

The Circular Economy & Cities

Implications & Imperatives



in partnership with

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The Business Of Cities

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What is the circular economy?

he concept of the circular economy has been emerging since the 1970s as an alternative to the 'linear economy'. The traditional 'take-makedispose' approach to products and assets is now recognised as wasteful of resources, and inefficient economically as the value of inputs is lost at the end of the lifecycle. New circular models seek to address these weaknesses.

The circular economy hinges on reducing, re-using, recycling and recovering materials in the production, distribution and consumption process. The concept redefines waste as a resource and aims to extract more value out of the supply chain. It promotes a better use of assets and resources within all economic sectors in order to achieve sustainability. As defined by the Ellen MacArthur Foundation, the concept is "restorative and regenerative by design".

To close the loop between consumption and production, the circular economy approach proposes actions both before and after use. Those actions rely on three main principles:

OPTIMISE. PRESERVE MPROVE **Optimise the way Preserve value:** Improve productivity resources are used: use maintaining the in the production of renewable energy highest possible value and consumption resources, efficient use from input materials in journey, minimising of primary resources, production processes externalities and improved waste

and final products





collection and resource recycling.







system leakages.





Source: Ellen MacArthur Foundation



GLASGOW









2 Why is the circular economy evolving now?

In the past five years, a number of drivers have accelerated the profile of the circular economy:

Online references to Circular Economy, 2004-2018 Source: Google Trends



The global sustainability agenda

The agreement of the 2016 Sustainable Development Goals (SDGs) has prompted many countries to shift their attention towards a circular approach that creates a more efficient supply chain, across all sectors, from food to manufacturing to construction. The circular economy is a vehicle to achieve several of the SDGs.

Pressure on infrastructure and increase in resources consumption

The unprecedented growth of middle-class consumers implies greater use of already limited resources and more pressure on infrastructure. The circular economy enables stakeholders to address those issues through efficient resource management, sharing platforms and extended products' lifecycles.

Stretched public budgets

The budgetary and demographic challenges experienced by local and regional governments around the world have encouraged more to explore the 'reduce,













reuse, recycle' approach of the circular economy. Programmes such as Sharing City Seoul is one of many that seek to cut municipal costs, incentivise businesses to minimise waste and optimise spare capacity, while fostering new business opportunities and relationships.

Rise of new technologies allowing for things to iv happen

The rise of new exponential technologies in this cycle has triggered a shift from the physical to the virtual, enabled by the digitisation of services, and better management of resources. Mapping technologies make it easier to visualise the networks and create synergies between different sectors.

library: a newly opened library at Starfield COEX Mall, Seoul, South Korea















3 How are cities addressing the circular economy?

Cities generate around 300 billion tonnes of waste each year and also account for 70% of global CO₂ emissions.

Amsterdam, Malmö and a number of Danish cities have all launched comprehensive citywide circular strategies



s engines of economic change and innovation, cities can play a pivotal role in the transition to circular economy by embedding the principles of the circular economy across all urban functions and policies. Many cities around the world are already taking a lead. Amsterdam, Malmö and a number of Danish cities have all launched comprehensive citywide circular strategies. Amsterdam has released Circular Gemeente Amsterdam, a roadmap providing guidance on how to foster circularity in the city's value chains. The city encourages initiatives across sectors, with the aim to turn Amsterdam into a living lab for circular innovation.













ther cities are starting their transition to a more circular economy. In 2016, Glasgow, for example, completed Circle Economy's Circle City Scan to understand how to make the city more sustainable. The study aimed to identify the sectors with the greatest circular potential and define strategies for the City to reduce its environmental impact while strengthening its economy. Further to this, the Leader of Glasgow City Council announced in October 2018 that the city will be establishing a Circular Route Map for the City in 2019. A common first step for cities is the establishment of targets: Austin, San Francisco and Phoenix have all developed zero waste masterplans. The creation of new public departments and programmes demonstrate cities' desire to incorporate the circular economy to their daily operations. The City of Toronto has established a Unit for Research, Innovation and Circular Economy to help it reach its goal of zero waste. The unit's task is to incorporate the principles of the circular economy into new programs, procurement and processes.

