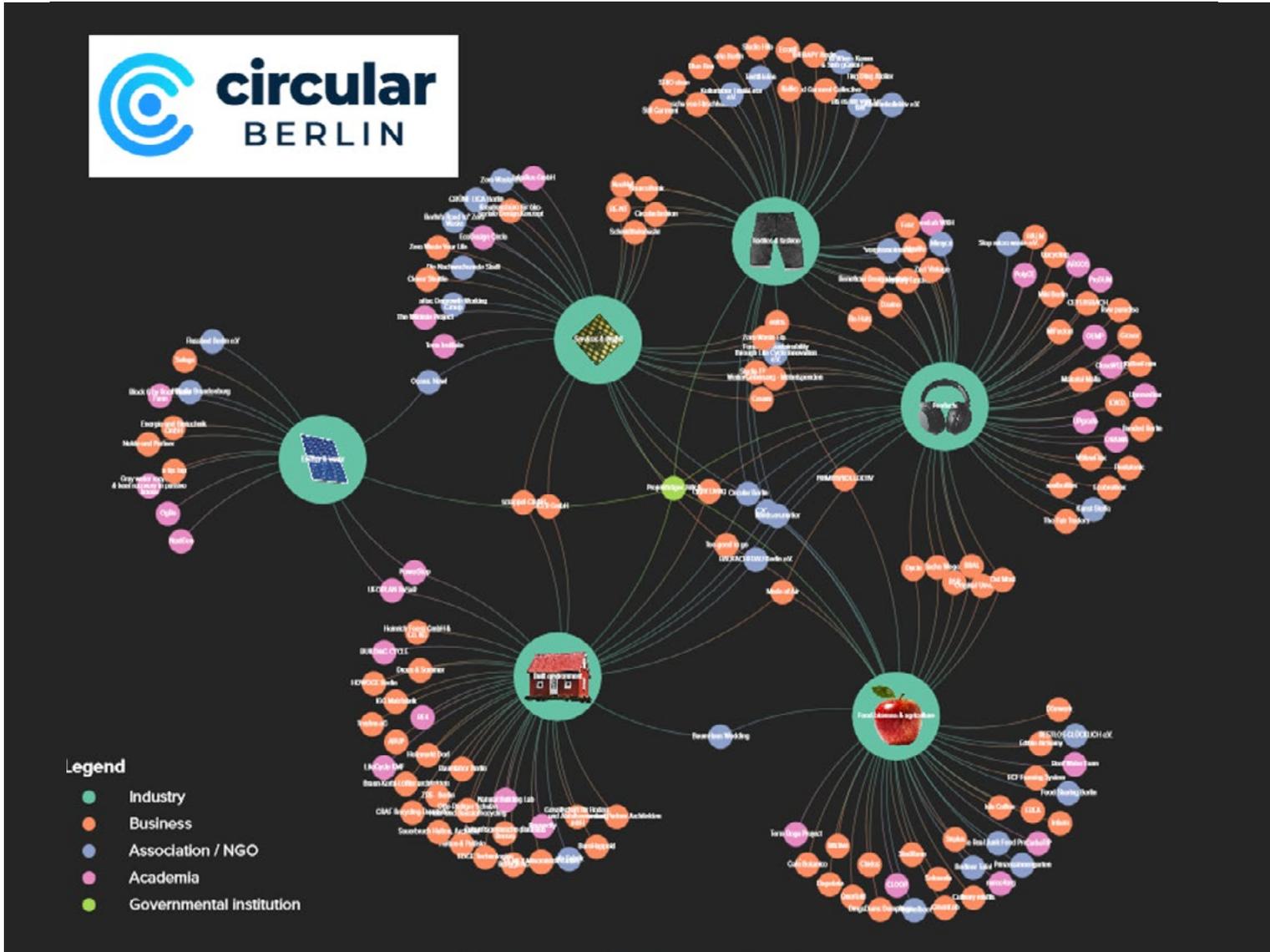
If a revolutionary change from the climate degenerative economic model that has dictated society for the past forty years is to succeed it must be driven by a future based on co-operation and not competition. Care and concern for our planet and our people can only be achieved through a spirit of collaboration, tolerance and understanding to eliminate destructive environmental and economic exploitation and self-interest.

