

# *Circular Innovation City Challenge*

## DRIVING A CARBON-NEUTRAL CITY THROUGH MAPPING OF RESOURCE STREAMS & MATCHMAKING

Case presentation on a public-private innovation project  
between Glasgow and Topolytics



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# 1. POTENTIAL & IMPACT: BRINGING CIRCULAR ECONOMY TO LIFE IN GLASGOW



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In December 2020 Glasgow announced an ambitious commitment to become [a circular city by 2045](#).

To succeed with the ambitious transformation requires the involvement of all parts of the Glasgow City Community, and not least the introduction of new innovative solutions.

To explore and detail the journey ahead, Glasgow published a [‘Circular Route Map’](#) in 2020 highlighting key circular initiatives critical to succeeding with the 2045 commitment.

In addition, Glasgow became one of the five key city partners in the Circular Innovation City Challenge (CICC), along with Copenhagen, Amsterdam, New York, and Toronto. Seeking those innovative solutions that can bring Glasgow further on its journey.

A key part of the route map is the requirement for Glasgow to make the most of its materials and resources, minimizing waste. Exploring the opportunity of local collaborations around material reuse will not only be critical for Glasgow’s 2045 commitment but will also be a key driver for Glasgow in achieving its 2030 Carbon Neutrality target. In practice, Glasgow wants to bring a circular economy to life by providing a transparent and real-time view of the available



material resources in the city, and secondly by fostering symbiosis between operators and value chains in the city and across waste streams.

Through the participation in the Circular Innovation City Challenge, the City of Glasgow identified the opportunity to engage with the UK-based company Topolytics, which was chosen as one of five winners out of the 137 submissions in the challenge.

Topolytics is a data-driven circular economy business doing data aggregation analytics that helps map and creates visibility around waste and material streams, helping its commercial partners to understand the flow of waste and surplus materials.

*“Essentially, we [at Topolytics] generate insights in terms of that waste material; What it is, where it ends up, and what happens to it? How far have things moved and what are the outcomes? That live-view of what is happening to that material is our value proposition.”*

When it comes to achieving a circular economy at scale, Michael Groves, CEO at Topolytics, highlights that a new and systemic approach is needed. Getting there will require more reliable data and visibility over waste materials.

*“If we want to get to a systemic approach to a circular economy, we can’t ignore all the materials going into that [waste] system. Obviously, we can design it out, we can create industrial symbiosis, we can do all of those really powerful things around designing different packaging, different materials, and substitute materials and new business models. But we still think that you have to deal with the volume of material going into the waste system.”*

- Michael Groves, CEO of Topolytics





As a joint venture, the City of Glasgow and Topolytics want to make urban resources and material flows tangible rather than simply providing waste company data and waste scheme information.

In doing so, they intend to foster strong commitments from private operators and ecosystems to drive carbon neutrality in the city.

*"It's important that it's more than just a few figures on some waste paper, but that it becomes a new marketplace in which we can raise the idea of circular economy in the city. This is a tool that helps Glasgow organizations be part of the carbon reduction narrative and meet the carbon neutrality targets",* says Colin Hughes, Policy Officer - Sustainability, City of Glasgow

The following presentation provides insights into the Glasgow-Topolytics collaboration, as a case for public-private innovation around digital, circular solutions. Furthermore, it summarises the benefits Glasgow has gained from engaging in city-city collaboration in driving an ambitious, circular transformation.

## 2. RESULTS & EMERGING OUTCOME



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**Glasgow's vision is to establish a material platform** that connects all the relevant users in the Glasgow City Community. This platform will map waste streams, what goes into the city, and where it ends up. And most importantly, it will put a value on these materials streams to understand and exploit their circular potential.

The ambition is to create an open platform with a data marketplace. A platform that will be part of the commons. And a platform that will be transparent and visible for all organizations, communities, and private operators to use. The plan is for the City Council to be the operator and administrator, as this is perceived as the most independent way to facilitate the initiative. In other words, the platform can be interrogated and accessed by anybody looking for matching, resources, or surplus material as a new input source.