In 2016, Glasgow completed Circle Economy's Circle City Scan to understand how to make the city more sustainable















4 How does circularity transform construction and real estate?

onstruction and real estate are among the sectors that make the most intensive use of raw materials, which is why adopting the principles of the circular economy would have a significant impact on both sectors. Four main impacts of circularity on construction and real estate have been observed:

Arup's circular model shows how circular economy principles apply to commercial property:













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More affordable and flexible construction process

The reuse of materials provides more security of supply and protects developers against volatile prices of raw materials. For example, Alliander's headquarters in the Netherlands was built from re-working and extending an existing building. 90% of the building materials were reused or remained on-site, thus reducing resource use and transport emissions. The use of reversible connections enables a more modular approach to buildings: it is now possible to re-assemble them by changing the layout or adding floorspace without having to demolish them entirely.

The following graph by Arup demonstrates the embedding of circular economy principles in the built environment:



Source: Arup (2018) -First steps towards a circular built environment













Potential for greatly improved operational efficiencies

Well-designed buildings can now generate energy and facilitate closed loops of water. Digitally-enabled assets are able to regulate room temperature and electricity consumption, thus leading to cheaper electricity bills for occupiers. Technologies such as BIM can also improve decision-making and performance across the building lifecycle. In emerging cities such as Bangkok, circular approaches are helping mixed-use development achieve more than 30% more efficiency of water, energy and CO_2 consumption.

Increase in building use and occupancy models

Circular economy facilitates increased density through shared occupancy. Maximising building value and minimising vacancy through daily use or building cycles, it helps to improve asset utilisation and extend the lifespan and usability of a building.

Greater returns on good design

For the efficiency, flexibility and reuse benefits to be unlocked, buildings' performance has to be embedded into design processes. High-quality design also minimises externalities and leakages during building operation.

High-quality design also minimises externalities and leakages during building operation















The Royal Institution of Chartered Surveyors (RICS) created this model to show how the new definition of waste as a resource and design principles can spur new circular business models:



Source: RICS Training (2016) - What is the Circular Economy to the built environment













How can cities encourage the real estate sector to embrace the principles of the circle economy?

City governments have at least five key roles in helping their real estate sectors to adopt circular economy approaches.

As a planning authority

As a planning authority, cities can adjust planning regulations to facilitate development or encourage embedded circularity. When granting building plots in Buiksloterham district, the City of Amsterdam selects on the basis of circularity and sustainability. Instead of top-down planning, some cities such as Antwerp have decided to engage more with end users and customers to identify and agree space and processes.

As an owner and user of land and buildings

As an owner and user of land and buildings, public land can be earmarked for circular economy partnerships with private developers. For example, the city of Phoenix has created a Resource Innovative Campus on 50 acres of vacant land where others can collaborate, research and find resource effective solutions. Cities can set clear targets for all public land and buildings. The City of Charlotte, in collaboration with the non-profit Envision Charlotte, has decided to repurpose a former facility of the Fire Department into a circular economy incubator. These types of initiatives can be scaled up through creative use of land and property resources.

As a procurer of services

As a procurer of services, cities catalyse the introduction of circular economy goods and services including leasing of façades and materials. 12 Danish cities













have established the Partnership for Green Public Procurement with national and regional governments, with the aim to integrate green goals in their procurement policies. The city of Egedal developed a local plan with circular requirements, including solar collectors on the roof, intelligent control and data collection of energy and water consumption and heat recovery.

As a convenor

As a convenor, city governments can promote knowledge sharing through accessible platforms hosting information portals and guidance. Some cities, like Amsterdam, provide case studies of successful projects to encourage best practices and support entrepreneurs. Cities can also use workshops and targeted discussions to bring together local and regional stakeholders to sport opportunities for closed loop services.

