

CIRCULAR ECONOMY ROUTE MAP FOR GLASGOW - 2020







We are a city on a journey; transforming to meet the challenges of a new and unprecedented future. This route map outlines our vision to move forward with a circular approach and how we interact within our communities, throughout our city and across our nation. This route map aims to address the complex issues entrenched into the mind-set of a throwaway society. The concept underpinning the circular economy is not a new one, "making things last" and "mend and repair" were common mottos of generations past.

The principles of creating locally, extending the life of materials, taking care of and repairing items, and ultimately re-using wherever possible supports the city at its most basic level. These circular actions build resilience. They prevent the creation of wasteful practices and the loss of precious resources. They prevent the pollution of our environment and ensure that quality is an intrinsic part of our approach.

Glasgow has been part of the circular economy story for a number of years and the development of this document takes the city's involvement to new level. It will be the first of its kind in Scotland and we hope it will be regarded as one of the most progressive and inclusive route maps yet published. Within this route map, we will revisit core values in order to rebuild our city with an approach that is built to last. This Circular Economy Route Map marks our ambitions to support a green recovery and to bounce back stronger, despite many real challenges we face at a city level. Challenges such as inequalities and poverty, climate emergency and more recently the dramatic effects of the Covid-19 pandemic and the difficulties it has raised for our security and resilience as a city.

With a new vision encompassing a circular approach, we can recreate a future where we maximise the value in all of our materials and minimise our consumption. It is within a Circular Economy that the city will rebuild itself stronger, will be more connected, and more successful, ensuring a secure future for all Glaswegians.





Councillor Anna Richardson City Convenor for Sustainability and Carbon Reduction



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4 Circular Economy Route Map

1.0 Executive Summary



"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

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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 ecodesign, 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 underutilised 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/governancefinance/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.





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 addresses 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



"... 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;

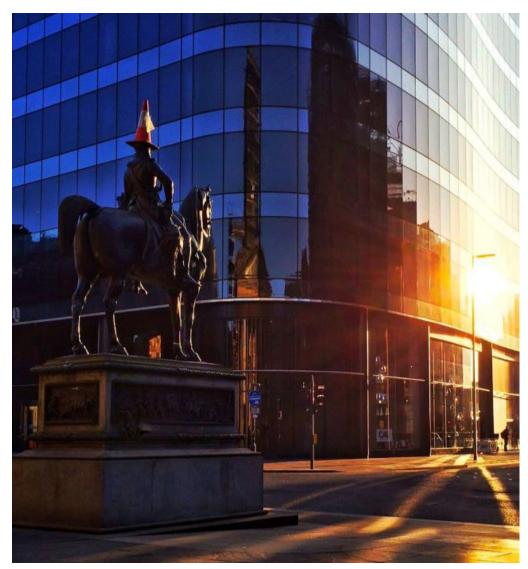
 Establish and mainstream the guiding principles of circularity. This includes environmentally regenerating the city through design, sharing, reuse, repair and remanufacture across the public, private and community sectors of the economy;

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/

 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-circulareconomy-design-out-inequality-as-well-aswaste/ Huffington Post - Circular Economy 2.0

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



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

3.0 Where are we now?



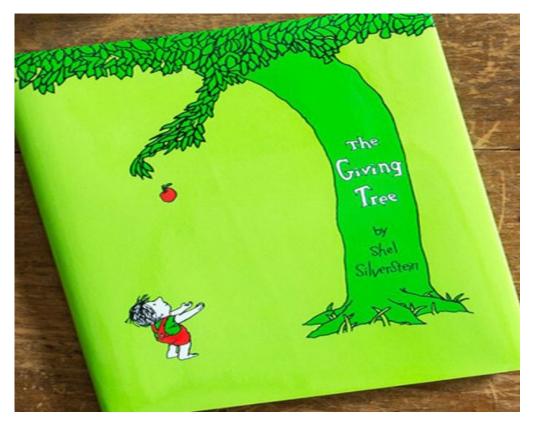
In 1964 American author. Sheldon Silverstein. wrote a children's picture book called, The Giving Tree. It tells the story of a selfless and nurturing tree and her relationship with a small boy as he grows through life. The boy takes everything he needs from the tree in a selfish and unthinking manner 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?



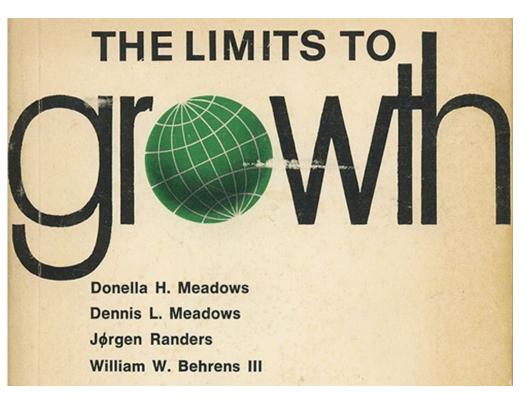
national level. This will build upon their influential strategy document, Making Things Last, which was published in 2016.

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-togrowth/ https://climateemergencyeu.org https://www.gov.scot/news/circular-economybill/





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 subsector focussed upon;

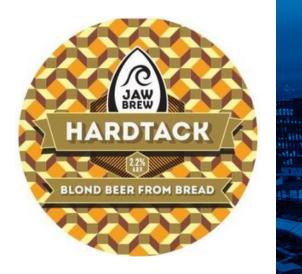


Heat Recovery: One key example demonstrated heat recovery from bakery ovens could save 15% – 30% of the energy currently used in the baking process.

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/





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.

an initiative of

CIRCULAR GLASGOW

CHAMBER OF COMMERCE

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 futureproof 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.

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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/
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https://www.gov.scot/publications/making-

things-last-circular-economy-strategy-scotland/



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 hyperalobalisation 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-healthopportunities-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



Glasgow City Council have previously undertaken extensive consideration of what it means to be a resilient city. Being awarded membership of the **Rockefeller Foundation's 100 Resilient Cities** global network in 2013, the city developed the strategy, Our Resilient Glasgow, through a broad and inclusive process of engagement with city stakeholders and citizens. Resilience is defined as "the ability to survive and thrive in the face of both the acute shocks and chronic long term stresses that face a city".

The strategy looked to identify both short and long-term challenges facing the city and its people and to set in motion a number of actions to build a more resilient response.

Focused on four defined pillars, these areas remain relevant, and are a key building block upon which we can develop our work to become a more resilient city now and in the future, taking a circular approach.

- Empowering Glaswegians. This pillar includes building personal resilience, upskilling and enabling us to support our citizens. This considers equitable access to local services, fostering wellbeing, creating spaces for social networks and to mitigate against social isolation.
- Unlocking Place Based Solutions. This pillar embraces placemaking at the heart of city development, ensuring that we are integrating delivery of services and learning from best



https://www.ellenmacarthurfoundation.org/news/more-than-50-global-leaders-pledge-to-build-backbetter-with-the-circular-economy https://medium.com/circulatenews/fixing-broken-supply-chains-47a780932ff9 https://www.glasgow.gov.uk/resilience

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.

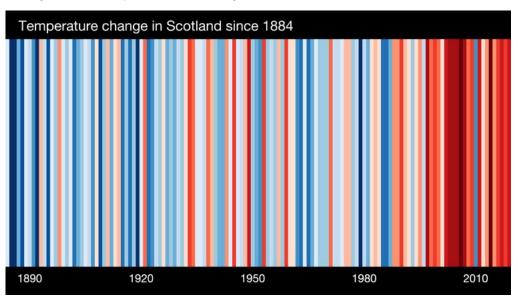


Figure 1. Temperature change in Scotland from 1884 to 2019



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

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

Postponed due to Covid-19, the



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 carbonintensive 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



IN PARTNERSHIP WITH ITALY

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.



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 placebased 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 placebased 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 indepth 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.



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



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



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

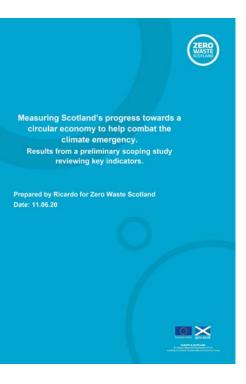


Measuring and monitoring progress and the impact of our actions is essential. It is important to any work programme, and our ability to evaluate the transition to a circular economy is no different.

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

https://www.zerowastescotland.org.uk/sites/default/files/Branded%20Report%20MetricsV1.pdf

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





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.





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

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ECONOMY

Figure 2. – The circular economy by Circular Flanders

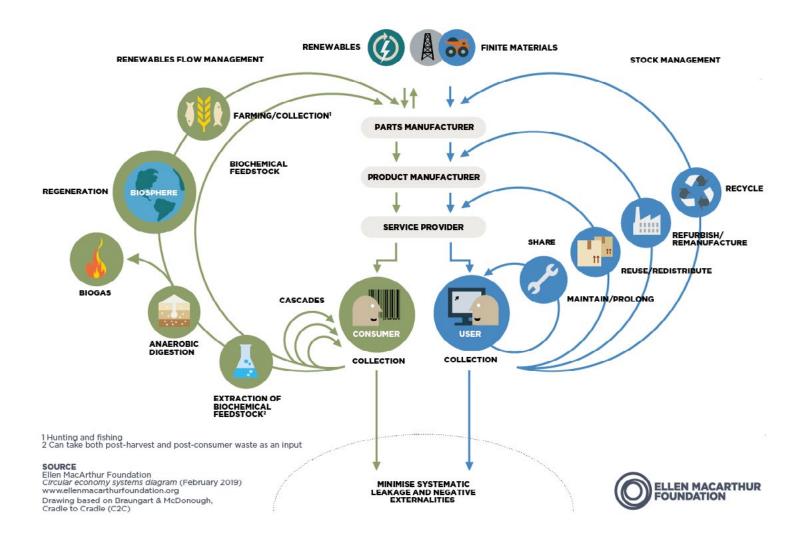
https://www.ellenmacarthurfoundation.org/explore/the-circular-economy-in-detail

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.





