The Brussels Regional Programme for a Circular Economy (BRCPE), commonly referred to as Be Circular, is Brussels’ central circular economy initiative from which all other circular economy activities emanate. It is designed to harness the opportunities presented by a circular economy, including reconciling economic and environmental objectives, supporting local production, optimising land use and integrating transportation requirements. Key drivers were the desire to stimulate innovative economic activity, create new jobs, and improve the quality of life for Brussels’ citizens.

**TIME FRAME**
Be Circular is a four-year initiative, launched in 2016.

**FOCUS AREAS**
The initiative focuses on five key economic sectors: retail, logistics, waste and resources, food, construction, and the built environment.

**CORE TEAM & EXTERNAL PARTICIPANTS**
Four agencies and three governmental departments are involved at a strategic coordination level. At implementation level a core team of 15 coordinators has been designated across the different regional administrations. Alongside the core team, close to 200 people from over 90 different public, private and non-profit organisations representing multiple sectors are also part of the Be Circular initiative. These participants act as thematic coordinators, leaders, partners, and experts in particular areas. This inclusive approach has created a strong sense of ownership and helps ensure the initiative is resilient and systemic.

**FINANCE**
To date, a yearly budget of approx. EUR 13 million is allocated by Brussels’ regional government.

**OUTCOMES TO DATE**
In the first years of Be Circular:
- More than 220 companies have been educated and supported in the implementation of circular economy approaches
- EUR 8.3 million has been granted to 139 business or research projects
- Over 1,400 individuals have been trained through the education measures
- New collaborations between public agencies and enterprises

Be Circular received the 2016 Regional Innovation Award from the Assembly of European Regions, and in 2017 was presented with the Eurocities Innovation Award.

**LEAD POLICY LEVERS**
- Roadmaps and Strategies
- Convening and Partnering
- Awareness Raising
- Capacity Building
- Financial Support
THE JOURNEY

ORIGINS
Be Circular is built on the experiences of the Brussels Employment-Environment Alliance (EEA) collaborative initiative. The EEA ran from 2010 to 2014 with the aim of uniting environmental goals with economic opportunities. Following this initiative, three successive milestones led to the emergence of Be Circular:

1. A highly positive participant review of the EEA initiative
2. An urban metabolism study that assessed material flows within Brussels
3. The creation of Brussels' Circular Economy Roadmap

LAUNCH
In March 2016, Be Circular was launched by three Brussels’ Ministers. The Ministers of:

• Housing, Quality of Life, the Environment and Energy
• Economy, Employment and Vocational Training
• Waste Collection and Treatment and Scientific Research

These portfolios are reflective of many of the policy areas that can enable and benefit from circular economy implementation. The Be Circular initiative works to unite them in an integrated strategy. The three ministries are supported by four public agencies who coordinate the Be Circular initiative:

• Bruxelles Environnement (environment agency)
• Hub.brussels (business support agency)
• Innoviris (innovation and research agency)
• Agence Bruxelles-Propreté (waste collection agency)

DECIDING THE FOCUS
Initially, the participants, who include EEA participants and new organisations, were consulted on a bilateral basis by the governmental agencies. They were then invited to working groups, where they pooled their sectoral expertise and refined the vision and objectives for the city. Five focus areas were identified based on need and opportunities and the vision was translated for each: retail, logistics, waste and resources, food, construction, and the built environment.

From these five focus areas, participants identified transition measures of which 111 were approved by the ministers, ranging from the running of pilots, to new policies, tools and testing business models. Many have been funded from the Be Circular budget and after almost two years of implementation, 20% have been completed and only 12% are yet to begin.

The measures below showcase the diversity of angles considered, from enterprise support, to policy development, training, and academia:

ENTERPRISE SUPPORT MEASURES
Be Circular – Be Brussels enterprise call offers advisory, financial and marketing support to entrepreneurial circular economy projects that are technically and economically feasible, and beneficial for local employment. An annual call for projects is issued with a budget of approximately EUR 1.5 million available to those that meet the criteria. Supported projects, of which there were 60 in the first two years, are publicly celebrated as Be Circular Laureates. Other measures also focused on supporting businesses, from coaching services to a business incubator, as well as a Circular Economy cluster CircleMade.Brussels and Innoviris’ living labs for circular economy research projects.
POLICY DEVELOPMENT MEASURES
The Circular Regulation Deal, supported by a policymaker secretariat, brings together private and public sector actors in topic-specific workshops to identify legal and administrative barriers to a circular economy transition and set up work plans to remove them. Topics for discussion range from the use of space and buildings, to the designation of waste. This measure is supported by legal and administrative experts.