Glasgow is committed to being a Co-operative Council, therefore

<https://www.gov.scot/groups/just-transition-commission/>
https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en



	6.0 Route Map Action Plan: What's to be done?	
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This platform can also help with the sharing of materials and resources, of facilities and manpower. In Toronto they have aligned all of the circular processes occurring in the city, in order to host all of the initiatives under one banner. This allows for easy access to see what services are available and how they link and impact the city. It is important we build a cohesive network and Circular Berlin have carried out a similar project that has successfully linked all the businesses and interested parties together in their currently evolving Ecosystem. The online platform can mirror this initiative and give Glasgow a similar valuable resource.

Businesses supporting Toronto's circular economy
<https://circular.berlin/community/>

11.0 Glasgow's Circular Economy: Call to Action

Changing the economic motor in Glasgow won't change the world economic model, but we can work to move the focus from a profit-motive system to one which promotes climate justice, co-operation, care, inclusion and wellbeing.

A significant underlying element will be the positive social impact the circular economy could bring to our city over the next 25 years.

Most of the inspiration for this Route Map has been ignited by the circular economy roadmaps and action plans developed by the City of Paris since 2007.

Glasgow City Council, have learned and must continue to learn from best practice across the globe to build and refine the concepts of circularity throughout the city. Entering into formal working agreements to solidify national and international networks with like-minded cities such as Paris, Amsterdam, Milan, London, Vienna and Pittsburgh will help create a coalition based on shared goals. By

assembling an influential political and economic bloc we can exert influence on a macro scale to effect changes on the largest multi-national corporations and campaign to change wasteful processes across continents.

Ultimately, we see the concept of building a circular economy as essential not just for environmental reasons. We see this system change as an enormous opportunity to recognise and truly value the abundant and talented resource we have; our citizens.

We have before us the opportunity to develop the sustainable economy, the ability to create transformative change bringing improved environmental quality, economic prosperity and social equity, to the benefit of current and future generations.

Only together
can we
create a truly
sustainable
Glasgow



St. Enoch and St. Mungo by Sam Bates, Glasgow City Mural Trail



The circular economy in Glasgow, United Kingdom

OECD Programme on the “Circular Economy in Cities and Regions”



The OECD Programme on the Circular Economy in Cities and Regions

The OECD Programme on the Circular Economy in Cities and Regions supports cities and regions develop and implement circular economy strategies, in order to transition from a linear to a circular economy. It helps identify the role of cities and regions as promoters, facilitators and enablers of the circular economy.

The ongoing Policy Dialogue with the City of Glasgow, United Kingdom aims to: identify the framework conditions to unlock the potential of the circular economy; strengthen governance (in all relevant policy areas); build consensus on the diagnosis and policy recommendations.

Partners of the OECD Policy Dialogue on the Circular Economy are: Zero Waste Scotland, Chamber of Commerce and the City of Glasgow. The Policy Dialogue consists of a 15 months multi-stakeholder process, concluding

with an OECD report in 2021. To date, two rounds of virtual interviews (10 in total) and individual meetings (3 in total) have been organised gathering 60 stakeholders:

- **First round** (27-30 April 2020): it gathered representatives from the business sector (big companies and SMEs), community initiatives and members of the city council.
- **Second round** (22-25 June 2020): it focused on key sectors identified in the first round of interviews, such as, construction; innovation; retail; events & tourism.
- **Individual meetings with key stakeholders:** City Councillor for Sustainability and Carbon Reduction, CEO Zero Waste Scotland, ZWS Skills Programme Manager.