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 ecodesign 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



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 cooperatives to grasp the opportunity to create and share the benefits of this economic transformation

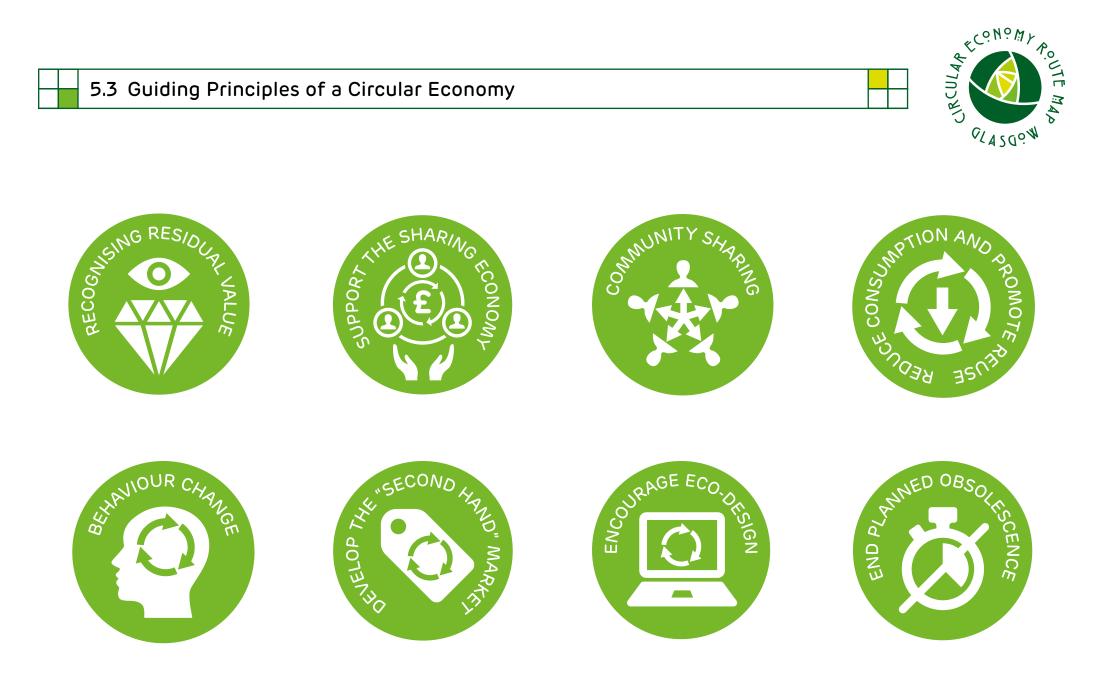
A truly circular economy can have a major impact on all layers of society. Improving the sustainability profile of the city through many means including new markets where the opening up of new opportunities could be a motor for environmental change, commercial success and social improvement. The main 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 UKwide 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 selfsufficiency 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.







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.





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 relinguished 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



Case Study 1: EGG Lighting



Location: Glasgow, Scotland

Guiding Principle: Servitisation/The Sharing Economy



EGG Lighting is developing the emerging strategy of servitisation. Located in Glasgow they are building a successful business model that is both innovative and circular. They are reducing energy and material waste and have been providing start-to-finish delivery of business to business LED lighting and sensor projects in the public and private sectors since 2013.

LED systems themselves have also been improving at a rapid rate. In just three years, over 50% savings in running costs are now possible when comparing original LEDs with the latest generation models. The rapid improvement in LED technology should mean that businesses experience this meaningful drop in their energy usage each year, but that's only if the LED lamps can be replaced periodically. That hasn't happened because most manufacturers don't design-in a route for repair and the reverse logistics to support it.

While upgrading LEDs to the latest models may make good economic

sense, it also unfortunately means generating a considerable amount of waste. While surveying a new installation of the latest LED lighting Brian O'Reilly, the owner and director of EGG Lighting realised "that we would be taking out a perfectly good LED lighting system that was going to end up just being disposed of. I really don't like waste, and I thought that there must be a better way". In fact, only 5% of the light fitting actually needed to be replaced meaning that 95% of the remaining material would be discarded unnecessarily.

Therefore, the core of EGG's value proposition lies with their in-house research and development team who produce bespoke innovation and technical solutions for clients. They are continuing to work in the sectors of modular design and servitisation of lighting to support facility maintenance analytics. This approach is adding value to business and also retaining value in Scotland's resources.

The sharing economy is a constituent element of Industrial Ecology50 where all processes and products are mapped throughout lifecycles to reduce environmental burdens. The UK National Industrial Symbiosis Program (NISP) operated by International Synergies51, which originated in Denmark, is an example where there are opportunities for private and public organisations to operate in the same way as nature where everything has a place and function, and nothing goes to waste. Industrial symbiosis looks at interactions between the environment, the economy and industry, and promotes aligning projects and requirements to share materials and minimise waste. They also provide research on new sustainable alternative materials, and help to identify circular principles through commercially viable opportunities on the basis that waste streams from one business can be used as an input for another following the example of a natural ecosystem, where everything is reused.

http://www.egglighting.com/





Figure 5 - Community Fridge in Dundee



A sharing approach enables localised community projects to thrive.

> 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.



Case Study 2: Southside Tool Library



Location: Glasgow, Scotland

Guiding Principle: Sharing

Tool libraries have been springing up around Glasgow where, for a small membership fee, customers can borrow a wide range of tools for DIY and gardening. It was recognised that many people buy these products and rarely use them, leaving them lying redundant in sheds. This type of initiative allows low cost access to items that might only be required once. Community groups such as Southside Tool Library explained the important social and environmental benefits of their service:

- carbon savings in just six months of lending tools, the Southside Tool Library gained 100 members and loaned out 200 unique tools (and counting!), saving half a tonne of carbon
- affordability members have saved over £5,500 in tool purchases

- carbon savings in just six months of lending tools, the Southside Tool Library gained 100 members and loaned out 200 unique tools (and counting!), saving half a tonne of carbon
- affordability members have saved over £5,500 in tool purchases
- social inclusion The tool library has also proved particularly popular with women – 70% of loans have been by women.
- empowering the tool library is giving Southsiders the ability to borrow the tools they need to improve their homes affordably and upskill themselves.

https://southseeds.org/tools/







Case Study 2: Southside Tool Library

Another type of sharing concept that has emerged is toy libraries. They have sprung up around the globe and one that has been developed in Gothenburg (Leksaks Biblioteket) is a great initiative where pre-school children donate the toys to allow other kids, especially under-privileged children, to play with them, teaching them at an early age that "sharing is caring". The toys are also all ecological without toxins or chemicals. By borrowing instead of buying the project is there to teach parents and the children. in a practical way, to reduce their carbon footprint through sharing instead of constantly buying new things.

Borrowing, renting, sharing or leasing can be seen all around Glasgow as the council's active and sustainable travel plan has introduced an ever expanding network of mass automated bike hire stations operated by Next Bike all over the city. Similarly, the city has long been promoting the use of car clubs and the new fully electrified Co-Wheels fleet is being introduced to the city in 2020. The city car club has been part of the Air Quality Action Plan for many years now and will play a key role in mobilising local communities with the introduction of Phase 2 of the Low Emission Zone which will encompass all vehicle types in 2023.

Amsterdam have formalised the concept of the sharing economy by instituting their own Sharing Economy Action Plan. The city plan offers many advantages, including: making use of public and private assets that would otherwise be underused; opening up new business opportunities and revenue streams for individuals and businesses; and creating connections between residents and visitors. Some of the areas they have developed are item sharing, high quality fashion rental, temporary vehicle rental, and a meal sharing platform to eliminate food waste.



Figure 6 - Next Bike Scheme in Glasgow

Glasgow Next Bike Scheme

https://www.leksaksbiblioteket.se/ https://www.nextbike.co.uk/en/glasgow/locations/





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".

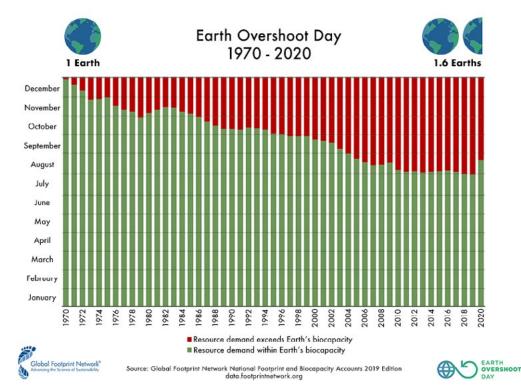


Figure 7 - Earth Overshoot Day from 1970 until today August 2020)

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/





"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.







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 inbuilt 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

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.



https://sustainabledevelopment.un.org/sdg12

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





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.





Case Study 3: Revolve (Zero Waste Scotland)



Location: Glasgow, Scotland

Guiding Principle: Reuse

From clothes to household goods and electronic equipment Zero Waste Scotland has championed the perception that "second hand is not second best" and have developed the national Revolve initiative.

Revolve provides a certification for retailers and this distinguished mark gives consumers confidence when considering to shop with approved retailers knowing their repaired and second hand reuse products are of the required quality. The network also supports social enterprises who are providing career opportunities and employment prospects for those furthest from the job market.

Revolve is currently helping with

training and business support to 59 organisations with 141 shops throughout Scotland.

The certification process supports re-use stores to meet all relevant legislative and trading standards including product checking for second hand goods.

https://www.zerowastescotland.org.uk/revolve







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 CO.

Savings Warp It has made for clients so far



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-unitedkingdom-uk/

https://www.zerowastescotland.org.uk/press-release/new-figures-show-shift-scots-second-handculture-revolve-network-provides-greater https://www.crns.org.uk/





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 quarantee 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 consumptionbased 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.





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. 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.



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 Figure 9 - Electronic waste in Accra, Ghana



https://www.telegraph.co.uk/technology/2020/03/02/apple-agrees-pay-500m-iphone-slowdownlawsuit/

https://eur-lex.europa.eu/resource.html?uri=cellar:9903b325-6388-11ea-b735-01aa75ed71a1.0017.02/DOC_1&format=PDF



Case Study 4: Fairphone



Location: The Netherlands

Guiding Principle: Eco Design

With an awareness of the vital components required to construct a modern smartphone coming from conflict and environmentally endangered zones, this Amsterdam company embarked on producing the most ethical and circular phone on the market.

Made from components that's can be easily swapped out with a takeback scheme and repaired without the need for expertise or disposal the Fairphone design is unique and is gaining popularity. It is now its third iteration and with the components improving to challenge the best on the market their reputation is growing too.

Fairphone also offer a unique perspective on the product you purchase by introducing you to the different challenges the company faces in sourcing materials and the impact it is having on local communities. Fully certified and responsibly sourced materials go into the Fairphones and they are the first and only smartphone company to be Fairtrade gold certified.

FAIRPHONE

https://www.fairphone.com/en/





ТΜ

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 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.