The long-term ambition for the platform is essential to enable new businesses, new social enterprises, and new cooperatives across value chains around a novel and innovative urban resource symbiosis.

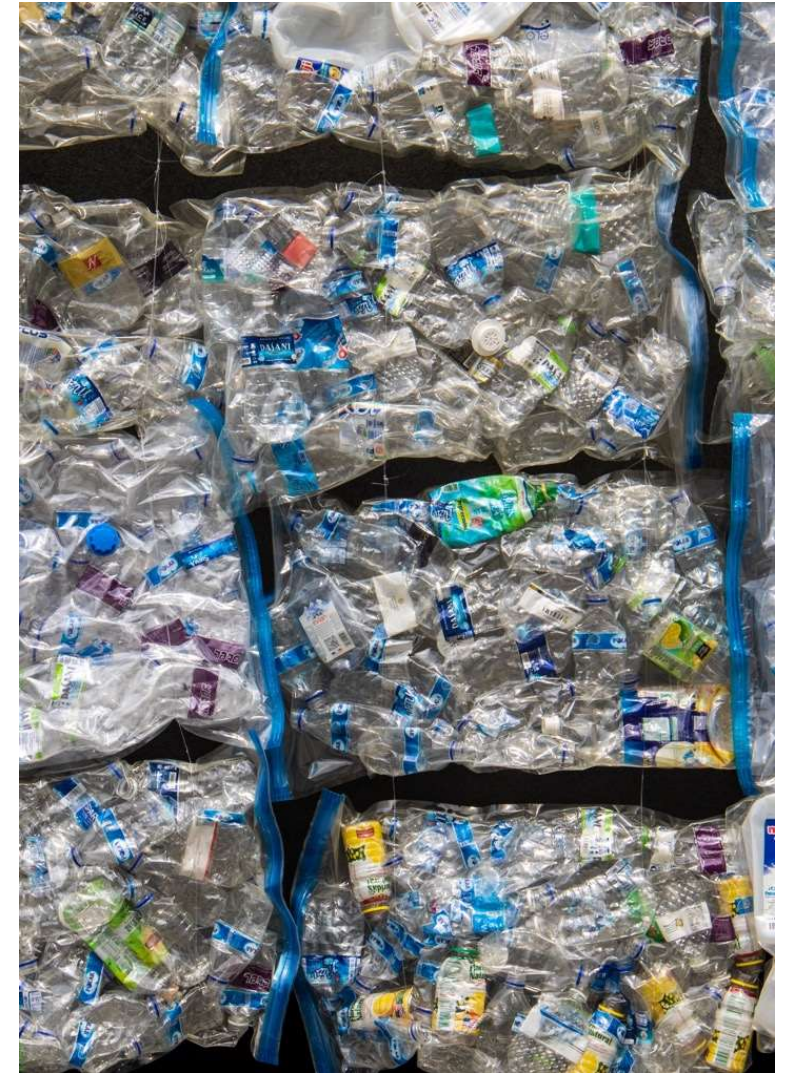
It has been imperative for Glasgow to establish the project with a strong vision and ambition. Despite not knowing whether it can fully be achieved, this has enabled the city to drive action

and engagement at the scale required to reach the 2045 ambition.

Hence, it has been extremely important to ensure that the project is strategically grounded in the City Council from the very beginning. This involves the engagement of a broad range of key city stakeholders and operators. This is both to ensure support from these stakeholders as well as to establish early-stage engagement as they will be key contributors to the data, as well as future users of the platform once established.

The end goal is to create a membership scheme so that the marketplace can be self-sustaining. It won't just be about companies and organizations using the platform instead of the old way to dispose of waste. Even more so for those companies to use the platform to identify new material streams - waste resources, secondary materials, or surplus - and to create business opportunities from these streams. Thus, enforcing the circular loops in the city.