Partners of the projects participated in several OECD events:

- OECD online workshop “Measuring circularity in cities and regions through the OECD Scoreboard” (12 July 2020). The Workshop discussed: the clarity and usefulness of the Scoreboard; the relevance of the key 10 dimensions to improve decision-making; methodological issues towards disaggregated or composite indicators; and the visualisation options;
- The Webinar “Spotlight on the circular economy in cities and regions” (31 March 2020, am), which showcased circular economy initiatives in various cities, such as Groningen (Netherlands), Umeå (Sweden), Valladolid (Spain), Glasgow (UK), Granada (Spain), as well as from Ireland, as case studies of the OECD Programme on the Circular Economy in Cities and Regions.
- The Webinar “What’s new on the circular economy in cities and regions and how to measure circularity?” (31 March 2020,

Appendix 1: OECD Summary - The circular economy in Glasgow

pm), which introduced the findings from the OECD Survey to 45+ cities and regions, and presented the OECD Scoreboard to advance the measurement side.

- The 1st OECD Roundtable on the Circular Economy in Cities and Regions which took place at the OECD Headquarters in Paris on 4th July 2019. The Roundtable gathered 100+ participants including civil society, academia, business, financial sector and philanthropy to discuss the transition to a circular economy in cities and regions.

Towards a circular economy strategy in Glasgow. Preliminary insights.

Glasgow's circular path has been driven by a partnership between Zero Waste Scotland, a non-profit environmental organisation funded by the Scottish Government and the European Regional Development Fund, Glasgow City Council and the Circular Glasgow initiative

which is managed by the Glasgow Chamber of Commerce. These organisations have been working together with businesses and other stakeholders to encourage and support the development of circular approaches.

The first steps in the circular economy in Glasgow took place in 2015 when Zero Waste Scotland, Glasgow City Council and Circular Glasgow partnered to conduct the Circle City Scan of Glasgow to identify circular economy opportunities for the City of Glasgow. In 2016, the Scottish Government adopted its circular economy strategy "Making Things Last". The strategy sets out priorities for moving towards a circular economy and it has been built on Scotland's progress in the zero waste and resource efficiency agendas. The strategy prioritises four main areas: 1) food and drink, and the broader bio-economy; 2) remanufacture;

<https://www.oecd.org/regional/cities/circular-economy-cities.htm>

3) construction and the built environment; and 4) energy infrastructure. In 2016, Zero Waste Scotland also started to address the circular economy from a regional basis, focusing on opportunities for collaboration and on keeping resources circular in cities and regions.

In 2018, during the Circular Economy Hotspot Scotland Conference, the Glasgow City Council committed to develop a circular economy roadmap. For the design of the roadmap, a variety of groups have been targeted within the private sector, such as food and beverages, construction, manufacturing and events. The strong engagement with the private sector is driven by the city of Glasgow's target to reach 6% of total employment related to the circular economy. In addition to the private sector, the city aims to embed a circular approach on education in collaboration with universities and institutions.

The celebration of COP26 in Glasgow (postponed due to the COVID-19 crisis), the development of the Circular Economy Roadmap in 2020, the Declaration of Climate Emergency and the Net Zero Target for 2030 set by the city council in 2019 have sharply accelerated the pace of change in the city.

The OECD Programme on the Circular Economy in Cities and Regions will help identify challenges and opportunities for the circular economy to take place in Glasgow, following the 3Ps framework: people, policies and places. According to this framework, the circular economy is transformative as it implies sustainable production and consumption pathways, as well as new business and governance models connecting a wide range of stakeholders (people). It also requires a holistic and systemic approach that cuts across sectoral policies (policies), and functional approach going beyond the

Appendix 1: OECD Summary - The circular economy in Glasgow

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administrative boundaries of cities and linking them to their hinterland and rural areas to close, narrow and slow loops at the right scale (places).