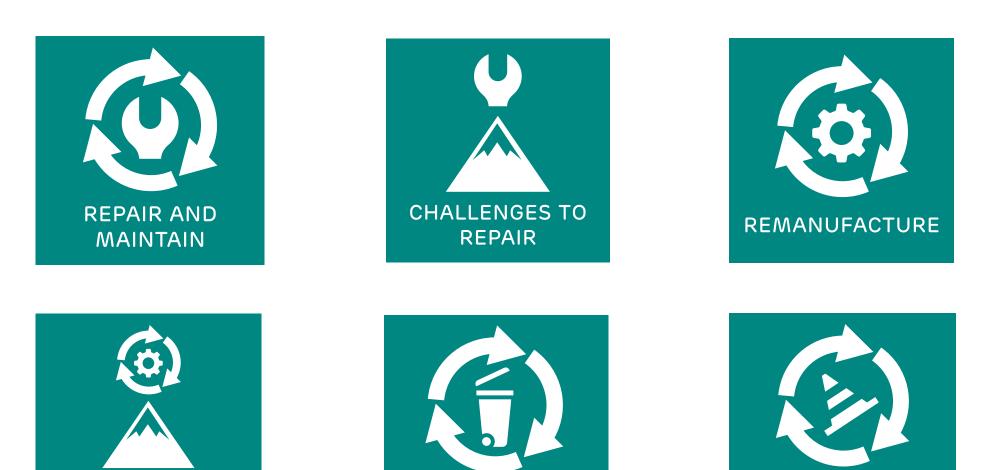


https://www.lensculture.com/articles/renee-c-byer-electronic-waste-dumpsite https://ec.europa.eu/environment/circular-economy/first_circular_economy_action_plan.html https://www.c2ccertified.org/ https://www.c2ccertified.org/get-certified/ cradle-to-cradle-https://www.c2ccertified.org/ products/registry

CHALLENGES TO

REMANUFACTURE





RECOVER AND

RECYCLE

RECYCLING IN GLASGOW





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 nonprofit 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 iourney 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





Case Study 5: Repair Café

Location: Glasgow, Scotland

Guiding Principle: Repair

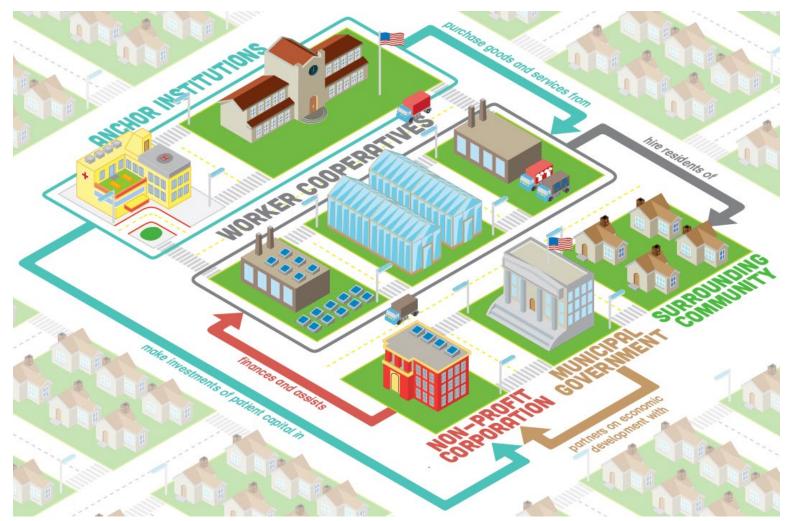
With too much waste built into the system, reuse strategies such as repair help to conserve energy, materials, and water. The reuse and refurbishment of electronics makes more efficient use of scarce materials, it reduces the carbon impact of transportation of new replacement products, and on a societal level a repair economy can provide jobs and opportunities within local communities. This has become a widespread movement throughout Europe with the proliferation of Repair Cafés since its inception in Amsterdam in 2009, and the network now extends to 36 countries with a local café in Glasgow's southside. The Repair Café also has a significant impact in building social capital as well as performing a technical function. Running many repair workshops to upskill citizens has developed a community spirit and a tangible social impact in Glasgow.







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 Cooperative 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 selfsustaining 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-Modelhttps://community-wealth.org/content/cleveland-model-how-evergreen-cooperatives-are-buildingcommunity-wealth





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.







The circular economy can be the catalyst for **Glasqow'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".

Zero Waste Scotland

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.

- 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

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

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



Case Study 6: Mackie Automatic & Manual Transmission



Location: Glasgow, Scotland

Guiding Principle: Remanufacture

A good and established example of remanufacturing in Scotland has been from the pioneers and leaders in the field of transmission remanufacture, overhaul & repair for over 40 years. Mackie is a wellestablished transmission company, having skills and knowledge in every aspect of automatic and manual transmission remanufacture, repair & servicing, including intelligent diagnostics & programming, removing and refitting.

Mackie Automatic & Manual Transmissions is the sole UK supplier of remanufactured transmissions for Subaru, Isuzu, Hyundai, Nissan and Chevrolet for warranty repairs. The company can provide remanufactured transmissions from stock with a warranty to cover the remainder of the original warranty period. This work makes up about 45% of their business.

Mackie employ over 25 highly skilled engineers, the majority of which have over 20 years' service experience each. Mackie's reputation in the automotive industry is well established and they know their products and workmanship are regarded as the equal of the original but they are also aware that perceptions still endure of second hand being second and they offer an open invitation to anybody wising to see their facility and procedures to reassure their customers. On a wider scale remanufacturing can have significant community benefits by creating parallel ancillary jobs with associated works like tool making, maintenance, component harvesting and scrap material markets to responsibly address industrial waste. These all create additional local employment, education and investment opportunities.



https://www.mackie-transmission.com/



Case Study 6: Re-tek



Location: East Kilbride, Scotland

Guiding Principle: Remanufacture/Reuse

The firm repairs and refurbishes functional used IT products and sells them on to new owners, sharing the revenue with the previous owner. This includes laptops, PCs, flat screen monitors and hand held electronics. Re-tek operates an 'incentivised return' business model which is a circular economy business model offering a financial or other incentive for the return of 'used' products, which can then be refurbished and resold.

Re-tek sources most of its equipment from medium to largesized businesses and public sector organisations such as the NHS, and they aim to re-market as much of the material received as possible. Approximately 80% of all equipment received is refurbished and re-marketed. Only equipment which is non-functional or has no market value goes to conventional IT recycling partners. **Of the recycling output, the average resulting landfill is just 1%**.

The benefits of incentivised return business models for Re-tek include

electronic equipment kept in use for longer, maximising the life of materials, ensuring a consistent supply of functional parts and machines to meet demand and develop to new markets which diverts perfectly useable items from landfill.





https://www.re-tek.co.uk/company/





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 warrantied 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/





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 reuse. Diverting waste from landfill or incineration and recirculating back into industrial and manufacturing processes necessitates cooperation, knowledge and sharing alliances.







The council provides a network of over 650 sites across the city where materials can be deposited for recycling which covers materials such 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 drv 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 longestablished waste treatment plant at Polmadie.



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



Received a solution of the sol

Case Study 6: Glasgow Recycling and Renewable Energy Centre (GRREC)

The GRREC facility is Glasgow's largest waste treatment facility dealing with all residual waste that has been processed at the Blochairn Material Recycling Facility. It handles 200,000 tonnes of council green bin residual waste every year. It diverts 90% of green bin residual waste away from landfill, saving millions of pounds. The facility produces enough energy to power the equivalent of 26,496 households and heat the equivalent of some 8,000 homes. The current heat and energy produced goes to operating the plant however it is proposed that this heat recovery will eventually benefit local housing through a district heating plan being developed. The GRREC also delivers an environmental saving to Glasgow of 90,000 tonnes of CO² every year and alongside improvements to recycling, an extensive community benefits package has been established. This scheme has created over 250 new jobs, including 17 apprentices, supporting local social enterprises, and small and medium sized businesses throughout the building programme and beyond.



The council also encourages citizens to reduce, reuse and recycle through passive messages embedded in the council website and recent reports show that this practice needs to be strengthened. The 2018 figures from SEPA indicate that Glasgow generated the most household waste in comparison to the other Scottish local authorities, with 245,318 tonnes. And, the recycling rate for Glasgow is the country's lowest in comparison with the other mainland councils at just 24.6%. The report also showed that Glasgow also sends the most household waste to landfill at 167.502 tonnes which is 68.3% of all the household waste generated in the city. These figures indicate a need for a substantial public education programme and improvements in the recycling infrastructure to encourage the citizens to participate especially to embrace food waste recycling.

https://www.glasgow.gov.uk/article/17042/Reduce-Re-use-and-Donate https://www.sepa.org.uk/environment/waste/waste-data/waste-data-reporting/household-wastedata

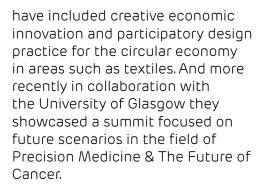
https://www.viridor.co.uk/energy/energy-recovery-facilities/glasgow-rrec/



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, researchdriven 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 # DESIGN INNOVALION THE GLASGOW SCHOOL # ARE



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-mantlefashioning-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/circulareconomy-quidance-for-construction-clientshow-to-practically-apply-circular-economyprinciples-at-the-project-brief-stage/



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/

strategy promoting bioscience to boost new forms of clean energy from waste and industrial by-products. Producing smarter, cheaper materials such as biobased 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 Transtion. 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

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/



- 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 antibacterial 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)

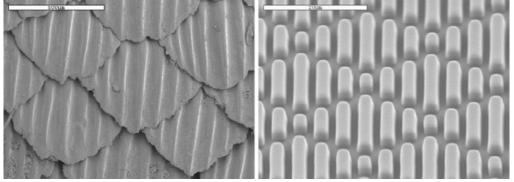
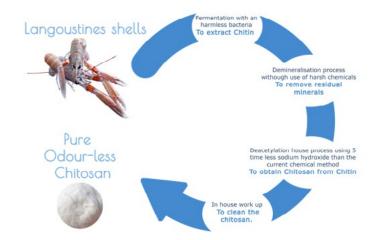


Figure 10 - innovative material

CuanTec's Process



- 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/



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 establish 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.

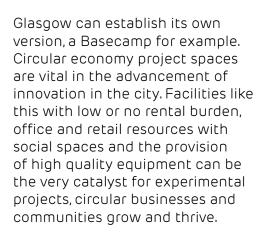
Projects will succeed and should be incubated to allow time for them to mature and be scaled up and although some may fail, which is to be expected, this should be looked upon as part of a positive learning experience. Innovation hubs can be the places to enlighten and expand knowledge.We can learn from 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



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



CIRCULAR ECONOMY PROJECTSPACE

For our people and our planet

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



co-working facilities open to all circular business projects that could complement the Tontine by taking advantage of vacant units all around the city. Similar to social enterprise initiatives, start-up innovation projects will be nontraditional and may struggle to access traditional business funding streams to support themselves in the early years of their existence. Zero Waste Scotland's Circular Economy Investment Fund could be accessed to help activate circular businesses and bring life to this opportunity.