Ultimately, the City of Glasgow wants to change the mindsets of city stakeholders and private operators by changing the operating conditions they are acting within. A change in mindset will be the greatest achievement of this project.





*"We want to change the mindset through the ability of changing the working operations [for city operators] as well. For me, that would be the biggest victory to see the existing working model to be changed, for that shift to be made, and for this transaction to be closely aligned to the information, the data and digital platform that we discovered through the Circular City Innovation Challenge."*

- Colin Hughes, Policy Officer - Sustainability, City of Glasgow



The vision for Glasgow is to change the existing working model and experience the shift in mindset through new system practices by private operators in the city.

Glasgow's Circular Economy goes beyond case studies and includes great storytelling through prototypes on the ground.

*“We see a broad scope for expansion but we need to see prototypes on the ground to start off with, and that brings it to life. We have always said that one of the most valuable aspects of circular economy is not just case studies but it is storytelling. To show that it is implemented and running, to show that this is already operating will create a whole new dynamic for players in the industry. They will then realize the benefits, they will see the value in it and then it will create its own momentum at that point”,* says Colin Hughes.

To experience a real change in practice and being able to tell the story is key. Seeing this material platform and urban resource marketplace up and running will provide entirely new benefits for private operators and companies. It will create momentum around the platform that is critical for the circular transformation.



# 3. THE CHALLENGES - ON SOCIAL, CITY AND PROJECT LEVEL

**Today, a great deal of materials are lost,** and the value of these existing materials is not realized. The value of these resources can drive a marketplace itself.

Glasgow has conducted studies and analyses to identify materials floating around the city. However, this data did not include information about the flow of the materials, where they were located, and where they ended up. More importantly, no data were available on the estimated value of the identified materials.

To achieve the transformation towards a circular city by 2045 more detailed data is necessary. As the Glasgow Circular Route-Map states:

*“Retaining materials in a localized environment where waste from one process can be the feedstock for another industrial process also reduces the carbon impacts of exploitation of virgin resources and global transportation. [...] This concept can apply to every sector of modern industry where the most sustainable practices will result in “closed-loop” cycles and materials remain in a constant cycle of re-use. Diverting waste from landfill or incineration and recirculating back into industrial and manufacturing processes necessitates co-operation, knowledge and sharing alliances.”*



The visibility that Topolytics can give to waste and surplus materials are absolute key in bringing the circular economy to life in Glasgow. By leveraging that visibility, the city and its ecosystem actors can create new business and market opportunities based on waste and surplus materials. By doing so, we ensure that materials remain useful for as long as possible, one of the key principles of a circular economy.

As an example, Glasgow is home to major engineering companies that produce a lot of plastics, steel, and metal, as well as a lot of industrial waste. Glasgow is also home to one of Europe's largest engine and gearbox manufacturers, with extensive metal works.

This could be an excellent opportunity for establishing a resource symbiosis, perhaps with the help of a third Glasgow-based company that deals in remanufacturing steel. Currently, such a resource symbiosis is an untapped potential. However, the hope is that the data from the Glasgow-Topolytics collaboration will open up the conversations and help establish prototypes that will lead to a more defined understanding of the potential and future opportunities.



*“While the circular economy is about designing waste out of the system, in order to accelerate this shift, we also need to tackle the by-products generated through industrial, commercial, retail businesses and the consumer system. I think the only way we can do this is by building a better version of the truth, with data that is comparable, trustworthy and makes the system more visible.”*