Policy recommendations and an action plan will be set up upon consultation with stakeholders. Amongst others, results of the OECD case study will support the city of Glasgow in adopting a more active role in the promotion of the circular transition; increasing coherence among policies at the city level by applying systemic thinking to avoid silos and fragmentation, as well as co-ordination among city departments and across levels of government; promoting capacity building in the city government; adopting procurement models, including circular criteria; improving the engagement of large corporations in the circular transition and fostering circular business models across medium and small enterprises.



Appendix 2: Action Plan

(Actions highlighted offer potential opportunities of a Green Recovery from Covid-19)

ACTION	DESCRIPTION	THEME	TARGET	OWNER	TIMESCALE
1	Glasgow City Sustainability/ Circular Charter – To promote, raise awareness and enhance the Circular Glasgow movement within the city.	Policy	Create a City Sustainability/Circular Charter for Glasgow to enable organisations to demonstrate commitment to circularity and support a sustainable recovery. All businesses who sign up will be promoted as proactive business across the City and urged to display the charter logo.	GCC, Chamber of Commerce, Sustainable Glasgow	To ensure the Charter scheme is up and running by December 2020.
2	Monitoring and Evaluation - Develop metrics and indicators to assess circularity in the city.		Create a suite of indicators to measure circular economy progress in Glasgow based on Scottish national guidance.	GCC, ZWS	Interim report developed by October 2021.
3	Collaboration - Continue to form global, European, National and regional metropolitan partnerships and alliances in order broaden influence towards a more circular economy.		Consider building formal partnership and collaborations through knowledge sharing and mayoral covenants with partner cities to strengthen circular economy commitments. Circular Economy to be a focal issue as part of the Private Sector and Green Recovery Hub at Sustainable Glasgow.	GCC, Glasgow City Region, ZWS, Sustainable Glasgow	Produce update report by August 2021.

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ACTION	DESCRIPTION	THEME	TARGET	OWNER	TIMESCALE
4	<p>Circular Construction Statement - create a circular construction framework for all construction projects within the city, including the implementation of a "Circular Economy Statement". This should include consideration of;</p> <ul style="list-style-type: none"> • Developing a municipal material passport catalogue for all public construction works. • A pledge to never demolish another building. 	Planning	<p>Support the development of a Circular construction framework, and Circular Economy Statement to be applied across all future construction in the city. This should include consideration of:</p> <ul style="list-style-type: none"> • A digitised system to allow blockchain categorisation for construction materials in the city. • The possibility of making retrofit the standard construction method in Glasgow. 	GCC, Chamber of Commerce, ZWS, SEPA, LWARB	<p>To investigate the most suitable means to introduce this Statement and have in operation by August 2021.</p> <p>Produce recommendation report consideration other supporting issues by October 2021.</p>
5	<p>Reuse of Construction Materials – Investigate opportunities to develop a system for the city-wide recovery and reuse of materials. This will include providing storage facilities for reclamation materials for construction purposes within the city limits.</p>		<p>Pilot at least one project, supporting the reuse of construction materials within Glasgow City. This should allow the ability to test the feasibility and framework required for the recovery and reuse of materials including logistical issues regarding storage and handling.</p>	GCC, Chamber of Commerce, ZWS, SEPA	<p>To prepare a feasibility analysis on this pilot by August 2021 providing recommendations to rolling out city wide.</p>