As a local authority we have control of significant procurement muscle, we are providers of education in STEM subjects to stimulate and prepare the workforce, and we hold one of the largest property portfolios in the city. Therefore, the council is in a unique position to help provide facilities to circular initiatives and to kick start innovation projects for that workforce.

Kircular Economy Innovation Space ONE



Dansken equatorial telescope by Rouge One. Photo by Louise Miller Glasgow City Mural Trai



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





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 emergingmarket 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



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 alobally 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 selforganisation 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

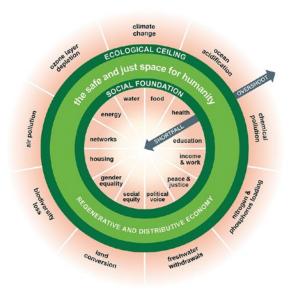


Figure 13 The Doughnut tool used to measure social and ecological impacts

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.

- 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

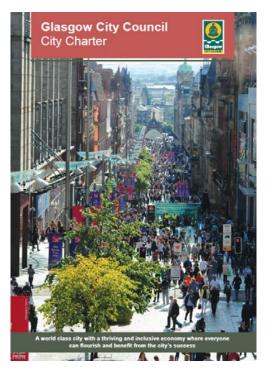
https://www.circle-economy.com/insights/the-amsterdam-city-doughnut-a-tool-for-transformative-action https://www.glasgow.gov.uk/strategicplan https://www.understandingglasgow.com/ https://www.glasgow.gov.uk/citycharter

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 reenergise 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 alobal 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



RESPONSIBLE

CONSUMPTION

AND PRODUCTION

"The Sustainable **Development Goals** are the blueprint to achieve a better and more sustainable future for all. They address the global challenges we face, including those related to poverty, inequality, climate change, environmental degradation, peace and justice."

United Nations

The UNSDG index allows a consistent and comprehensive framework to identify numerous elements that best reflect the pressures upon our city and enable Glasgow to establish a bold and visionary strategy.

DECENT WORK AND ECONOMIC GROWTH

With the knowledge that the city economy is inextricably linked to a profound and diverse impact on its citizens, Glasgow has expanded our focus and included additional goals to achieve an economy based on environmental improvement, sustainable economic growth and social equity. This Route Map identifies the following UN SDGs as important components of Glasgow's circular strategy.



SUSTAINABLE G

9.0 United Nations: Sustainable Development Goals

UNSDG 7 – Affordable and Clean Energy

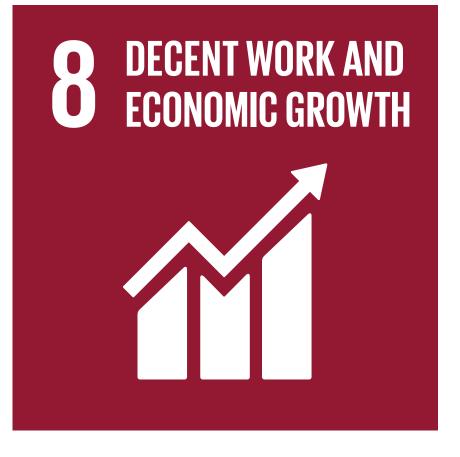




Ensure access to affordable, reliable, sustainable and modern energy for all. This is a vital component of the Circular Economy for Glasgow especially in the drive to achieve net-zero carbon by 2030. It also recognises an enduring problem in Glasgow and Scotland in a wider context, that of fuel poverty. Ensuring a fairer Glasgow based on economic sustainability and social justice enhances feelings of equality and empowerment and provides financial relief and carbon savings, which touches on all three main pillars of sustainability. This has previously been identified by the Affordable Warmth Strategy (2017-2022) which sets out the Council's ambitions for tackling fuel poverty, energy inefficiency and climate change up to 2022.

UNSDG 8 – Decent Work and Economic Growth





Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all should be intrinsic to this Route Map strategy from both a municipal and commercial point of view. Developing a circular city will increase opportunities, enhance life chances of our citizens where fair pay, security of employment, gender pay equality, and reskilling exist which are essential components of sustained and inclusive economic growth. To make the circular economy fully integrated into the city both public and private sectors should focus on creating an economic landscape which increases labour productivity in the green economy and invests in both physical infrastructure and skilled human capital.

UNSDG 9 – Industry, Innovation and Infrastructure



9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



Ensure access to affordable, reliable, sustainable and modern energy for all. This is a vital component of the Circular Economy for Glasgow especially in the drive to achieve net-zero carbon by 2030. It also recognises an enduring problem in Glasgow and Scotland in a wider context, that of fuel poverty. Ensuring a fairer Glasgow based on economic sustainability and social justice enhances feelings of equality and empowerment and provides financial relief and carbon savings, which touches on all three main pillars of sustainability. This has previously been identified by the Affordable Warmth Strategy (2017-2022) which sets out the Council's ambitions for tackling fuel poverty, energy inefficiency and climate change up to 2022. the construction industry. With particular focus on eco-design, future use and disassembly including climate preparedness to protect citizens and the economy from extraordinary chaotic weather events. Providing an economic landscape that can help to facilitate and nurture innovation and circular, sustainable and resilient projects would greatly improve the city's ability to respond to short term acute shocks and long term structural stresses.

UNSDG 10 - Reduced Inequalities





Reduced Inequalities should be an integral aspect of climate adaptation for Glasgow. As part of the circular economy project in Glasgow there has to be recognition that the economic system in the city has created stark inequalities. The City Charter has identified that inequality within Glasgow continues to be a significant concern despite progress in and efforts at narrowing disparities of opportunity, income and power. Therefore, social justice and inclusion must be integral to the Route Map to encourage a society that is fairer and more equal giving everyone in Glasgow the chance to flourish and improve their life chances and choices.

UNSDG 11 – Sustainable Cities and Communities

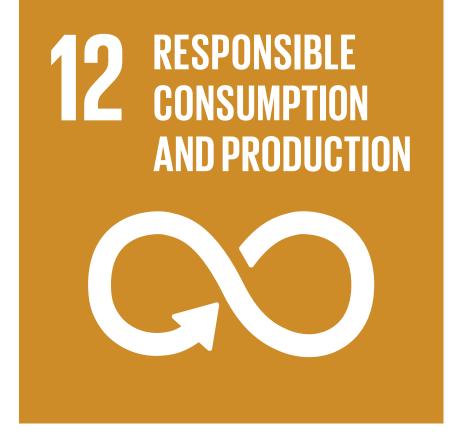




Make cities and human settlements inclusive. safe, resilient and sustainable. It is incumbent on the city administration, urban planners and business developers to identify areas of potential growth within the city, address inequities and help to develop local areas into places that attract investment, economic interest, jobs and social improvement. Social inclusivity can be achieved through community ownership models such as cooperatives where wealth is more evenly distributed and has been shown to be recirculated for local good. It is vitally important to re-energise the "town centres" of Glasgow, to localise the economy, engender participation and enable the provision of local employment, offering career opportunities to local citizens, helping to build a strong community spirit, increasing the sharing economy, reducing transport carbon emission and helping with fairer wealth distribution.

UNSDG 12 – Responsible Consumption and Production





This framework aims to tackle a significant aspect which affects all components of the economy, the development of a society that accepts and practices sustainable consumption and production. The Scottish Government has identified this SDG as being integral to the national legislation and sectoral plans. This is targeted at engendering sustainable business practices and consumer behaviour, together with adherence to international regulations. This will require a substantial commitment from the relevant stakeholders involved in the circular economy project in Glasgow to raise awareness generally and within the education system in particular on sustainable concepts starting with the very young and also being champions amongst the public and private sectors.

https://www.un.org/sustainabledevelopment/sustainable-development-goals/

UNSDG 15 – Life on Land





80% of all food will be consumed in cities by 2050. The current linear food system contributes to the prominent issues of obesity and malnutrition, however less well known is the measurable cost to the health service in Scotland of overweight and obese citizens which is estimated to be between £363 and £600 million not including the considerable individual, social, and economic consequences. The circular economy extended into food growth can design out waste and pollution, it could reuse materials, regenerate natural systems and provide good quality healthy products for consumption.

Scottish Government Riogholtos no h-Albo gov.scot

National Performance Framework

Find information on Scotland's National Performance Framework and how Scotland is performing against it.



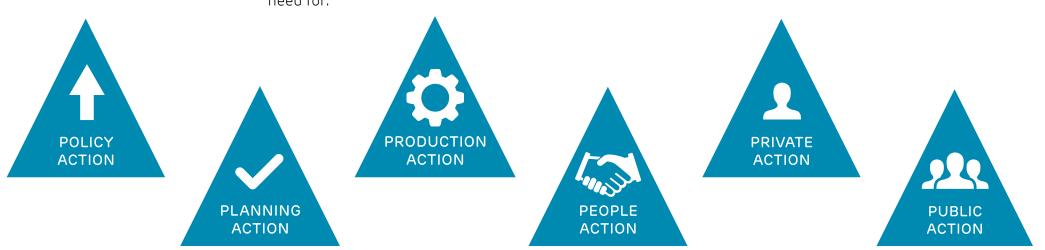
Further information on the Scottish Government's National Performance Framework is found here https://www.gov.scot/publications/scottish-health-survey-2018-volume-1-main-report/pages/62/ https://nationalperformance.gov.scot/



As the COP26 Conference approaches and the city continues to respond to the urgency of the Climate and Ecological Emergency there is a developing understanding that the post-Covid-19 recovery will play a major role in how the city adapts to the future. We support a Green Recovery, a recovery that requires more concern for future resilience, and less needless consumption. A recovery that builds strong communities, creates jobs, improves prospects and supports circular commerce, and recovery that is sustainable and socially just.

This will take radical change. To ensure that the embedding of a circular economy is positively transformative for environment, commerce and society we need to consider the different sectors within Glasgow and how they can be influenced. These include the need for: Consisting of 30 key actions, the following Route Map Action Plan is presented as building on the foundation of work that has already been undertaken and navigating a course to circular and sustainable future.

The complete Action Plan can be found in Appendix 2, with each action defined in more detail in the following pages.