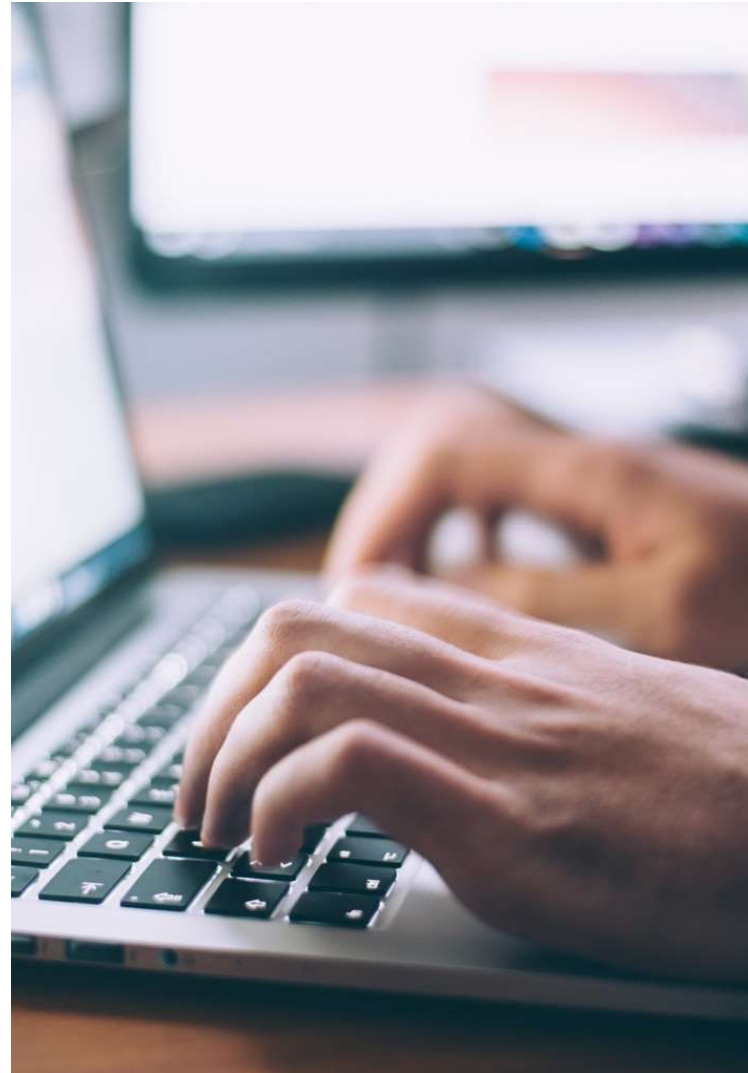
- Michael Groves, CEO of Topolytics

Globally, the volume of waste material coming out of the system and ending up in landfills is enormous. And the volume is only expected to increase during the next 20-30 years. This is partly due to the lack of visibility and data literacy.

According to Michael Groves CEO of Topolytics, the problem that most commercial players face today is that they have no visibility over the waste material they generate. As a result, they lose track and the responsibility for the waste. In addition, they lose out on the opportunity to get the material back into their production system or gain value from selling it.

*“Most of our customers are commercial. They are companies producing waste. Manufacturers, infrastructure companies, and commercial players - and they all have the same problem. They all want to achieve net-zero. However, they all wish to reduce the risks. Or they all want to understand what happens to the material. They all want to drive the material back into production. But the problem is that they don't have any visibility over what happens to that material when they hand it over to a third party and most of our customers will fall into that bracket.”*

For this problem to be resolved, commercial players need to take on their individual responsibilities and use this momentum to create reliable and high-quality data that could help improve the system as it stands today.



According to Topolytics, this is not a software problem, but rather a data problem.

*“You can create whizzy software and dashboards, but the fundamental issue is the quality of the data - how it is measured, how material is defined and why it is measured in a certain way. While WasteMap is software, what we are doing is creating actionable insights through tackling a significant data challenge. We see high quality data, poor data, missing data in a variety of formats, from real time sensors, to software and spreadsheets”,* says Michael Groves from Topolytics.

Data literacy shows itself both among city government and commercial operators in the city. It requires action and serious work with data strategies - both in the public and private sectors.

In Topolytics' case, the most challenging part of their digital solution has been identifying who are the willing and known commercial players who will provide data to Topolytics, allowing them to put that data into the system and start playing with it. Getting the initial players on board was the most challenging step, but Topolytics has a wide range of companies signed up today and a growing interest from various companies.