TRAINING MEASURES
The Circular building training tools offer circular economy education modules for Brussels and construction workers. They are run by the Brussels training centres CDR-BRC and EFP as the MODULL 2.0 and BRIC projects.

ACADEMIA MEASURES
An academic chair in urban metabolism & circular economy was created at the Brussels Free University to link private and public Be Circular participants with academia. It also allows urban metabolism studies to be integrated into the evolving strategy.

MEASURING PROGRESS
In return for project funding, participants record their progress on the Be Circular ‘stakeholder platform’, a centralised management tool. Progress metrics include various elements such as:

- Number of businesses engaged,
- Number of participants trained, supported and employed.

Progress is discussed at quarterly meetings between all the Be Circular thematic coordinators (those who coordinate a specific area such as construction, public procurement, training) and every 18 months the Be Circular Steering Committee reviews progress alongside Be Circular budget reviews. A mid-term and a final evaluation report will be made publicly available. As part of this, Be Circular coordinators are looking to develop indicators that report on the wider economic, environmental and social outcomes.

REFLECTIONS
Using circular economy principles to support and spark circular innovations for a thriving local economy and job prospects. The city government’s recognition and endorsement of circular economy, through the Be Circular initiative, has played an important role in giving entrepreneurs and businesses the confidence and momentum to apply new ways of operating, and opened up additional networks and partnerships.

Raising awareness and building capacity by using an iterative, inclusive and collaborative approach to programme design. The Be Circular initiative has strived to remain dynamic and open to innovation as learnings are assimilated. The inclusive, collaborative approach, coupled with clear political endorsement, has worked to strengthen engagement and commitment with the initiative. As awareness of the opportunities and benefits of a circular economy has grown, the approach has also created a climate of cross-cutting innovation.

Keeping the initiative moving forward through central coordination. Reaching consensus amongst multiple actors can be time-consuming, and the administration required to manage multiple factors comes with its own challenges. The creation of a central coordinating committee, made up of the three ministries and four public agencies, has helped to manage this, track progress and maintain momentum.

Engaging internationally and in peer networks to share resources and best practice. Brussels partnered with UN Environment to be a pilot city within GI-REC, a collaborative platform provided by UN Environment to help cities develop resource efficient economies. The engagement supports inter-city knowledge exchange and has provided Brussels with a deeper material flow analysis.

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This case study is part of Circular economy in cities, Ellen MacArthur Foundation
Endnotes
AT A GLANCE

THE INITIATIVE
Amsterdam city has developed a proactive approach to the sharing economy to support the goals of its ‘living’ Sharing Economy Action Plan which is designed to enable the city, businesses and residents to reap the benefits from sharing platforms, while also identifying and mitigating unintended risks.

The plan sits alongside the city’s circular economy activities, recognising that the sharing economy opens up opportunities to make better use of materials and resources. Multiple innovations have sprung from it that increase access to and use of public and private assets, including the sharing of household items, space, modes of transport, and even food. Several of these activities have also led to closer connections forming between residents.

TIME FRAME
The plan was first developed by the 2014-2018 City Board and continues to evolve to take account of new developments and administration changes.

FOCUS AREAS
The Action Plan looks into multiple activities including housing, office space and product sharing opportunities and individual and integrated sharing-mobility modes.

CORE TEAM & EXTERNAL PARTICIPANTS
The Action Plan was developed and stewarded by a strategy and coordination team of five people within Amsterdam city government. In keeping with the original idea of mainstreaming the plan across city departments, the strategy team has reduced to two people as relevant departments take on ownership.

FINANCE
Individual initiatives and pilots are funded by the relevant city department from existing budgets.

OUTCOMES TO DATE
The city’s Sharing Economy Action Plan sits alongside other city initiatives, such as StartupAmsterdam, that are designed to grow and improve the startup and business environment in Amsterdam. There are currently over 150 sharing economy platforms active in Amsterdam. Local platforms include, for example:

• Peerby - an app that connects people who need to borrow or rent an item
• MotoShare - an app that connects motorbike and car owners to those in need of temporary use of one
• LENA - a ‘fashion library’ where customers can rent high quality fashion items on a one-off basis or gain access to the clothing offered via a subscription service

LEAD POLICY LEVERS

For more see Policy Levers

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Amsterdam’s sharing platforms offer many advantages to the city and its residents, 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 that may not otherwise arise.