As a standard setter

Cities can also act as standard setters, through bold public initiatives and by spreading best practices. Tokyo has successfully reduced its waste volumes and landfill volumes by 95% and 85% respectively, as a result of several circular practices such as strict pollution standards for incineration plants and the conversion of ash into slag for use in construction work. In 2011, it established the International Cooperation Division of Waste Management to share its skills and experience in waste management. Similar initiatives could be applied to the real estate sector.

The city of Egedal developed a local plan with circular requirements, including solar collectors on the roof, intelligent control and data collection of energy and water consumption and heat recovery















6 What are the business models and practices that this brings?

he circular economy requires new business models and practices to replace the 'take-make-dispose' model and enable access to materials downstream. Five circular business models have been identified:















Sharing Economy Models

Business models based on the sharing economy are very valuable for circularity. Companies like Airbnb and WeWork bring solutions to increase density and minimise hidden vacancies, thus maximising the asset's value. The circular economy supports intensification and leverage of activities.

Leasing Models - 'Product as a Service'

The circular economy challenges concepts of ownership and encourages leasing models for goods and services. With a leasing or product-as-a-service model, manufacturers retain ownership of their products and their energy and materials, so they are incentivised to make them more energy efficient and durable. This enables better maintenance, reconditioning and recovery. For example, Singaporean-based Kaer has developed Air-Conditioning as a Service, whereby the client pays a fixed pay-as-you-use rate once the building is in operation. The optimisation of INSEAD business school campus' air-con system on this basis resulted in a 35% cut in energy use within six months and substantial associated savings.

Circular Inputs

Focusing on the beginning of the supply chain, businesses should maximize the use of inputs that are renewable or that can be reused. Construction companies should replace raw materials with non-toxic, reusable or biodegradable materials as much as possible.

Resource Recovery

In the circular city, buildings become "material banks", stockpiles of valuable materials that can easily be taken apart and recovered. Passports help identify the origin, composition and characteristics of materials to enable their recovery and future reuse, preserving most of their economic and environmental value. 'Design for disassembly' is increasingly preferred to demolition as it helps recover more useable materials from buildings at the end of their lifecycle.

Product Life Extension

Circular economy also promotes real estate data collection to monitor a product's performance throughout its lifecycle. It is spawning firms who specialise in preventive maintenance, refurbishing or retrofitting that can be planned at the optimal time to increase the building's lifespan.















How can city Government and city business leaders work together to drive the promise of the circular economy forwards?

Ithough national governments and inter-governmental bodies can foster circularity by passing legislation and adopting action plans, city governments often have more influence on adoption. They can encourage real estate actors to take a more holistic approach to buildings' lifecycle. Vancouver has passed a Green Demolition bylaw requesting all pre-1940s homes be deconstructed instead of demolished, with a minimum of 75% of materials being reused or recycled.

Public Procurement

City authorities' public procurement is a critical tool to encourage business leaders to adopt a circular approach. For example, in its tender to build 40 new homes, the City of Odense added green procurement requirements to ensure alternative materials for insulation, recycled bricks and energy-efficient solutions including LED lighting and solar water heating. Lower operating costs are expected to offset the extra initial investment.

City of Odense added green procurement requirements to ensure alternative materials for insulation, recycled bricks and energyefficient solutions















Initiate Pilot Projects

Local governments can also initiate pilot projects at all levels to engage business, support local innovators, raise citizen awareness and enable information sharing. Antwerp's Circular South project is one that aims to encourage residents in the city's New South district to use materials, energy and water in a more sustainable way, through a novel system of challenges, competitions and monitoring. Antwerp is also encouraging sharing and repairing initiatives within the design and school communities.

Investing in More R&D

Companies can also play an important role by investing more in R&D in order to find edges in terms of design, functionality and consumption that can bring about more profitable business models. In real estate for example, this means finding ways to reuse materials, improve the design process and make better use of energy. Google & Arup have partnered to create prototype buildings to show how designers can choose better materials, design for disassembly and make buildings more energy-efficient.