It is also challenging for Glasgow to create a material platform tailored to its vision and a marketplace based on data on local material flows.

First of all, there is the need to convince all local stakeholders to supply data to the platform. Data that may be considered confidential, and the provision of which may involve a fee. Glasgow will work through its business networks and ecosystem to engage the key stakeholders.

Secondly, the solution can't be one-size-fits-all. The innovation partner, in this case, Topolytics, must support the project as an evolutionary process. This means that they may need to evolve and develop their standard solution.

Thirdly, a City Government is a complex organization to work with. When it comes to developing and implementing innovative and systemic city solutions, there is a need to foster trust and buy-in within the Council.

In the same manner, this type of project is not considered a standard procurement project within the City of Glasgow. However, as a collaborative public-private innovation project, in which both parties are on a journey to determine the most effective strategy for meeting Glasgow's ambitious targets.

# 4. THE HOW & THE PILOT PROJECT UNFOLDED



A key initial step in the project has been to engage the [Sustainable Glasgow](#) partnership in the ambition and the activities around the platform and marketplace. The partnership was established to make Glasgow one of the greenest cities in Europe and a world-leading centre for sustainable policy, innovation and action. It includes some of the largest stakeholders in Glasgow, and it will be the central forum involved in anchoring and expanding the platform within the City of Glasgow.

By including this strategic city partnership early in the implementation process, the City Council wishes to demonstrate that it is ingrained in the organization on a strategic level. The assumption is that this will give the project and platform more credibility as a circular economy initiative being championed by the city.

Additionally, the Sustainable Glasgow organizations will serve as data providers as well as users of the future marketplace.

Over the next 12-24 months, the project will follow a three-step approach. Initially, the platform will be launched with resource and material data from the City Council itself, then expanding with data from the involvement of Sustainable Glasgow organizations. Thereafter, the platform will seek to scale through the 1000+ companies



in the [Glasgow Chamber of Commerce](#), also a project partner with their [Circular Glasgow](#) initiative.

Topolytics solutions will be a key component of the project and the material platform of the future. If the platform is to truly enable material resource flows within Glasgow and create the conditions for a thriving marketplace for businesses and city operators, it must provide near-real-time data with a high degree of accuracy and geographic context. Particularly as more partners join and new material streams are added. To be open and accessible for all interested organizations is also key.

Topolytics will provide the data around quantity, quality, value and destination in real-time. As such, the Topolytics solution is a crucial link between the marketplace and the operators in the city.

The platform will be developed over time, and Glasgow will seek out collaborators with relevant expertise to develop a platform that truly fits Glasgow's needs and vision.

In this way, Glasgow will invite multiple innovative partners and suppliers into the room for dialogue and collaboration, together crafting a custom solution based on all the available options.



For Topolytics, cities play an important role in changing the existing waste system and thereby the actions and mindsets of the commercial players and operators in the city. The city government could, for example, define goals, objectives, and policies aimed at stimulating a circular transition and a change in the city's operating system.

In addition, cities represent the system itself where public, private, and informal sectors operate simultaneously and where waste is generated.

The lack of data literacy has resulted in many cities being unaware of the full extent of their waste and material flows. But data and visibility can empower cities to take action and guide even better policies and initiatives for operators and the broader ecosystem of the city.

Public-private partnerships such as the one between Glasgow and Topolytics show that Glasgow provides value to Topolytics in multiple ways.

First, the project collaboration helps kick-in doors to the city council - especially with Colin Hughes as a dedicated internal advocate. This paves the way for putting material visibility and data literacy on the political agenda.



Likewise, it helps create political buy-in much faster than if Topolytics should initiate the conversation themselves.

As a second benefit, Glasgow helps Topolytics connect with potential commercial partners and waste producers. This generates a significant commercial opportunity from a business perspective.