Addressing lower participation amongst the elderly and low-income groups, Amsterdam continues to test the potential of the sharing economy to bring benefits to more people. In 2017, the city government ran a three month pilot, linking the Stadspas discount pass to Thuisafgehaald, a sharing platform that supports meal sharing, eliminates food waste and connects local communities. During the trial, more than 900 meals were collected by Stadspas holders through the platform, helping to meet nutritional needs, build local community connections and identify new opportunities to scale the service.

Encompassing and reflecting different city and citizen priorities has become a strong focus of the city’s work. To develop this further, Amsterdam is applying for EU research funding to build a framework of governmental interventions focused on how cities can work to make the sharing economy more inclusive, benefitting society more broadly.

THE JOURNEY

ORIGINS

Amsterdam city government was mindful of the unintended consequences arising from the sharing movement such as a reduction of long-term rental accommodation, or the emergence of unregulated activity such as illegal hotels. They were also aware of the potential opportunities, ranging from business innovations, more effective use of goods, reduction in municipal and structural waste, and the increase in community connections that can arise from sharing economy activities. The city government was keen to find a constructive response, particularly as momentum was growing and by 2015 organisations such as ShareNL had declared Amsterdam Europe’s leading sharing city.

In 2015, Amsterdam’s College of Mayor and Alderpersons (the municipal executive board) sanctioned a small team, formed from the Economic Affairs and the Innovation Office, to create a sharing economy vision and action plan to guide developments. Using a mixture of face-to-face interviews and questionnaires, the team collaboratively explored policy opportunities, innovations and responses with other city departments, businesses, sharing economy platforms, and residents.

DESIGNING THE ACTION PLAN

From the start, the coordinating team and relevant city departments have reached out to sharing economy platforms. Working closely with them has helped to create an environment that allows for the growth of sharing economy innovations, while remaining alert and responsive to risks.

Any adjustments to regulations that impact sharing activities may come from a city, national or European level, which further informs who is involved. Relevant city departments maintain responsibility for policy responses in their areas, for example, the Housing Department liaised directly with Airbnb to reach consensus on a Memorandum of Understanding (MoU), which in turn also helped inform the overall Action Plan. This MoU works to ensure local holiday let rules are upheld. It limits home sharing activities to a maximum of 60 days until 2018, reducing to 30 days in 2019. These responses work to mitigate against adverse impacts on the long-term rental market while Airbnb can still offer sharing services to homeowners and short-term visitors.

Under the Action Plan, different departments may work together to develop integrated solutions. For example, a bike sharing scheme brings together the Smart Mobility Department with the Planning and Tourism Department as they consider the needs of both residents and tourists alike, and seek to address challenges such as ‘rogue bike sharing’ that clogs up local parking spaces instead of utilising dedicated docks. Collaborating in this way has been key to enabling each department to support sharing platforms, while identifying risks and maintaining a level playing field amongst businesses.
Deepening its understanding and to complement delivery of the Action Plan, the city government decided to acquire hands-on operational experience by running a sharing economy pilot within its own offices. It involved sharing meeting rooms that stood empty at the weekend with social impact organisations running coding lessons for refugees. This proactive approach exposed several practical issues - such as who should take responsibility for locking up the building - that have helped the city further understand sharing platforms.

The new city board and council, elected in 2018, is yet to confirm or revise the current vision of the Action Plan as they continue to explore the movement.

MEASURING PROGRESS

The lack of a universal definition of the sharing economy makes measuring and comparing the progress of different initiatives challenging. Sharing economy activities involve opening up access to owned assets or services, and this can be at a cost or for free. And while many transactions take place via online platforms, not all do. Terms and references also vary widely, and can include collaborative consumption, platform economy, on-demand economy, renting economy, and peer2peer economy amongst others.

Shaping a sharing economy that benefits different sectors of society, supports economic activities and protects natural resources is a priority for the city. By establishing appropriate measurements that reflect these considerations Amsterdam is able to track progress.

Key measurement areas include:

- Awareness of sharing economy platforms as a way to increase access to goods and services without the need for individual ownership
- Participation of low-income and hard to reach groups who particularly stand to benefit from affordability benefits
- Resultant economic, environmental and social benefits

REFLECTIONS

Creating an Action Plan that benefits residents, businesses and visitors alike. By listening to citizens and businesses, Amsterdam is working to ensure i) this new market has the freedom to innovate and grow, ii) the city, citizens and visitors, and businesses, can increase their access to and use of resources in the city iii) unintended adverse effects are mitigated.