Google & Arup have partnered to create prototype buildings



Circular Business Strategies

Companies can also make a stance and incorporate circular principles to their business strategy. For example, the Dutch bank ABN AMRO has committed to making its real estate portfolio more sustainable and ensured all homes and offices financed by it had an average label A by 2030.













Collaboration Within the Supply Chain

Collaboration within the supply chain is essential to ensure complete circularity. For people down the supply chain to understand what manufacturers need to produce goods and services, all actors need to be involved and communicate, and vice versa. For instance, the demolition company was involved in the planning of the construction phase of the Park 20/20, near Amsterdam. This enabled greater recovery of materials used in the park when buildings were not in use anymore. In Sydney, 23 major property owners and influencers, overseen by the city government, have established the Better Buildings Partnership to find ways to increase recovery rates. Via large-scale collaboration, trials and changes to waste management processes, they have been able to show that a 60% recovery rate can be achieved at no additional project cost.

In Sydney, 23 major property owners and influencers, overseen by the city government, have established the Better Buildings Partnership



Partnerships

Partnerships between city governments and business leaders can also foster circularity by promoting its benefits while unlocking capital for city governments that can be used to support circular innovation. Recognising the importance of partnerships, the Ellen MacArthur Foundation has launched the Circular Economy 100 programme to promote knowledge sharing, capacity building and networking between cities and other key actors from the business and academic community.















A number of cities, districts and buildings are pioneering approaches to the circular economy:

Park 20/20 in Metropolitan Amsterdam

Park 20/20 in the north-west of the Amsterdam region is the first sustainable park to follow the 'Cradle-to-Cradle' concept. Its buildings' design optimises their energy use during their operation and disassembly. While part of the materials can be reused indefinitely to build other buildings or products, other parts serve as biological nutrients for the soil. Solar panels on the buildings' roofs transforms energy into electricity used for light and heating. Rainwater is collected for sanitary purposes, and sewage water is filtered, thus reducing water consumption.

Park 20/20, Amsterdam















Quay Quarter Tower, Sydney - 3XN

For the regeneration of the former tallest building in Sydney, the Quay Quarter Tower, 3XN Architects have reused 98% of the existing bearing structure instead of demolition. Nearly 70% of the materials were upcycled, saving more than 7,500 tons of CO₂. The redesign of the 200-metre tall high rise includes flexible facilities and optimised views of the harbour. The rotational façade creates sun-shade, eliminating the need for blinds. The project was estimated to save the owner, AMP Capital, AUD \$130 million (£70 million) compared to a full demolition. It also saved construction time and reduced energy consumption.

London's 2012 Olympics

During London's Olympics in 2012, the Olympic Delivery Authority (ODA) required that at least 90% of demolition material must be reused or recycled. Many of the facilities in the Olympic Park were designed for flexibility and reuse, allowing for different uses at the end of the games. For example, the athletes' villages were turned into a housing development of over 2,000 units comprising affordable housing.

Many of the facilities in the Olympic Park were designed for flexibility and reuse



The former Press and Broadcasting centres became Here East, an innovation hub re-using the digital infrastructure installed during the Games. The ArcelorMittal Orbit sculpture was even turned into a giant public slide.

In the end, 98% was reused. 100% of materials were diverted from landfill and 62% of the waste was reused, recycled or composted. 700,000 cubic metres of soil were decontaminated and cleaned for reclamation and reuse. These initiatives resulted in 400,000 tonnes of carbon dioxide being saved, in addition to significant cost and materials savings.













😰 Circular Industrial Park in suburban Beijing

Eco-industrial parks can stimulate the transition to a circular economy by increasing geographic proximity between companies and facilitating exchanges of products. For example, the Beijing Chaoyang Circular Economy Industrial Park is a business cluster which follows the 'zero-waste' principle of the circular economy. It promotes the reuse and remanufacture of unwanted resources.