Lastly, Glasgow has a huge amount of waste and material data themselves that they can provide and feed into the city waste map. And as Glasgow contributes to a lot of public data and existing data, it ultimately improves the visibility of the data available on the platform.

Besides the specific public-private collaboration with Glasgow, Topolytics estimates that the work being done in Glasgow could be replicated in other cities as well. Although regulations may vary, and commercial and non-commercial players may have different requirements, the platform and system solution from Topolytics will remain the same. Thus, it should be possible to scale Topolytics' digital solution to other partner cities, such as Asian cities for example.

# 5. KEY LEARNINGS FROM CICC AND PUBLIC- PRIVATE INNOVATION PROJECTS



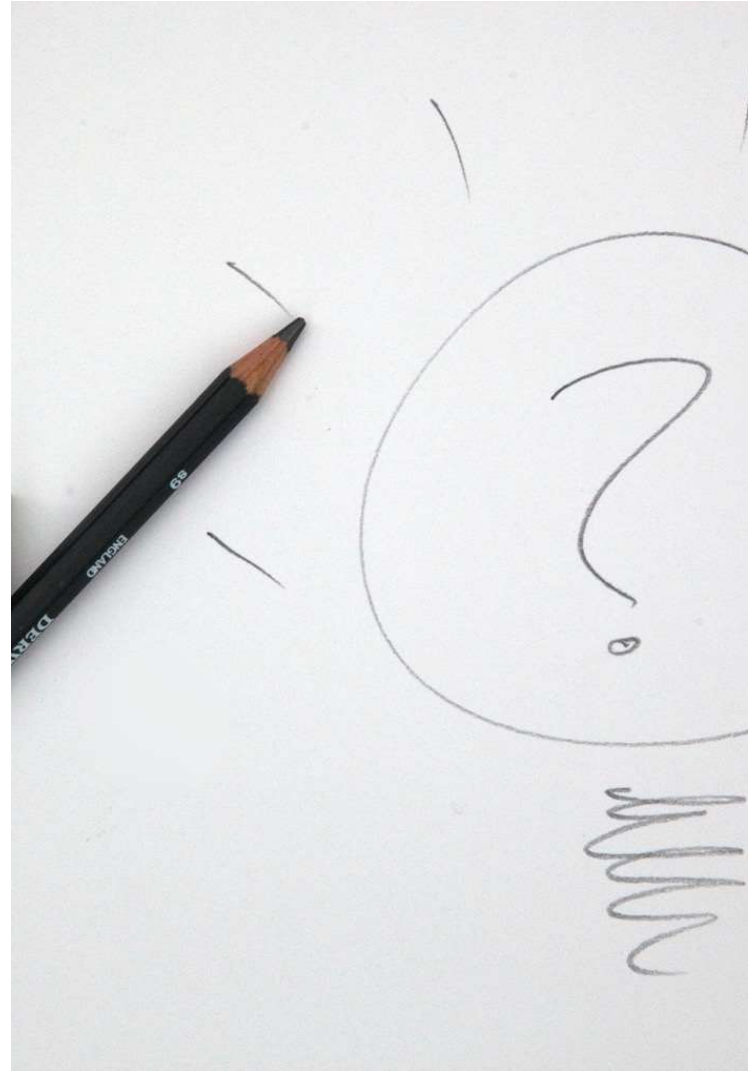
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**For Glasgow, engaging in a collaborative challenge** has brought several benefits.

The challenge process has provided access to solutions and allowed for focus to be set on areas that might otherwise remain unnoticed in Glasgow. Initially, Glasgow entered into the challenge process understanding its own need to map material streams and connect city businesses around circular resource streams.

However, the challenge process revealed a completely new area of interest for Glasgow. Particularly, the possibilities inherent in citizen engagement initiatives, such as the winner of the CICC, "Go Zero Waste", with whom Glasgow hopes to collaborate in the future.