10.1 Policy Action



1 Glasgow City Sustainability Charter

A new economic model for Glasgow must be incompatible with greed and poverty. Wasteful exploitation of precious resources has led us to this Climate Emergency and this cannot continue. Infinite growth based on finite resources can no longer be an acceptable economic model. We must campaign for a new system based on need with considerate and considered ethical consumption. There must be better quality, longer lasting products, better quality food, better paid jobs with better conditions of employment, inclusive green growth and an economic model based on "enough for everyone forever".

Glasgow City Council sees a sustainability charter as vital to enhance and mainstream the concept of circularity within the city. A City Sustainability Charter will be written and we will seek a commitment to circular economic and sustainable practices from the public sector, private business, academia, and community groups.



2 Collaboration

The Circular Glasgow network is in a unique position to represent the main participants in the economic landscape of Glasgow. The council must act as its citizens' advocate, the Chamber of Commerce provides vital representation for local business interests and Zero Waste Scotland enacts the national overview from the Scottish Government. Therefore we will collaborate with business, academia, non-governmental organisations and civil society organisations to fully open the conversation on the circular economy and drive change.

Glasgow must also look beyond its immediate boundary to neighbouring councils and towns to influence a regional approach to circularity which will ultimately have a defining impact on Glasgow's economy. Glasgow is at the heart of Scotland's only metropolitan city region with an extended population of 1.8 million and where the population of the greater Glasgow conurbation is around 2.3 million which generated £42.9 billion GVA in 2018. Many businesses and employees not located in Glasgow access the city daily and will be impacted by changes to the economic model and will be vital to the success of any circular economy proposals. Therefore, Glasgow will seek to strengthen relations and promote the circular message at a metropolitan level through the Glasgow City Region.

The City Council will continue to establish and develop partners across the globe building an alliance of like-minded cities and governments to share knowledge and projects and ensure that a bloc of circular cities demands structural environmental improvement for all of our citizens. Working closely with Zero Waste Scotland to develop metrics and indicators for the city is an essential aspect to ensure that circularity can be measured and reviewed robustly. This level of collaboration will create conditions to enhance support for local circular businesses, social enterprises and community projects and aid in integrating a network that can share resources, materials and facilities and strengthen linkages across the various sectors.



10.2 Planning Action



3 Develop a Circular Strategy for all Construction Projects

As with most cities in the UK the construction and demolition sector has the highest contribution to waste and carbon. It is therefore essential that collaboration and learnings are applied to this sector to reduce this impact. Glasgow City Council has officially linked with the London Waste and Recycling Board (LWARB) in 2020 as part of an EU Horizon 2020 project called CIRCuIT.

Along with a host of European cities and private industry partners this project is aiming to scale up the adoption of circular construction techniques at a city level through a series of demonstration, knowledge and skills sharing activities.



http://investglasgow.com/about-us/economy/ http://www.glasgowcityregion.co.uk/ https://www.lwarb.gov.uk/ https://www.circuit-project.eu/ Our planning authority is essential in the application of any circular policies that will affect the built environment and land use. They are responsible for the adherence to the City Plan and through planning policy and conditions we have to normalise the concept of modular construction. designing for disassembly, further promoting circular design principles in placemaking and the use of natural and sustainable materials with low embodied carbon. This could be constituted through an official Circular Economy Statement for Planning similar to that developed as part of the new London Plan by the Greater London Authority with support from LWARB to establish the requirements to which developers would have to adhere.

Like many European cities we need to consider a formal commitment to never demolish another building but retrofit instead and reuse the materials through effective project management and data categorisation. The UK Green Building Council (UKGBC) are a valuable resource for policy makers and clients and the council should develop a closer relationship with them to enhance a prioritised retrofit and sustainable construction approach in the city.



A new digitisation system is essential to co-ordinate and catalogue the materials in all construction projects. There is also a requirement to map the existing materials from in-situ structures and create a city or national catalogue which resembles the material passport directory in the Netherlands. This is achieved through an official block-chain data system allocating indelible digital values to each material, from quality and quantity to location and ownership.

4 Construction Materials

Large storage options within the city boundaries is critical to keep high value waste materials from being lost. The council can help in the short term to provide solutions by activating stalled spaces, derelict land, and void properties as storage opportunities. The council can also engage with property and land owners in the city to develop new business opportunities in providing storage and transportation solutions. Not only does this reduce the need to exploit valuable virgin materials and

https://www.london.gov.uk/what-we-do/ planning/implementing-london-plan/planningguidance/circular-economy-statementguidance-pre-consultation-draft https://www.theguardian.com/cities/2020/ jan/13/the-case-for-never-demolishing-anotherbuilding https://www.ukgbc.org/



10.2 Planning Action

promote the reuse and reverse cycling of existing materials it also has a major impact on national and transnational pollution emissions. The city will carry out a land and premises audit to identify suitable locations. There are numerous vacant and derelict brownfield and contaminated sites around the city that could be remediated and used as storage facilities to allow materials to be exchanged.

The council is in the process of developing a strategy to ensure that internal projects, especially those concerning the civic realm can reuse and share high value materials within the city. Paris has introduced a system where any public contract awarded by the council must first use materials that have been salvaged by the city for reuse. They have also set in policy the need for any contractor creating waste to collect the material and have it placed at the city storage facility for reuse by another contractor. These

policies require to be considered and if appropriate form part of the city planning and procurement policies. Zero Waste Scotland welcome engagement with the city on the development of these material hubs

Further to this we require to develop an online platform that can be used to exchange materials of these types and quantities, a pilot project is being developed to explore this aspect.

5 City Construction Forum

We must convene a collaborative network with developers, designers and architects working on projects within the city. By developing an official open forum we would enable a sharing space of ideas, knowledge and resources across the city between firms that are normally competitors. This should form part of any planning permission that the developer has to participate in the Glasgow City Construction Forum. We need to build this co-operative partnership to expand the possibilities of modularity, disassembly, designing out waste, layering fabrication, natural and sustainable materials. adaption and servitisation as well as reverse cycling and urban mining. There is also a requirement to raise awareness of the issue of embodied carbon in construction processes. The UKGBC have developed a free tool to estimate the carbon impact and this or something similar could become mainstreamed across the sector to ensure low carbon options are prioritised. Zero Waste Scotland believes there needs to be a country wide agreement on how embodied carbon is consistently measured within the build environment and have proposed a national group be set up through the Scottish Government to look at this. We also need to encourage the use and knowledge sharing around novel circular materials with



the assistance from our partners in the Chamber of Commerce, Zero Waste Scotland and the Construction Scotland Innovation Centre.

There is a very real potential of sharing materials across projects, whether through collaborative disassembly or joint purchase to reduce costs. We, as a council must insist on co-operation to ensure sharing of transportation deliveries and costs to avoid and reduce excessive emissions, and the co-incidental programming of projects that would minimise public through effective planning and collaboration.





10.3 Production Action

6 Re-manufacturing Sector

Support and develop remanufacturing within the city through planning and regeneration policy. Ensure the prioritisation of remanufacturing through refining the City Development Plan (CDP) and supplementary quidance. And promote remanufacturing where possible through public procurement policy. Working closely with Zero Waste Scotland, the Chamber of Commerce project and Developing the Young Workforce Glasgow to facilitate reskilling and capacity building within the current and future workforces. Help to stimulate innovation and investment in Scottish manufacturing sectors to better compete globally and support campaigns to promote the re-manufacturing sector, the quality of their products, and the socio-economic and environmental benefits it brings to the city.



REMANUFACTURE

7 Repair Sector

A radical shift to repair and remanufacturing will require the workforce to be skilled. knowledgeable and prepared. We must also build capacity with the public regarding an awareness of options to embrace a circular lifestyle in every household and office in the city. Promote the repairing of objects with a set of complementary initiatives to underpin repair sector infrastructure, enhance culture change messaging, support through marketing campaigns, provide reskilling and training

and facilitate material sharing across Glasgow.

Products that are repaired or refurbished are given a new life with its primary purpose. Electronics, mobile phones and computers can be returned to factory condition with data wiped and updated for new owners, this could help with disadvantaged families' education requirements. The repair sector can have a substantial impact on building community wealth through the social enterprise and cooperative movements. It is also perfectly placed to provide a solution to the Just Transition requirements facing the city in the coming decade.



Repair, reuse and sharing are central to the public awareness raising campaigns we will be embarking upon with Hubbub to raise consciousness throughout the city.

8 Reuse/Sharing Sector

For Glasgow to maximise the circular economy and help build the regenerative capacity of the city from the grassroots we need to endorse the message of reduced consumption. Over consumption and embodied emissions are a structural issue that has to be tackled through culture change. We must promote the reuse and sharing sectors as being integral to reducing carbon within Glasgow. To facilitate that position on the around we need to identify existing infrastructure that will be beneficial to spreading that policy.

We need to create central municipal storage facilities around the city for domestic household items, tools and even



10.3 Production Action



toys as shown in Gothenburg. The sharing sector can be developed further to encompass clothing rental and as we have seen in Glasgow with the incredibly successful bike and car sharing schemes.

The city needs to champion and build upon existing work in both sharing and repair activities to positively support second-hand behaviours. We must promote the benefits of reuse, support local actors and the Zero Waste Scotland Revolve initiative to grow the sharing and second hand economy to promote a "second hand as a first choice" narrative. The sharing economy can have a substantial impact on building community wealth through the social enterprise and co-operative movements. It is also perfectly placed to provide a solution to the Just Transition requirements facing the city in the coming decade.

Repair, reuse and sharing are central to the public awareness raising campaigns we will be embarking upon with Hubbub to raise consciousness throughout the city.



9 Plastics reduction

Glasgow aims to be free of Single-use plastics (SUPs) by 2022 and be free of unnecessary plastic by 2030. The differentiation would be that a plastic bottle is single use, but necessary. Therefore, an alternative is required. Whereas, excessive plastic packaging is also single use, but in the large part also unnecessary. Whilst in some cases plastic can present opportunities for more circularity in the economy, it is ultimately produced from a finite source. This means it is inherently at odds with the core idea of a circular economy.

Unlike aluminium, plastic cannot be recycled infinitely and recycling plastic multiple times will degrade it to the point that it is unusable and ends up in landfill or incineration. Therefore, curtailing the use of plastic in the city, as opposed to focusing solely on increasing recycling rates, fits into the broad aims of circular economy, whilst adhering more closely to the waste hierarchy. The implementation of the Plastics Strategy will hinge on active



participation as much as it will rely on policy. It will aim to address plastic use at events and in licensed premises in the large part after focusing on our own estate. Within this realm. the Council can use licensing levers to guide events and licensed premises away from using single use plastics. Broadly, the strategy will aim to provide education on plastic consumption to Glasgow. It will also focus on the use of plastic in schools, particularly in the school kitchens. The implementation of this will require participation from ourselves, the private sector, and the individual.