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ACTION	DESCRIPTION	THEME	TARGET	OWNER	TIMESCALE
6	<p>CIRCUIT Project – Provide updates and learning outcomes from knowledge gained through participation in the CIRCUIT Horizon 2020 EU project.</p>		<p>Working with LWARB produce updates and trial initiatives into embedding the circular economy in the construction industry.</p>	<p>GCC, LWARB</p>	<p>Provide update reports and relevant findings on a quarterly basis beginning April 2021.</p>
7	<p>Circular Forums – Host a series of Forums to support collaboration, knowledge, and best practice in a series of sectors including:</p> <p>City Construction Forum – Support knowledge exchange and upskilling of architects, designers and contractors, to construct and design whilst prioritising the reuse of materials through modular planning, diagnosis, sorting and recovery of site resources.</p> <p>Circular Textiles Forum – reform the city's approach to clothing supplies and textile waste. Incentivising alternative models to alleviate the impact of the forthcoming 2025 landfill ban.</p>		<p>Develop a series of Circular Forums to consider key challenges and opportunities towards creating a more circular city:</p> <ul style="list-style-type: none"> • Construction Sector • Textile sector 	<p>GCC, Chamber of Commerce, ZWS, SEPA, Ellen McArthur Foundation, LWARB, Keep Scotland Beautiful, WRAP</p>	<p>To investigate the most suitable platform to host the City Construction Forum – Covid-19 permitting. Forums to commence by Jan 2021.</p>

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ACTION	DESCRIPTION	THEME	TARGET	OWNER	TIMESCALE
8	Remanufacturing - support and develop the remanufacturing sector across the city.	Production	<p>Prioritisation of the remanufacturing sector, where possible, using public sector leverage. This would include using levers such as procurement, city development/planning and other policy options.</p> <p>This refocus would present further opportunities for the remanufacturing sector and stimulate innovation.</p>	GCC, ZWS	Suitable review of council policies and to support the prioritisation of remanufacturing, where possible by August 2021 .
9	Repair/maintain – support and develop the repair and maintenance of products with a set of initiatives targeting reskilling and material sharing.		<p>Initiate three pilot projects to support the delivery of a culture of repair and maintain.</p> <p>These projects should support development in the SME, community, and education sectors.</p>	GCC, Chamber of Commerce, ZWS, Scottish Government	Instigate pilot projects by August 2021 Prepare a short assessment on each project outlining any challenges, outcomes and unintended consequences by November 2021 .

Appendix 2: Action Plan

ACTION	DESCRIPTION	THEME	TARGET	OWNER	TIMESCALE
10	<p>Reuse and Sharing – support and develop the reuse and sharing sector. Promote the benefits of reuse and support local actors.</p>		<p>Pilot at least one reuse scheme within Glasgow City. This should test the feasibility of the recovery and reuse of materials between citizens including logistical issues regarding storage and handling. This will be undertaken in conjunction with city partners including HUBBUB.</p> <p>Consideration of a central municipal storage facility for reuse of domestic household waste items, electronics and textiles.</p>	GCC, ZWS, Scottish Government, Warp It, HUBBUB	<p>Undertake a reuse pilot in the city by August 2021. Prepare an assessment report to support city wide roll out by November 2021.</p>
11	<p>Packaging and Waste Reduction – support and promote the reduction of disposable packaging use, aligned to Extended Producer Responsibility.</p>		<p>Undertake baseline waste audits within the council estate to quantify the volume and type of waste produced, which will inform further internal policy.</p> <p>This internal audit will focus upon packaging, to support a sustainable covid-19 recovery.</p>	GCC	<p>To undertake Baseline waste audit by August 2021.</p>

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ACTION	DESCRIPTION	THEME	TARGET	OWNER	TIMESCALE
12	<p>Open and Accessible Estate - Support the opening of vacant and unused GCC estate/GCC property portfolio in order to provide space for circular innovation and start-ups with rent and rates amnesties to invigorate local action.</p> <p>This will include consideration of Community Innovation Hubs to support and promote the establishment of community incubators throughout Glasgow, which will foster new initiatives by providing premises and facilities.</p>	People	<p>Baseline audit of council property to be undertaken to identify under-utilised and vacant premises. This should identify which premises could be made open or available for organised sharing purposes, circular innovation, circular business start-ups, or other actors in the circular and social economy. Following on from audit of unused GCC estate Identify properties suitable for use as Community Innovation hubs. This would include those properties that are both multi-functional and multi-sectoral to support any circular innovation</p>	<p>GCC, City Property</p> <p>GCC, ZWS, Scottish Enterprise, Scottish Government</p>	<p>To undertake Baseline audit by December 2020.</p> <p>To identify suitable properties with a view to providing community hubs from April 2021.</p>
13	<p>Circular Kick Starter Fund – create an annual financial support fund for circular economy start-ups, providing seed funding, advice and connections.</p>		<p>Identify and ring fence a start-up fund to support circular innovation and circular business start-ups.</p>	<p>GCC, Business Gateway, ZWS</p>	<p>To identify a Circular Kick Starter Fund April 2021.</p>