Electricity generated by the waste-to-energy plant is transmitted to charging stations for electric vehicles. Residual ash from waste incineration is remanufactured as construction materials in the construction waste treatment centre. The food waste processing centre transforms food waste into bioresiduals and nutrients used for organic agriculture. Heat generated by the different plants is used to heat office buildings in the Park.

The reuse of waste is estimated to save RMB 233 million (£27 million) and around RMD 120 million (£14 million) are saved through the self-production of energy.

🕑 The Bullitt Centre, Seattle

The Bullitt Centre was the result of the collaboration between a local real estate firm Point32 and the Bullitt Foundation. It was designed to meet the requirements of the Living Building Challenge, the most rigorous benchmark of sustainability for the built environment. It illustrates how circular approaches can be embedded in the design, the choice of materials and the use phase.

With an area of circa 4,600 m², this office building uses a net of no water: rain is captured and filtered into drinking water. Waste water is composted in the cellar or biologically purified. Similarly, the building produces all its energy thanks to solar panels on the roof. The choice of materials – wood, steel and concrete – ensures a lifespan of 250 years while the façade, with a shorter lifespan of 50 years, has been designed to be easily replaced and modified. Around 350 damaging substances and chemicals have been excluded, ensuring the well-being of occupiers.

Glasgow's Commonwealth Games, 2014

The Athletes' Village at Glasgow's Commonwealth Games in 2014 saw 700 new homes built in the East End of Glasgow as part of the wider regeneration of the city. The first large scale carbon neutral project in Scotland, this development was designed to provide accommodation for the 6,500 athletes and officials, before becoming a residential community. Sustainability features included high quality thermal insulation, solar roof mounted thermal panels and a combined heat and power (CHP) based centralised energy system that contributes more than 55 per cent towards the 95 per cent carbon reduction achieved, which made the Games "the greenest ever".













9 Circular Glasgow Summit

lasgow: Towards a Circular City took place on 20 September 2018. Organised by Glasgow Chamber of Commerce through its Circular Glasgow initiative, this event was designed to look towards future proofing tomorrow's city built environment, with a focus on embedding circular strategy and business models in construction and the supporting finance sectors.

'The circular economy presents a real opportunity for Glasgow's construction businesses to innovate and become future proof. There's a moral imperative and it makes sound business sense!'

Alison McRae, Glasgow Chamber of Commerce

The event was designed to look towards future proofing tomorrow's city built environment















Circular Glasgow is an ambitious project which plays a growing role in helping achieve the City of Glasgow's ambition to become one of the world's first truly circular cities. It is an initiative of Glasgow Chamber of Commerce in partnership with Zero Waste Scotland, Glasgow City Council and Circle Economy. It is creating a movement to inspire businesses of all sizes to innovate and become future-proof by adopting circular strategies.

Connecting companies across the city, Glasgow Chamber of Commerce's target is to help them open new revenue streams, increase competitive advantage and realise financial savings using a range of practical initiatives. At the same time, these initiatives lead to greater resource efficiency, decreased carbon emissions and a more sustainable model.

Event Aim

Building on the work of Tomorrow's City Centre and the Glasgow City Deal, this event was designed to look towards future proofing tomorrow's city built environment, with a focus on embedding circular strategy and business models in construction (alongside various supply chains) and the supporting finance sectors.



The aim of this event was to inspire the key leaders in Glasgow involved in the delivery of large capital expenditure projects including the property developers as well as those who contract with SMEs in the construction sector.

ne construction sector is a major focus target of the Scottish Government's 'Making Things Last' strategy













It sought to encourage the construction and associated sectors in Glasgow / Scotland to consider influencing the creation of a future proofed built environment, meaning sustainable buildings and infrastructure made to last, easily repurposed, producing no waste, increasing their long-term financial value and reducing environmental impacts.

With Glasgow having many major infrastructure projects in the pipeline, all of which could provide a significant opportunity to embed circular thinking in the construction sector and supporting finance sector, this event was a major opportunity to influence these projects at the earliest possible stage.