The current situation with regards to the Covid-19 pandemic has left us facing an unprecedented situation. We acknowledge that we are living in a new and unfamiliar reality, which will involve changes to the way we live and consume in the short term. Whilst the

https://www.glasgow.gov.uk/article/25330/Glasgow-Set-2030-Target-To-Be-Free-Of-Unnecessary-Plastics



10.3 Production Action



upturn in our reliance on single-use plastic items is understandable during lockdown, we remain committed to long term sustained action which adheres to the principles of the waste hierarchy, which is principally; to reduce, reuse and recycle wherever possible.

It remains to be seen if any potential increase in singleuse plastic waste will remain post-lockdown. Our challenge as part of our sustainable recovery will be to ensure the continued progress of actions in the Plastics Reduction Strategy, including raising awareness with regards to action on plastics and preventing their uncontrolled release causing further environmental impact.

10 Waste reduction

The council is a huge organisation with many different and challenging waste streams. We must show leadership in the city and carry out baseline waste audits within the local authority to quantify the amount and types of waste produced to develop an internal strategy to address any wasteful practices. This is designed to not only reduce the quantity of waste material but also to identify useful products that can be diverted to another process as a feed stock and spark a circular initiative. A wider resource mapping exercise of the city encompassing private and public sectors would help identify opportunities based on location and surplus materials.

As the largest waste handler in the city we must promote a general reduction policy across the city through our Waste Strategy team with social media and awareness raising campaigns. We must highlight the cost to the city of processing waste and how that money could be diverted to more productive and meaningful services for the citizens. We must campaign for a reduction in disposable packaging use and support the legislation surrounding Extended Producer Responsibility (EPR) and also the new Deposit/Return Scheme for drinks containers which, with some innovation could bring a new circular material resource for remanufacturing or production. Packaging EPR is more direct in that we know it intends to charge producers 100% of the costs of delivering efficient and effective household and commercial collections. It will also change the labelling to make it easier for consumers to understand. This potentially drives investment in Glasgow's waste services, increases the quality of collection and therefore opens the door to higher value recycling. The producer fees will be modulated based on recyclability and 'recyclable' determined by the consistency of collections at UK level.





10.4 People Action



11 Open Estate

The local authority is the largest property owner in the city and a vacant premises audit will allow for the consideration of opening up the estate to establish circular opportunities. The Council has to be at the forefront of re-energising our town centres with vacant and under-utilised properties being opened up for community projects and establishing innovation hubs. This will require a fundamental shift in property thinking to relax rates and rents and if possible provide long term amnesties to support new and fragile businesses allowing for them to mature. Capital costs can be recovered through long term planning and agreements which will provide security and flexibility that social enterprises and innovative start-ups cannot access from the private sector finance because of their nontraditional business plans.

The City Council will explore ways to create enabling

environments for business based on the Strategic Plan. It is important to give full consideration to increasing support for business startups, particularly in the most disadvantaged areas of the city by looking at changes to business rates and around concessionary rents.

12 Community Innovation Hubs

The council, alonaside Zero Waste Scotland, are investigating the possibility of opening workshops in town centres taking over empty units and establishing a new community trading, repair, refit and remanufacturing base. Post-covid-19 there may be opportunities to access more office space to provide more co-working facilities. This in turn will require rolling out training and upskilling courses to build capacity with the local population and handing over the established mature project to the community.

Expand the Tontine incubator concept and support and promote the establishment of community incubators throughout Glasgow to foster new initiatives, provide premises and facilities. Make these premises modern and comfortable multi-functional and multi-sectoral with food and refreshments, social spaces, wifi connections, meeting rooms and high quality IT infrastructure.

Consider new industrial and enterprise parks that group circular businesses together to allow for the free sharing of materials, knowledge and resources.

13 Circular Kick Starter Fund

Funding for new and innovative projects can be complex and disparate with many different support funds available with limited and strictly controlled criteria. Consider creating a support mechanism for circular economy start-ups that groups the advice and guidance and available funding in one place to make this easier to access.

The Kick Starter Fund could be co-distributed between similar, joint or complimentary projects that use and share resources and materials between each other to enhance the circular message within the city.

14 Existing Circular Social Project Support

We must ensure the projects that are currently fighting to survive are fully supported. We must conduct an audit in partnership with relevant stakeholders to identify businesses, projects, initiatives, social enterprises and cooperatives that fall under the circular umbrella.

Opening a city wide forum to share resources and project knowledge can help spread the circular message, open up new material streams and enhance collaboration throughout



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



This will not only make the sustainable movement in Glasgow more cohesive, it will open up more opportunities to expand projects and identify areas that require intervention.

15 Transportation

Transportation is vital to the economy of any city. However we must be mindful of the resultant traffic congestion, noise and emissions associated with traditional vehicular movements. Glasgow City is in the process of working towards the implementation of a Low Emission Zone, ensuring a stringent set of emissions standards for vehicles that travel into the city centre. (Timescales have the potential to be impacted due to the current Covid-19 pandemic).

With a focus on modal shift we must continue to work towards sustainable travel for our citizens, ensuring that transport options are accessible, affordable and low carbon. There are a number of areas outwith our current scope of influence. To this end we must fully explore opportunities to deliver an integrated public transport system, which would likely require consideration of the need for a re-regulated system.

We support concept projects such as the Glasgow Metro initiative and believe that we should expand our ambitions further by fully exploring the example set by major European and American cities like Luxembourg, Tallinn and Kansas City that have introduced a free public transport system. This would help encourage residents and commuters to choose public transport over private vehicles. These schemes focus on making transport services available to those on lower incomes which further creates economic benefits from added mobility and inclusivity of citizens and visitors.

An expanded system with new

low carbon technology on inclusive routes would reflect a modern progressive city. This vision will not only enhance connectivity, it will reduce emissions and support a low carbon, renewable economy, As part of the forthcoming Transport Strategy, the city will consider opportunities for last mile low-carbon delivery systems into the city centre and reverse logistics to effectively capture materials for reuse. Distribution centres on the periphery of the city could also help to organise these processes and create new business and employment opportunities and have a substantial positive impact on air and noise emissions.

Sustainable transport solutions and infrastructure constructed during the Covid-19 pandemic as part of the Spaces for People project have made it easier to choose active travel as an option to access the city, these measures should be evaluated and if successful be implemented on a permanent basis. As part of the Covid-19 response the Ellen MacArthur Foundation identified that multimodal mobility infrastructure and refurbishment, remanufacturing, and repair infrastructure were two important opportunities to help build a more resilient city. These aspects;

"offer solutions to key challenges created by the pandemic, but also: meet governmental priorities for economic recovery (e.g. stimulating growth and innovation, creating jobs, meeting Sustainable Development Goals (SDGs) and climate targets; offering circular economy growth potential (e.g. driven by innovation, policies, and evolving customer preferences); and helping reduce the risk of future shocks (e.g. those relating to climate change and biodiversity loss)".

Ellen MacArthur Foundation, Mobility







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 unchartered 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







10.5 Private Action

scale projects emerge from both new and existing industries. Zero Waste Scotland have wide scale business support programmes and the council's economic development group can advise and help businesses access funding and support.

18Food and Drink

Circular Glasgow must work with businesses to fully quantify material flow and the waste impact from the hospitality sector. Hospitality wise, Covid-19 has had a significant detrimental impact on planned activity. Zero Waste Scotland regards it as essential that any re-engagement strategy is empathetic to the fact that the sector is focusing on survival. Zero Waste Scotland will work closely with partners on ways of engaging with businesses and help them re-open greener and together identify opportunities and raise awareness through workshops and webinars.

Once a normality has resumed

the focus must be on the business journey from food waste reduction and prevention to implementing circular strategies using unavoidable food waste.

City restaurants and food outlets should be encouraged to source fresh food from local growers. This in turn will support that local economy and provide employment opportunities and solutions to under used land and buildings. The council can consider some kind of discretionary rate to consumers of locally grown food to encourage them to change their supply chain. Formal recognition can also be provided developed to encourage and enhance environmental reputation.

Glasgow has many acknowledged health problems and inequalities. While these largely mirror those of the rest of Scotland, the city has a particularly strong association with poorer health and shorter life expectancy than other

areas. The council can build on work already carried out by Environmental Health to influence businesses to alter their ingredients and practices and to support healthier eating. By promoting the already established Glasgow Food Pledge the city can encourage continual improvement from food outlets in the quality and types of foods they sell. This can be further embedded by promoting veganism and vegetarianism as circular ways of life which in turn can promote jobs and economy, and reduce the city's impact on the environment.

Glasgow Food Policy Partnership

is also a major asset to the city by bringing many diverse partners together, including the Council, Zero Waste Scotland, and the Chamber of Commerce to positively affect the quality of people's lives in Glasgow. The progressive charter from this group resonates firmly with the city's sustainable message about food and its production being good for the planet, good for workers, and good for local businesses. This Route Map believes the vision GFPP have for food in the city is in alignment with this overall strategy where they prioritise fairness, health, skills, community focus, shorter local supply chains and a diverse food economy that promotes local business and jobs.





10.5 Private Action



19 Textiles

In February 2020, the innovative re-use clothing social enterprise ApparelXchange in concert with the council arranged the first city forum dedicated to the questions and requirements surrounding the issue of clothing textiles within Glasgow. This initial conversation has brought into sharp focus the concerns over the wasteful consumption and disposal of clothing. The success of this forum must be expanded to include retailers of all sizes in the clothing industry in Glasgow to determine a pathway to sustainability.

The city textiles forum requires to formalise a defined textile plan across all main actors, retailers, and producers in the knowledge that EU legislation is coming in 2025 that will make discarded textiles a further burden on council resources. With this in mind the council must work with the forum, academia, business and its citizens to influencing behaviour and promote sustainable alternatives to landfill and the fast fashion high street.

Customer engagement is key to effecting change in the textile sector, well-informed consumers can positively influence change through educated choices and changes in behaviour. Skills and education will play a key part in transitioning to a more circular economy, and particularly for textiles there remains a lack clarity around the pressing issues in the sector from production to disposal as well as a lack of skills, particularly in relation to care and repair of clothing.

Working in collaboration with LWARB, Glasgow is exploring the initiatives to remove tonnes of waste clothing from landfill and re-route them as a feed stock to create opportunities and support the growth of new and existing sustainable economic opportunities including repairing, sharing, reusing, upcycling.