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ACTION	DESCRIPTION	THEME	TARGET	OWNER	TIMESCALE
14	Grassroots Circular Project Support –providing an element of shelter to those circular projects that are fledgling and may not survive without additional support.		Undertake a research and information gathering project to spatially identify those grassroots circular projects across the city. This report will gather best practice, and collecting information on local and wider impact, and potential challenges faced by circular business.	GCC, Chamber of Commerce, ZWS, Scottish Enterprise	To undertake research and prepare short report by April 2021 .
15	Last Mile Delivery - Support and develop a “Last mile low-carbon delivery system” into the city centre.		Undertake a feasibility study into a “last-mile delivery proposal” for the city centre including reverse logistics opportunities. This would include reverse logistics to effectively capture materials for reuse and links to city distribution centres.	GCC, Chamber of Commerce, ZWS, Scottish Government, ECOSTARS	Produce feasibility report with recommendations by October 2021 .
16	Facilitate Closed Loop Circularity – develop potential linkages across the business community by opening up data on waste streams with a view to creating closed loop material and waste flows in the city.	Private	Establish a virtual exchange business platform across the business community to “match-make” waste streams with material inputs. This information would inform a database of materials and support material flow across the city.	Chamber of Commerce, GCC, ZWS, Business Gateway, Scottish Enterprise	To investigate suitable platforms to enable the creation of this information exchange and database by August 2021 .

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ACTION	DESCRIPTION	THEME	TARGET	OWNER	TIMESCALE
17	<p>Circular Events - develop a fuller understanding of the material and waste streams associated with events. This will also comprise an assessment of carbon impact.</p>		<p>Work with at least three key events in the city to identify and categorise carbon impact, material and waste streams to allow consideration of more circular action, and how it could feed into the Global Destination Sustainability Index.</p>	<p>Chamber of Commerce, GCC, ZWS Keep Scotland Beautiful Glasgow Marketing Bureau</p>	<p>To undertake a waste and materials audit on three key events by August 2021.</p> <p>This study could be extended due to restrictions imposed by Covid-19.</p>
18	<p>Food and Drink – develop a city wide scheme supporting those business that support sustainable, healthy, low carbon and local produce, as part of a resilient city Covid-19 response. Glasgow through the actions in this plan, will also commit to contributing to the Scottish Government food waste target to reduce Scotland's food waste by a third by 2025</p>		<p>Review and relaunch a city wide sustainable business scheme with consideration of existing best practice schemes such as the Glasgow Food Pledge and the Environmental Business Awards.</p>	<p>Chamber of Commerce, GCC, ZWS</p>	<p>Develop and assess options for city wide scheme providing recommendations report by December 2020.</p> <p>Scheme to become up and running by October 2021.</p>