The second benefit is that a well-structured challenge, including the jury and selection process, provides positive credentials and a blueprint for the winning solution. In situations where city departments and stakeholders need to be engaged in collaborative projects involving solutions, the credentials that come from being selected as a winner aid in breaking down internal barriers, easing market validation processes, and increasing momentum.



A significant learning from the public-private innovation project established with Topolytics is that it is critical to approach the project as an evolutionary process.

Not one solution will be a perfect match for Glasgow's needs. Therefore, the solution providers, Topolytics, and others will have to evolve and develop their solutions in close collaboration with Glasgow. Sometimes this means taking parts of the solutions from one provider and parts from another. Also, when participating in a public-private innovation project, the attitude of agility must be mirrored by the city and solution providers. Another key benefit of this process is that it enables the solution providers to learn how to navigate through a city government's complexity.

For Glasgow, there can be strong value in sharing such learnings with other cities, as well as to gain mutual insights into each others' learnings. Yet, it is imperative for Glasgow that city-city collaborations take place between cities that are engaged in actual, practical action on the ground, and where both practical lessons can be learned and collaboration process experiences from public-private innovation partnerships can be exchanged.



# 6. NOW WHAT? FUTURE AMBITIONS & NEXT STEPS



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**Within three years,** Glasgow plans to have established, in collaboration with Topolytics, a self-sustaining resource and data platform that brings momentum to the creation of resource symbioses between Glasgow businesses.

In the same period, Topolytics' ambition is that the platform will gain more visibility of what materials are available in Glasgow. In addition, in terms of the material system, in general, leading to more efficient outcomes and increased reuse, and by working with the end of the pipe, the Glasgow-Topolytic collaboration will prevent it from becoming waste in the first place.

Additionally, Glasgow hopes to have investigated, explored, and possibly even piloted collaborations with other CICC winners, such as Concular and Go Zero Waste.

Especially Concular, who digitalizes materials in buildings using material passports and recirculates materials into new buildings, is a strong potential collaboration partner for Glasgow. The experience and expertise Concular brings with them can serve to create a more circular construction sector - an area that has a critical impact on Glasgow's circular ambitions.



In terms of the sharing of insights gained from CICC, Glasgow has been selected to host the Circular Economy Scotland partnership, including seven Scottish cities. Glasgow will be responsible for bringing circularity knowledge to the seven participating cities and supporting the scaling of circularity from a city level to a national level. Glasgow will bring insights and experiences from CICC to this partnership.

Over the next few years, the broad collaboration surrounding digital, circular solutions, and the circular transformation of Glasgow will continue to be crucial. And due to Glasgow's post-industrial status and its position as a regional growth center, it faces many complex challenges in creating a carbon-neutral, just, inclusive, and circular city.

Finding like-minded partners to assist in this transformation is not only a nice add-on but a crucial component in achieving Glasgow's vision. To broaden impact towards a more circular economy, Glasgow will continue to establish global, European, national, and regional partnerships and alliances.