Leveraging departmental expertise and accountability to embed sharing economy practices. By convening and partnering with other departments, the small coordinating team have been able to leverage departmental expertise, and embed a common approach amongst policymakers engaging with the sharing economy. Collaborating in this way creates opportunities for more rounded schemes to emerge, even while it comes with certain coordination challenges, such as maintaining momentum and keeping track of new developments.

Raising the profile of sharing economy opportunities via mayoral and external endorsement. Endorsement from the vice-mayor in 2015 has helped to develop and deliver the Action Plan. Amsterdam city’s connections to ShareNL has also helped to promote the benefits. ShareNL provides advice, webinars and meet-ups for sharing platforms, policymakers, start-ups and researchers. ShareNL also manages the Sharing Cities Alliance, an organisation that works with startups, corporates, governments, research institutions, and individuals from around the world. This gives cities, including Amsterdam, the opportunity to share their achievements with a broader audience and benefit from peer-to-peer learning.

FOR MORE INFORMATION

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THE INITIATIVE
The City of Austin’s ambition to reach zero waste by 2040 has generated several initiatives, including the creation of the Austin Materials Marketplace, an online materials exchange platform. Aligning with circular economy principles, the platform’s ambition is to keep materials and products out of landfill and in use, not only reducing waste management expenditure for the city, but also providing the means for local businesses to advertise and bid for surpluses, thereby benefiting from cost savings or creating additional income.

TIME FRAME
The United States Business Council for Sustainable Development (the USBCSD), a non-profit organisation that works with businesses to find solutions that address environmental and resource challenges, won the city’s contract to develop and manage the Materials Marketplace. The contract began in April 2014, with the launch of the Materials Marketplace in August of the same year and runs until 2020 when the programme will be reviewed.

Planning, budgeting, testing and developing the Materials Marketplace took approximately two years and policymakers were integral to the development.

FOCUS AREAS
The Materials Marketplace is designed to attract users from across different sectors as discarded materials from one company can be valuable input materials for another. Materials advertised and sought on the Materials Marketplace include construction and demolition materials, plastics, organics, and packaging.

CORE TEAM & EXTERNAL PARTICIPANTS
The programme is run by a Project and Contract Manager from the City of Austin alongside the USBCSD team.

Over 500 businesses, institutions and not-for-profit organisations have signed up as participants of the Materials Marketplace.

FINANCE
For each of the first two years of the initiative, the Materials Marketplace received USD 175,000 - funded by the Austin Resource Recovery Department (ARR), an enterprise department within the City of Austin which in turn is funded through resource recovery rates and a clean community fee. The funding has decreased annually with the intention that the platform will generate a self-sustaining revenue by April 2020. In 2018, the public funding was approximately a half of what it had been at inception.

LEAD_POLICY_LEVERS
OUTCOMES TO DATE

By the end of 2018 the Materials Marketplace had engaged with over 530 participants on the platform. In the period October 2017 to September 2018, an average of 20 trades per month were processed. At the point at which 593 trades had been made, a net value of USD 622,772 had been generated. This includes the amount paid for each trade, in addition to the sellers’ estimated disposal cost savings, and the amount the purchasers saved by not having to buy a new item.

The trades have resulted in:

- Over 400 tonnes of material diverted from landfill
- Over 950 million tonnes of carbon dioxide equivalent emissions saved

THE JOURNEY

ORIGINS

The USBCSD, based in Austin, had already been working with businesses regionally and nationally to find convenient ways of connecting the material input needs of one manufacturing business, with the material disposal of another business.

This work, along with other materials exchange programs in the US, was the inspiration behind the creation of an electronic ‘clearing house’, that matched supply with demand and diverted materials and products from landfill. Recognising these circular economy practices and the city’s wider strategy to achieve Austin’s zero waste to landfill by 2040 goal, city staff worked with the ARR Director to develop the concept of a materials exchange programme for Austin.

The concept was put out to tender, USBCSD won the bid and the Materials Marketplace was born.

LAUNCHING

The Materials Marketplace has initially been funded by ARR, formerly known as ‘Solid Waste Services’, which promotes waste reduction and resource recovery. The Materials Marketplace is positioned by the ARR as a tool to help businesses address their material input and disposal requirements. In parallel, the ARR also holds events and workshops to bring together multiple stakeholders, raise awareness of the platform and other opportunities, and build knowledge and capacity in Austin.