The construction sector is also a major focus target of the Scottish Government's 'Making Things Last' strategy.

The Event

The Summit was delivered by Glasgow Chamber of Commerce in partnership with Circle Economy and Zero Waste Scotland and moderated by Prof. Greg Clark CBE.

A strong turnout of sixty cross sector delegates attended



An invite only event for businesses in the construction and associated sectors, a strong turnout of sixty cross sector delegates attended.

With the intention to progress the conversation in Glasgow and encourage Glasgow's businesses to take action due to the opportunity for the circular economy in construction, Professor Greg Clark opened the event with the key question...

'What is Glasgow's edge in the circular economy?'

Professor Greg Clark CBE













With the need for an ambitious approach in the built environment through innovation and a coalition of the willing, context of the journey towards circular business practices in construction in Amsterdam – where a bold commitment to become 100% circular by 2050 has been set – was provided by Annerieke Douma, Director of Programmes and Business Development at Circle Economy.

Key learnings from the Netherlands were shared, where 41 pilots in circular construction techniques are underway in Amsterdam alone.





The financial model was highlighted as being critical to unlocking the main barriers to circular construction. Circular construction can have higher costs upfront due to its pioneering nature, but the return on investment and yield can ultimately be higher. This was highlighted by the QO Hotel development in Amsterdam and ABN Amro's Circl Pavilion where this extra cost has been recouped in media value, client engagement and residual value.













Owen Zachariasse, Innovation and Sustainability Advisor from Delta Developments brought this to life when he provided a strong insight into why the business operates with circularity and cradle to cradle principles, and the benefits this has brought.

'Profit is not a dirty word, it is an engine for change'

Owen Zachariasse, Delta Developments

With 1 million metres squared of circular property realised, and a current pipeline of 1 billion euros, Delta Developments has embraced circularity as a key principal for the business with the aim to maximise quality per square metre and to maximise the residual value of materials using the World Rebuilding Council principles.



Park 20/20 is one of Delta's flagship developments and the first fully integrated cradle to cradle office environment which has been consistently high performing:



- Approximately 92,000m² workspace, 5000m² amenities & 17,650 m² hotel.
- Total project investment volume €354 million.
- Budget deviation so far -1.4% (under budget).
- Rental levels € 200-230, = / m² outperformed market by 15-30%.
- Exit yields consistently outperformed market by 6-12% (40-80 bps).
- Consistent user satisfaction >95%.
- Project ROI so far 13.36%.













In addition to the financial requirements to support circular construction, emphasis was also placed on community engagement and people as being crucial. Involving the community and local businesses creates a new vibrant and collaborative ecosystem.

People are also key – the right people, suppliers and leadership are required for success. The Circl Pavilion, an initiative of the Dutch bank ABN Amro, which was developed as a way to bring the circular economy to life using their own real estate as a platform for sustainability and the circular economy held road shows to engage with and interest the right suppliers.

'We shape builds and thereafter they shape us'

Niina Pussinen, ABN Amro



Harnessing techniques such as urban mining, designing for reuse, repair and disassembly and a circular building platform developed with BAM Construction, the CIRCL pavilion has been built under the principle of the 'right to copy' to encourage other businesses to follow this example.



With a 40% smaller carbon footprint, and 60% less virgin materials used, it will only take 36 years for the cumulative effect of being energy positive to outperform the direct positive environmental effect of material choices.













The need for circular procurement was identified as key by all speakers from the Netherlands as the way forward to avoid a race to the bottom with pricing and materials. Material passports and a digitised system were also identified as crucial.

With the Dutch Government taking an overview of regulations to ensure their circularity target is met, innovation is key – but, 'in terms of innovation don't get too far forward - make sure the market can still see your backside' - Owen Zachariasse, Delta Developments.

'Do your own project, start experimenting – just start'

Niina Pussinen, ABN Amro

With attention then turning to Glasgow, a strong session with Ian Manson, Chief Executive, Clyde Gateway; Jill Farrell, Chief Operating Officer, Zero Waste Scotland and Doug Munro, Head of Structuring and Solutions, Legal and General, then considered how Glasgow could take the step forward to adopt circularity.