# 6. BACKGROUND & METHODOLOGY



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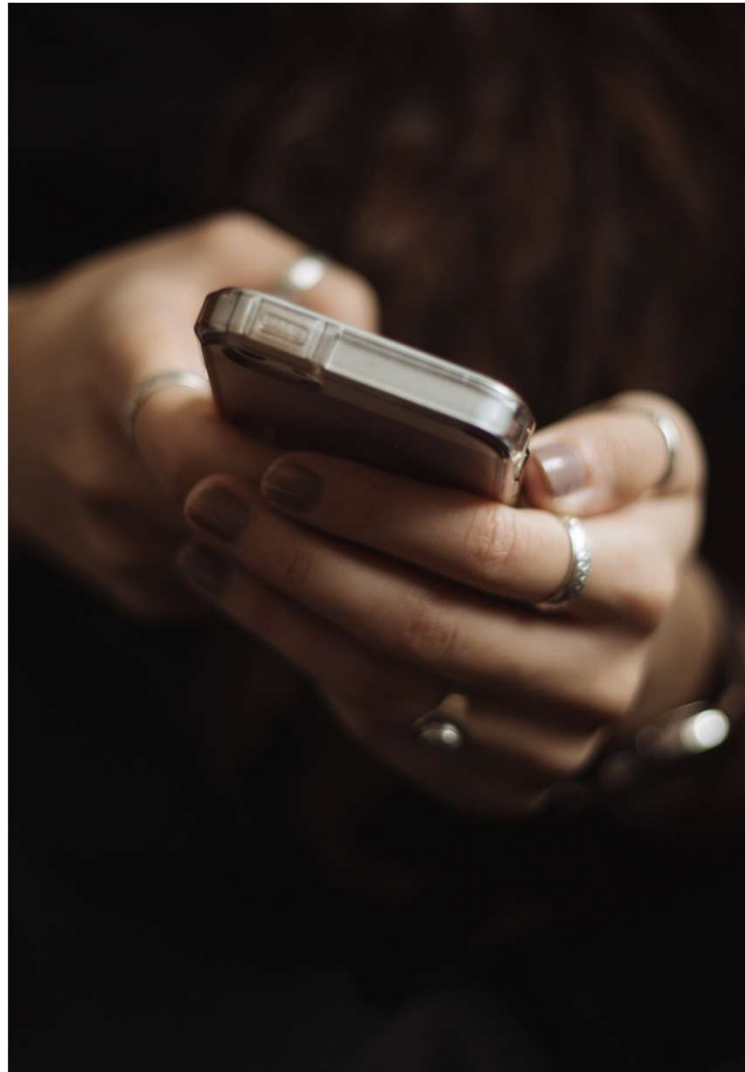


### About Circular Innovation City Challenge

In a joint effort, the cities of New York, Toronto, Amsterdam, Glasgow, and Copenhagen sought innovative digital and data-driven solutions from around the world to create more circular and thriving cities. Digital solutions to create a truly circular city where businesses and people work together to make the most of our scarce resources. A thriving city where designing for circularity means generating new jobs and opportunities for all citizens and communities.

The Circular Innovation City Challenge has been a global call to action for innovators and entrepreneurs with digital and data-driven solutions to accelerate circularity. Together with the five partner cities, the DDC, Leaderlab, the Danish Business Authority, and the Ellen MacArthur Foundation invited and encouraged all types of innovators globally to apply and help cities find innovative solutions to create more circular and thriving cities. Fortunately, we found that there are already several innovative solutions on the global scene within the digital and circular economy fields.

Find more information about CICC here:  
[www.circularinnovation.city](http://www.circularinnovation.city)



The challenge has resulted in following:

- More than 137 digital and data-driven circular solutions were submitted from more than 26 countries across the five continents
- 15 finalists pitched their digital and data-driven solutions for cities and international jury members
- 5 winners were selected by our international jury. [Get to know the winners here](#)
- The five winning innovators are now exploring public-private innovation collaboration opportunities with the cities

### The methodology behind the cases

The three cases from the Circular Innovation City Challenge are based on interviews with partner cities and winning innovators participating in the selected public-private innovation collaboration projects.

In the two case studies focusing on the specific collaborations, both cities and innovators are interviewed, but the focus is on the perspective of the interviewed part.



We have posed the same questions for both the selected city and the innovator engaged in the project. The third case is taking a broader look at the field of digital and data-driven solutions in circular economy and the learnings gained from working with public-private innovation within this field.

The empirical data for the three cases are drawn from 5-6 interviews and other secondary qualitative sources such as background information and meetings held with the partner cities throughout this process, as well as insights and perspectives presented by the cities during panel debates at public events in 2021. The format of the interviews was a semi-structured interview held as an informal conversation lasting one hour. Each interview was recorded for internal purposes.

This particular case is generated based on interviews with:

- Colin Hughes, Policy Officer - Sustainability, City of Glasgow
- Michael Groves, CEO of Topolytics

## Partner Cities in the Circular Innovation City Challenge



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# *Thank you!*

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