Reducing clothing waste can create economic, social and environmental value in Glasgow and alleviate the enormous volumes exported to developing nations that don't have the desire or infrastructure to cope with. We must refer to the council property audit to help retain textiles within the city



https://www.glasgow.gov.uk/glasgowfoodpledge http://goodfoodforall.co.uk/ https://www.apparelxchange.co.uk/?gclid=EAIaIQobChMImbHRiNLP6wIVx7HtCh2c-At1EAAYASAAEgJ-C_D_BwE





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.

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. 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.

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

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.

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

City of Glasgow College and

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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/circularconstruction



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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.









22City Doughnut

Inspired by the decision of Amsterdam to embrace the Doughnut Economic model of Kate Raworth, we are committed to formalising our economic intentions concentrating on all aspects of sustainability from the planetary ecological ceiling to the social foundation of Glasgow.

We intend to engage with stakeholders to perform this task and determine our social and ecological baselines to help direct our circular economy policies.

23 Energy and Carbon Reduction

As the council strives to achieve carbon neutrality by 2030 the local authority must ensure 100% renewable energy supply is used for all council properties and that we operate a decarbonised fleet that is fuelled from sustainable energy.

The council will produce an

updated Carbon Masterplan in 2020 to outline the requirements of the local authority and how we can meet these targets. On a wider city scale the development of the Local Heat and Energy Efficiency Strategy is ongoing to explore the opportunities and requirements to commence local and district heating networks throughout the city to localise the energy supply and reduce fuel poverty.

Renewable energy systems like solar or ground source heating can be a catalyst to create locally grown food allowing initiatives like vertical farming to really take off in Glasgow.

Furthermore, the LHEES will aim to assist in the uptake of Community Energy projects, feeding into the decentralist narrative of this strategy and granting citizens further autonomy over their consumption habits.

24Education

The city government will address climate justice through the education system which is key to culture change. It will take decades to unravel the wasteful linear mind-set and embed circularity in Glasgow; future generations are our hope and we need to give them the intellectual tools to build a sustainable and caring society. The value of knowledge cannot be underestimated. and education and reskilling are needed to prepare for a future where the organisation of society is going to be fundamentally disrupted.

Disrupted either by an economic shift to embrace a sustainable future and the re-alignment of industry, or disrupted by the catastrophic climate crisis that will continue to deepen if we don't.

https://www.gcu.ac.uk/study/modules/ info/?Module=MMH225906 https://www.lantra.co.uk/ https://www.glasgow.gov.uk/article/23332/ Energy-Efficient-Scotland-Route-Map

Therefore, the school curriculum must reflect the circular economy and build the necessary skills for a future where the choice to reduce. reuse, repair and remanufacture are mainstream. Education is absolutely vital to the economic strategy and school children across Glasgow have already shown they are willing to embrace the necessary changes. Inspired by Greta Thunberg's Schoolstrike for Climate protest our schoolchildren have been participating in demonstrations challenging the pervading established culture and demanding climate iustice for their future in uplifting campaigns, like our verv own Sunnvside Ocean Defenders. Their innovative and challenging approach has raised consciousness across the city and we want to capture that enthusiasm to help them continue their momentum. The development of pilot projects to enhance the knowledge and understanding of sustainability, environmental and climate





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







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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 education principles into knowledge and understanding across early years, primary and secondary schools. Through partnership working there is scope to extend this work into Glasgow schools.

As an organisation we will continue to build capacity and awareness within the Council through information seminars such as the Carbon Literacy training that we have commenced. This is intended to be rolled out further to city partners; such as the Sustainable Glasgow partnership, providing a foundation for mindset change across team, business, and communities taking a holistic view of the circular economy in Glasgow.

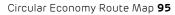
25Sustainable and Circular Procurement

Public sector procurement policies provide the city with a fundamental framework to establish the local authority as a circular organisation. Procurement can act as an enabler to support more sustainable action from suppliers. This work has already been considered through the Corporate Procurement Strategy (2018-2022) which sets out a clear approach for consideration of sustainable principles, and sets an action plan to do so. This work included the creation of the sustainable procurement working group. It is through this existing group that we will reconsider sustainable and circular action across the council family, determining if it is fit for purpose and refocusing on key action required to support the Circular Economy vision. For example; policies currently in place encourage suppliers to demonstrate their sustainable credentials to a maximum of 10% of their tender. Opportunities to further prioritise those suppliers undertaking sustainable practices should be explored.

Developing a series of metrics

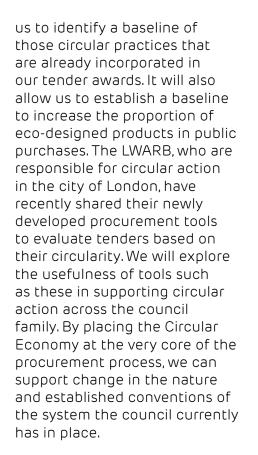
will allow us to identify a baseline of those circular practices that are already incorporated in our tender awards. It will also allow us to establish a baseline to increase the proportion of ecodesigned products in public purchases. The LWARB, who are responsible for circular action in the city of London, have recently shared their newly developed procurement tools to evaluate tenders based on their circularity. We will explore the usefulness of tools such as these in supporting circular action across the council family. By placing the Circular Economy at the very core of the procurement process, we can support change in the nature and established conventions of the system the council currently has in place.

This is a vital aspect of how the public pound can be used for common good. Supporting circular practices will build a positive reputation for the city and act as a catalyst will allow









This is a vital aspect of how the public pound can be used for common good. Supporting circular practices will build a positive reputation for the city and act as a catalyst to encourage change from private businesses wishing to work with the authority. The council's existing Sustainable Procurement working group will be revitalised to ensure that we accommodate learnings from others such as the Eurocities project, Big Buyers Initiative . This project identifies the importance of collaboration with others, potentially looking to other authorities across the region, to gain the maximum impact.

Upskilling programmes must be rolled out throughout the council to build officers confidence and knowledge and understanding with regards to the circular economy. Educating officers allows them to feed into the conversation and makes them acutely aware of the important contribution that they make towards the council's sustainable impact. This circular education will be supported by the roll out of the Carbon Literacy course. This course was developed and commenced in 2020 to address the climate

emergency and raise awareness of key action required. It is important to ensure buy-in throughout the organisation so that future designs, projects, and decisions reflect circularity.

It is worthy of note that procurement also affects private industry. We must consider support for initiatives that influence purchasing out-with the local authority's framework. Projects such the EU H2020 CIRCuIT Project will be invaluable in helping to identify the best ways possible to influence behaviour and encourage circular choices. This could be further assisted within the city by organisations such as the Glasgow Chamber of Commerce by continuing to promote circular initiatives through its informative and influential outreach work.

26 Soils Biodiversity and Ecological Emergency Work

Currently, the agrifood industry is responsible for almost a

quarter of greenhouse gas emissions globally and has degraded the natural resources on which it depends, polluting air, water, and soil. Further to this the globalised production of unsustainable monocrops has fundamentally altered the natural biodiversity and caused widespread deforestation in some of the most important environmental regions on the planet.

Focusing on a local food growing movement would allow the city to adopt regenerative practices support the development of healthy soils, develop community gardens, use circular urban farming systems, such as those that combine indoor aquaculture with hydroponic vegetable production which could help with sustainable food production and provide a security of supply and provenance of products. Under



https://www.glasgow.gov.uk/article/19647/Corporate-Procurement-Strategy--Annual-Procurement-Report



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the Community Empowerment Act 2015, all Scottish Local Authorities are required to produce a Food Growing Strategy for their area and the Glasgow Food Growing Strategy is scheduled to be delivered in 2020.

It is recognised that cities could not satisfy the supply requirements to fully provide an urban population therefore a regional and national approach would be required to collaborate with farmers, and rewarding them for adopting these beneficial approaches. A circular economy for food consciously emulates natural systems of regeneration so that waste is instead feedstock for another cycle. In such a system organic resources, such as those from food by-products, are free from contaminants and can safely be returned to the soil in the form of organic fertiliser.

The council can also expand its already impressive biodiversity education programme to expand knowledge, develop growing techniques and the provision of growing spaces would help to reduce the transboundary transport emissions and address the convenience and reliance on the carbon impact of importing unseasonable crops from the other side of the planet. The Climate and Ecological Emergency can also be a catalyst to green the city with native species of plants using derelict and contaminated land to create carbon sinks. The Avenues project has brought that greening approach to the city centre streets and itserves a double purpose: to counter emissions and also to cool the city.

27 Just Transition

A national commission on the Just Transition has been convened by the Scottish Government to open the conversation of diversification away from the hydrocarbon industry. The city must develop a strategy that identifies the impact and mitigation of the transitioning to a new economy based on renewable energy systems within the city. With net-zero carbon (2030) and significant greenhouse gas emission targets set within

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

https://www.gov.scot/publications/community-empowerment-scotland-act-summary/ https://www.glasgow.gov.uk/foodgrowing

https://www.rhs.org.uk/advice/profile?PID=911





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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, Cooperatives 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 netzero carbon target year.

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ASGOW

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 selfinterest.

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

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







therefore let us focus on developing innovation through co-operation by using the leverage of the procurement process to empower circularity and sustainability and shoulder the burden that many small operators in a precarious position cannot. As made clear by Professor Mazzucato, public funding has often taken financial and entrepreneurial risks that the private sector or communities cannot and will not. This has resulted in many of the great developments that we enjoy today that originated from pioneering work done in publicly funded institutions. The council can be a long term empowering and stable economic partner that can create co-operatives based on democratic participation, social responsibility and innovation similar to those in Cleveland, USA, The city can help develop social enterprises and community partnerships to embed a circular economy in the city that will make our society resilient and self-sustaining in

the face of the climate challenge.

Glasgow must look to localise the economy and by doing so it must regard public ownership as a vital component to build city resilience and offer a solution to the Just Transition. As a city we must rethink the security of food supplies, security of energy supplies and public transport, these services have to be regarded as crucial to the common good. These aspects of modern life are essential to ensure social continuity in periods of turbulence as the Covid-19 crisis has starkly shown. The Parisian model of the 15 Minute City brought to prominence by Mayor Anne Hidalgo has been enacted throughout the pandemic with lockdown forcing many Glaswegians to re-engage with their immediate surroundings, amenities and facilities. Glasgow has to build on this and ensure like Paris that we can create self sufficient communities from our Liveable Neighbourhoods programme.