Appendix 2: Action Plan

ACTION	DESCRIPTION	THEME	TARGET	OWNER	TIMESCALE
19	<p>Reskilling and Upskilling our Circular City (RUCC) Programme – Creating capacity through the delivery of partnership projects with business, community and public sector to provide training and reskilling in the guiding principles and building blocks of the circular economy.</p>		<p>Undertake a feasibility study to identify key skills gaps which are required for a post-Covid-19 green recovery.</p> <p>Define key milestones in the reskilling and upskilling (RUCC) programme, collaborating with partnerships across the city to identify and plug key skill shortages and gaps in knowledge and understanding.</p>	<p>Chamber of commerce, ZWS, GCC Education, HEFE sector, Skills development Scotland (SDS), SNOOK, Sustainable Glasgow</p>	<p>Undertake gap analysis and feasibility study by December 2020.</p> <p>Provide report into roll out of a range of reskilling initiatives through the RUCC Programme by October 2021.</p>
20	<p>City Doughnut - Develop a detailed analysis of Glasgow's social and ecological boundaries.</p>	Public	<p>Work in conjunction with Kate Raworth's city laboratory to carry out a City Doughnut exercise for Glasgow which will outline the strengths and weaknesses in terms of social justice and ecological impact. This will include participation in the Doughnut Economics Action Lab (DEAL) and collaboration across cities.</p>	GCC, ZWS	<p>Commence this project by January 2021.</p> <p>Provide progress report by October 2021. recommendations by October 2021.</p>

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ACTION	DESCRIPTION	THEME	TARGET	OWNER	TIMESCALE
21	<p>Circular Energy and Carbon reduction: Ensure that projects emerging in the forthcoming Local Heat and Energy Efficiency strategy (LHEES) support and encourage circularity principles.</p>		<p>Circular Energy and Carbon reduction: Ensure that projects emerging in the forthcoming Local Heat and Energy Efficiency strategy (LHEES) support and encourage circularity principles.</p> <p>heat generation, and including reuse of infrastructure and materials. This would also Explore opportunities to support circular and sustainable construction and retrofit for low carbon outcomes.</p>	GCC, ZWS, Scottish Government	Prepare a progress report by August 2021 .
22	<p>Circular Education – promote the concept of circularity, sustainability and responsible consumption to young people.</p>		<p>Support education providers to embed the principles of the circularity into knowledge and understanding across early years, primary and secondary schools. Embed this through workshop and collaboration projects.</p>	GCC Education, ZWS, Young Enterprise Scotland, Education Scotland, Developing the Young Workforce	Progress report to be prepared by August 2021 .

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ACTION	DESCRIPTION	THEME	TARGET	OWNER	TIMESCALE
23	<p>Sustainable and Circular Procurement – Review the existing internal sustainable procurement working group to ensure this is fit for purpose. This should work to evaluate and determine how best to embed key principles of sustainability and circularity into current procurement procedures.</p>		<p>Review the existing internal sustainable procurement working group. This will include consideration of how to recognise and support circular practice, eco-design and sustainable businesses by prioritising them, where possible, in the procurement process. This will also consider reassessing our current policies, using best practice and available tools to supplement these where possible and learn from European examples to influence development.</p>	GCC, ZWS, LWARB	<p>Review of the existing internal Sustainable Procurement team by December 2020.</p> <p>Prepare short feasibility report on opportunities for action by August 2021.</p>
24	<p>Sustainable and Circular Procurement Baseline - Work to undertake a mapping exercise of procurement activity across the Council family. This will generate a baseline of current sustainable practice and identify opportunities for securing the largest impact.</p>	Public	<p>Mapping exercise to be supported by the Sustainable Procurement working group to provide a baseline across the council family. This will involve identifying and collating information on current best practice and outlining opportunities to make the greatest impact.</p>	GCC NS Sustainable Procurement Working Group	<p>Mapping exercise to be undertaken via the internal sustainable procurement working group by December 2021</p>