As with the previous session, procurement, collaboration and government intervention stood out as key opportunities to enable Glasgow to adopt circularity in the construction sector.

It was noted that Glasgow is both well positioned to do more and has already started to view the opportunities through examples such as the Athletes' Village built for the Commonwealth Games in 2014. Momentum is growing within companies and by consumers.

















Delegates were then given the opportunity to break out into smaller groups to hear key topics in more detail – about circular economy innovation from Circle Economy and ABN Amro, alongside finance, from David Mowat, Partner at Circularity Capital and procurement from Julia Messenger, Sustainability Advisor at BAM Construct UK.

'Patient capital is critical, having a long-term vision and working with partners is key'

Doug Munro, Legal and General

The event finished with a strong session with the delegates moderated by Prof. Greg Clark, with a number of commitments made to explore and progress this agenda from businesses such as the Wheatley Group, Legal and General, the University of Strathclyde and Zero Waste Scotland.

Construction of Glasgow's International Technology and Renewable Energy Zone















Conclusions

Concluding the Circular Glasgow Summit Prof. Greg Clark made the following 10 observations:

Moment of substantial opportunity

Glasgow has an opportunity to develop a leadership position in circular economy for a number of reasons: the scale of redevelopment in the city and along the River Clyde is high; Glasgow is committed to reinvention and inventiveness; there is a strong DNA on engineering and design; a great pool of innovative SMEs and there is a drive from both Glasgow City Council and Glasgow Chamber of Commerce.

Technology

New technologies from materials science, data, AI, modelling, engineering and design, energy systems and earth sciences are making circular construction and real estate management much more innovative. Glasgow has, and can create, new platforms for real estate development.

Barriers and innovation

Although there are some barriers and constraints to be addressed in terms of procurement practices, rules, scaling, and financial models, these are all amenable to actions that will propel the industry and city forwards. One criticism mentioned is the way that residual value of materials and components is accounted for and valued.

Corporate Glasgow

Glasgow's corporates are generally very positive about embracing circular change and are keen to integrate new approaches. They have been at the forefront of new working practices and sustainability endeavours.

Investors

Institutional investors that invest in Glasgow are increasingly driven by shareholder values that want to embrace resilience, sustainability, action on climate and













inequality. The circular economy provides a ready means and organising principle for these investors.

vi SMEs

Glasgow's SME base is keen to develop design led solutions that embrace new technologies and foster engineered solutions to planetary issues. They seek opportunities to apply know-how to global challenges.

🐨 Government

City Government and Scottish Government are committed to this agenda and are willing to reform the framework conditions in policy, planning, standard setting and procurement mechanisms to make circularity work. They are also able to invest directly in helping to scale up circular economy development.

Eco-system

The eco-system for collaboration is good. Glasgow has a strong history and reputation of collaboration, in particular through academia, the public sector and business. Universities, Government, Corporate, Investors and SMEs have an appetite for networking and believe in coordination and facilitated engagement. The commitment and attendance at the Summit demonstrated this enthusiasm.

Leadership

There are willing leaders across different parts of the eco-system that are able to take a lead now to set high targets. For example, Zero Waste Scotland is willing to invest in eco-system development, Glasgow City Council wants to become a world leader on Circular Economy and key institutional investors want to make Glasgow a showcase for new circular assets.

Story

Glasgow also has a narrative advantage. The story of Glasgow is one of a city of invention, engineering, design and enterprise where the city has built businesses that do the things that the world really needs, often ahead of their time and before others have caught on. Glasgow pioneered environmental work programmes in the 1980s and it led the first major PPPs to renew homes and schools in the 1990s. The River Clyde runs through the city as a reminder of its ecological origins and it provides an organising idea for the future of a more circular Glasgow. The circular economy is the next natural step and evolution of the city through the creation of enabling conditions.











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