We must engage with and learn from organisations like the Mondragon Corporation, a Basque confederation of local workers co-operatives. Since its founding it has grown into the tenth largest business group in Spain, an organisation with 266 companies and co-operatives employing more than 80,000 workers in Spain and abroad. The salary ratio between the lowest and highest paid worker is just 1:9 compared to 1:129 for the average FTSE 100 company and has annual revenues of over €12 Billion. What makes this model so attractive is how durable and resilient it is, Formed in 1956, it has survived and thrived throughout economic ups and downs, including the great financial crash of 2008. Glasgow could replicate this model in the city and have a mini- Mondragon of co-operatives giving employment opportunities and retaining wealth within our city.



30 Online Circular Platform

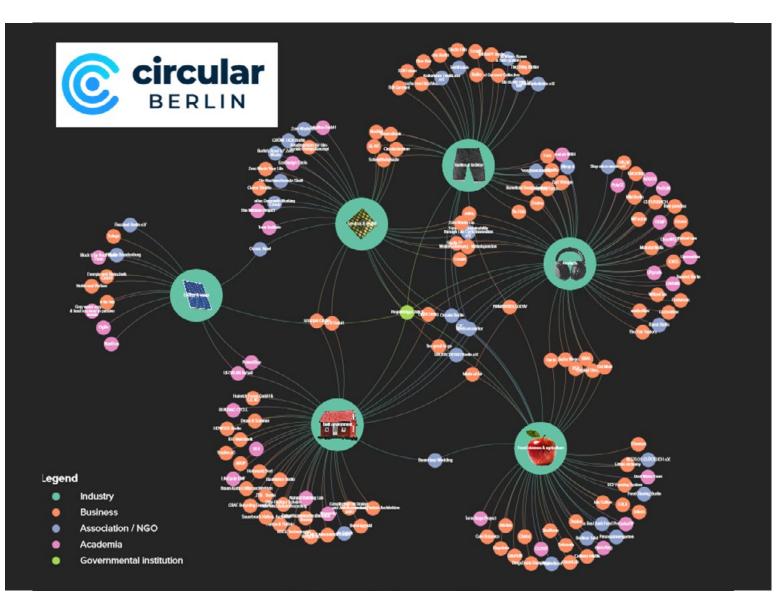
Explore a new Circular Economy online platform for information and advice including a connection to the Warp It website to increase the variety items available for re-use and recirculation. This is a facility that can act like an information hub by connecting all the organisations in Glasgow that are invested in the circular economy project.

http://www.evgoh.com/

https://www.theguardian.com/world/2020/feb/07/paris-mayor-unveils-15-minute-city-plan-in-reelection-campaign https://www.mondragon-corporation.com/en/about-us/







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/



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.

Must 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 multistakeholder 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,



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 the 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/circulareconomy-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 polices (policies), and functional approach going beyond the

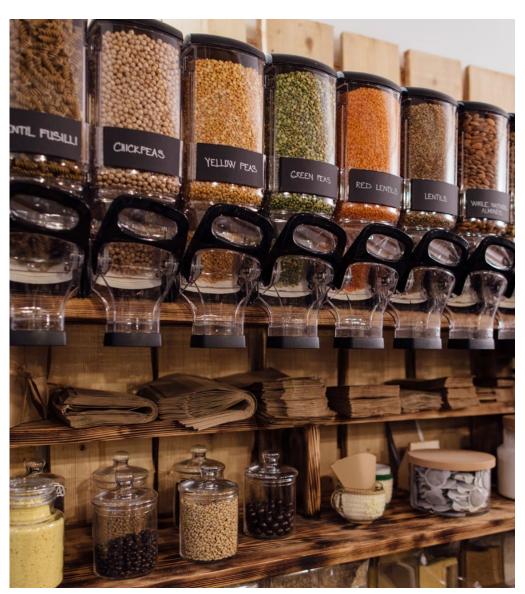


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administrative boundaries of cities and linking them to their hinterland and rural areas to close, narrow and slow loops at the right scale (places).

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.





(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.

Appendix 2: Action Plan



ACTION	DESCRIPTION	THEME	TARGET	OWNER	TIMESCALE
4	 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; Developing a municipal material passport catalogue for all public construction works. A pledge to never demolish another building. 	Planning	 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: 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	To investigate the most suitable means to introduce this Statement and have in operation by August 2021. Produce recommendation report consideration other supporting issues by October 2021.
5	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.		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.	GCC, Chamber of Commerce, ZWS, SEPA	To prepare a feasibility analysis on this pilot by August 2021 providing recommendations to rolling out city wide.

Appendix 2: Action Plan



ACTION	DESCRIPTION	THEME	TARGET	OWNER	TIMESCALE
6	CIRCuIT Project – Provide updates and learning outcomes from knowledge gained through participation in the CIRCuIT Horizon 2020 EU project.		Working with LWARB produce updates and trial initiatives into embedding the circular economy in the construction industry.	GCC, LWARB	Provide update reports and relevant findings on a quarterly basis beginning April 2021.
7	 Circular Forums – Host a series of Forums to support collaboration, knowledge, and best practice in a series of sectors including: 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. 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. 		Develop a series of Circular Forums to consider key challenges and opportunities towards creating a more circular city: • Construction Sector • Textile sector	GCC, Chamber of Commerce, ZWS, SEPA, Ellen McArthur Foundation, LWARB, Keep Scotland Beautiful, WRAP	To investigate the most suitable platform to host the City Construction Forum – Covid-19 permitting. Forums to commence by Jan 2021.



ACTION	DESCRIPTION	THEME	TARGET	OWNER	TIMESCALE
8	Remanufacturing - support and develop the remanufacturing sector across the city.	Production	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. This refocus would present further opportunities for the remanufacturing sector and stimulate innovation.	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.		Initiate three pilot projects to support the delivery of a culture of repair and maintain. These projects should support development in the SME, community, and education sectors.	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 .



ACTION	DESCRIPTION	THEME	TARGET	OWNER	TIMESCALE
10	Reuse and Sharing – support and develop the reuse and sharing sector. Promote the benefits of reuse and support local actors.		 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. Consideration of a central municipal storage facility for reuse of domestic household waste items, electronics and textiles. 	GCC, ZWS, Scottish Government, Warp It, HUBBUB	Undertake a reuse pilot in the city by August 2021. Prepare an assessment report to support city wide roll out by November 2021.
11	Packaging and Waste Reduction – support and promote the reduction of disposable packaging use, aligned to Extended Producer Responsibility.		Undertake baseline waste audits within the council estate to quantify the volume and type of waste produced, which will inform further internal policy. This internal audit will focus upon packaging, to support a sustainable covid-19 recovery.	GCC	To undertake Baseline waste audit by August 2021 .



ACTION	DESCRIPTION	THEME	TARGET	OWNER	TIMESCALE
12	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. 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.	People	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	GCC, City Property GCC, ZWS, Scottish Enterprise, Scottish Government	To undertake Baseline audit by December 2020 . To identify suitable properties with a view to providing community hubs from April 2021 .
13	Circular Kick Starter Fund – create an annual financial support fund for circular economy start-ups, providing seed funding, advice and connections.		Identify and ring fence a start-up fund to support circular innovation and circular business start-ups.	GCC, Business Gateway, ZWS	To identify a Circular Kick Starter Fund April 2021 .



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 .



ACTION	DESCRIPTION	THEME	TARGET	OWNER	TIMESCALE
17	Circular Events - develop a fuller understanding of the material and waste streams associated with events. This will also comprise an assessment of carbon impact.		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.	Chamber of Commerce, GCC, ZWS Keep Scotland Beautiful Glasgow Marketing Bureau	To undertake a waste and materials audit on three key events by August 2021 . This study could be extended due to restrictions imposed by Covid-19.
18	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		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.	Chamber of Commerce, GCC, ZWS	Develop and assess options for city wide scheme providing recommendations report by December 2020 . Scheme to become up and running by October2021 .



ACTION	DESCRIPTION	THEME	TARGET	OWNER	TIMESCALE
19	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.		Undertake a feasibility study to identify key skills gaps which are required for a post-Covid-19 green recovery. 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.	Chamber of commerce, ZWS, GCC Education, HEFE sector, Skills development Scotland (SDS), SNOOK, Sustainable Glasgow	Undertake gap analysis and feasibility study by December 2020 . Provide report into roll out of a range of reskilling initiatives through the RUCC Programme by October 2021 .
20	City Doughnut - Develop a detailed analysis of Glasgow's social and ecological boundaries.	Public	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.	GCC, ZWS	Commence this project by January 2021. Provide progress report by October 2021. recommendations by October 2021.



ACTION	DESCRIPTION	THEME	TARGET	OWNER	TIMESCALE
21	Circular Energy and Carbon reduction: Ensure that projects emerging in the forthcoming Local Heat and Energy Efficiency strategy (LHEES) support and encourage circularity principles.		Circular Energy and Carbon reduction: Ensure that projects emerging in the forthcoming Local Heat and Energy Efficiency strategy (LHEES) support and encourage circularity principles. 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.	GCC, ZWS, Scottish Government	Prepare a progress report by August 2021 .
22	Circular Education – promote the concept of circularity, sustainability and responsible consumption to young people.		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.	GCC Education, ZWS, Young Enterprise Scotland, Education Scotland, Developing the Young Workforce	Progress report to be prepared by August 2021 .



ACTION	DESCRIPTION	THEME	TARGET	OWNER	TIMESCALE
23	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.		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.	GCC, ZWS, LWARB	Review of the existing internal Sustainable Procurement team by December 2020 . Prepare short feasibility report on opportunities for action by August 2021 .
24	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.	Public	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.	GCC NS Sustainable Procurement Working Group	Mapping exercise to be undertaken via the internal sustainable procurement working group by December2021



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



ACTION	DESCRIPTION	THEME	TARGET	OWNER	TIMESCALE
27	Healthcare – Following from the original recommendations of the Glasgow Circle Scan report, develop and support more circular practices in this sector.		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. This will include consideration and identification of key waste streams *Covid-19 permitting*.	GCC, NHSGGC, Chamber of Commerce, ZWS, SEPA, Scottish Government	Initial findings report to be prepared By December 2022.
28	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.		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.	GCC	Produce Social Economy Vision report by April 2021 .

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ACTION	DESCRIPTION	THEME	TARGET	OWNER	TIMESCALE
29	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.		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.	GCC	To identify a suitable platform for the Circular City by April 2021 . Platform to fully functional by August 2021 .
30	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.		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.	GCC, ZWS	To develop and commence a communications campaign by December 2020 .



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.		Develop a Circular Economy challenge within the creative sector to stimulate thought, engagement and participation. This could form an annual challenge as part of a COP26 Climate Change legacy event.	GCC, Creative Scotland, COP26 Delivery Group	To develop a brief for the campaign by December 2020 . Challenge to be complete by October 2021 for the commencement of COP26 in November 2021.

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