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ACTION	DESCRIPTION	THEME	TARGET	OWNER	TIMESCALE
25	<p>Biodiversity and Ecological Emergency Work – support greening of unused vacant and derelict land to create carbon sinks and open space up for community enterprise.</p> <p>Empower communities and education groups to expand biodiversity learning and practical application to support upskilling, innovation and enterprise</p>		<p>Consider the widespread provision of growing spaces throughout the city making use of vacant and derelict land and properties. Carry out a land audit to identify suitable locations.</p> <p>Work with schools and community groups to further the knowledge and education of local growing in the city.</p>	GCC	<p>Prepare short feasibility report by April 2021.</p> <p>Progress report by June 2021.</p>
26	<p>Just Transition – Ensure that the principles of the Just Transition are included in any key circular action to enact a positive impact.</p>		<p>Preparation of a recommendation report to identify positive action and future opportunities for the city to develop a just and circular economy in Glasgow.</p> <p>To be developed with reference to the principles of the forthcoming EU Green New Deal.</p> <p>This will also be undertaken as part of the Doughnut Economics studies</p>	GCC, Scottish Government, Trade Unions, Common Weal	<p>Produce a recommendation report by August 2022.</p>

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ACTION	DESCRIPTION	THEME	TARGET	OWNER	TIMESCALE
27	<p>Healthcare – Following from the original recommendations of the Glasgow Circle Scan report, develop and support more circular practices in this sector.</p>		<p>Commence discussions with the NHS, private healthcare facilities and public sector healthcare operations to identify early opportunities to establish more circular practices in this sector.</p> <p>This will include consideration and identification of key waste streams *Covid-19 permitting*.</p>	<p>GCC, NHSGGC, Chamber of Commerce, ZWS, SEPA, Scottish Government</p>	<p>Initial findings report to be prepared By December 2022.</p>
28	<p>Social Economy Vision - Support and encourage a culture where the city council plays the combined part as employer, commercial partner, investor and enabler within the city economy.</p>		<p>Production of a Social Economy vision document for Glasgow. This document will act as “think piece” for a more social circular, and innovative economy. This will include key case studies, opportunities and best practice in community investment and expanding the principles of Community Wealth Building.</p>	<p>GCC</p>	<p>Produce Social Economy Vision report by April 2021.</p>

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ACTION	DESCRIPTION	THEME	TARGET	OWNER	TIMESCALE
29	<p>Circular City Platform - support pro-active citywide circular action, by the creation of an online circular platform to connecting all the organisations and individuals across Glasgow.</p>		<p>Develop and create an online "Circular City platform". This will be used build connections across the city. This should include information and advice, signposting to existing platforms such as "Warp It", and space for collaboration on larger projects or citywide funding bids. Connecting actors in sustainable and circular projects throughout the city and act as an online major material sharing hub.</p>	GCC	<p>To identify a suitable platform for the Circular City by April 2021.</p> <p>Platform to fully functional by August 2021.</p>
30	<p>Circular Economy Communications Strategy – Develop an ongoing communications campaign to raise awareness of the circular economy, impart knowledge and understanding to impact behaviour change and consumer choice.</p>		<p>Develop and commence a communications campaign designed to raise awareness of the Circular Economy and enact positive behaviour change in conjunction with a post Covid-19 green recovery.</p>	GCC, ZWS	<p>To develop and commence a communications campaign by December 2020.</p>

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ACTION	DESCRIPTION	THEME	TARGET	OWNER	TIMESCALE
31	COP 26 – Arts and culture challenge to create artwork that is a city response to the climate change conference incorporating circularity.		<p>Develop a Circular Economy challenge within the creative sector to stimulate thought, engagement and participation.</p> <p>This could form an annual challenge as part of a COP26 Climate Change legacy event.</p>	GCC, Creative Scotland, COP26 Delivery Group	<p>To develop a brief for the campaign by December 2020.</p> <p>Challenge to be complete by October 2021 for the commencement of COP26 in November 2021.</p>

Governance

The Action plan will commence once approval has been given by the City Administration Committee. Action Groups will be set up with partners listed and other interested parties to finesse the scope of each action, establish a term of reference, reporting process and desired and achievable outcomes. The action plans listed are an indication of the areas the city has identified as appropriate to concentrate on, however this is flexible and changing focus or refining each individual action plan after discussion with the action group is expected.



Front Cover photograph by Galina Walls