The circular nature of activities on the Materials Marketplace also complement the work of Austin’s Recycling Economic Development programme whose mission is to provide advice and support to zero waste companies, and promote opportunities for local job creation. The programme includes the provision of a Recycling and Reuse Enterprise Resource Guide which provides information on local programmes, services, resources, community groups, and regulations relevant to zero waste entrepreneurs and in keeping with Austin’s 2040 zero waste goal. Other policy initiatives in Austin also work to support the Materials Marketplace, such as regulation in the form of Universal Recycling Ordinance. These mandate commercial property owners in Austin (such as apartment blocks, office buildings and warehouse facilities) to find ways to provide convenient recycling access for tenants and employees thereby diverting discarded materials and products from landfill. The Materials Marketplace provides an additional way for commercial property owners to address their disposal needs and realise a revenue stream in the process.

The Materials Marketplace is now well established, with transactions between businesses taking place on a regular basis. The online platform is now undergoing a software upgrade to improve user experience, attract new businesses, enhance reporting functionality, and develop improved revenue creation to support the platform.
MEASURING PROGRESS

As part of the commitment to running the Materials Marketplace and to qualify for ARR funding, the USBCSD reports back to the City of Austin on a monthly basis. Each trade is recorded, including details of who the trading parties are, the value of the exchange, the type and quantity of products or materials traded, and their final use. The overall value of trades, which includes avoided disposal costs and avoided costs of purchasing materials through other means, is also tracked.

To determine the value of each trade and track what is being diverted from landfill, each trade is given a weighted score according to the type and quantity of materials and products. For example, construction and demolition (C&D) concrete would have a lower rating by volume than C&D gypsum board due to the limited local market for gypsum and the toxic gases it creates in landfill. Therefore C&D gypsum receives a higher weighted score for successful diversion. The current program metrics for the Austin Materials Marketplace provides an overview of engagement to date, a breakdown of the materials available and required, and diversion from landfill data.

The Waste Reduction Model produced by the United States Environmental Protection Agency is used to track and report greenhouse gas emissions reductions.

REFLECTIONS

Applying circular economy principles supports government targets and can unlock revenue opportunities. Austin has embraced circular economy principles as a way to help meet its zero waste by 2040 goal. The city’s Material Marketplace is one measure, amongst a package of policy initiatives, that has helped to find new solutions that avoid valuable materials being sent to landfill, and has provided opportunities for entrepreneurs and businesses. The Universal Recycling Ordinance mandates is another compatible measure, as is the compilation of the Recycling and Reuse Enterprise Resource Guide. The City of Austin’s spirit of collaboration has also played a key role. The city has a history of engaging with local businesses to promote the economic benefits of working in different ways, through organisations such as the Austin Energy Green Building Programme and the Green Business Leaders Programme.

Building a suite of complementary and reinforcing interventions. In 2015, Austin launched the [Re]Verse Pitch Competition, a complementary initiative to the Materials Marketplace. It connects businesses seeking disposal solutions for products that may be less in demand, with entrepreneurs and advisors who are pursuing opportunities to develop innovative ways of repurposing materials. The most impactful ideas receive funding and in-kind support to launch. [Re]Verse Pitch was launched together with the USBCSD and several additional community partners.

Gathering insights and learnings for future initiatives. The Materials Marketplace was initially offered as a free service, making the transition to a fee paying structure harder, particularly amongst non-profit organisations or infrequent users. With a desire to transition the Materials Marketplace to generate a self-sustaining revenue stream, the platform currently suggests a voluntary donation for each transaction, and is working to establish a percentage-based transaction fee in the future.

Storage and transportation of products and materials has been another learning area. The platform relies on platform-users managing this, rather than creating a dedicated USBCSD storage place which would change liability and risk factors for the initiative. Materials kept in a dedicated warehouse would require the USBCSD taking ownership of them, diverting time and resources from the primary aim of finding new users. USBCSD is therefore currently working with local third-party shippers to find appropriate fee-for-service transport solutions.

FOR MORE INFORMATION

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This case study is part of Circular economy in cities, Ellen MacArthur Foundation
GLASGOW
THE BUSINESS COMMUNITY
KICKSTARTING CIRCULAR CITIES
AND REGIONS IN SCOTLAND

Adopting circular economy practices to create thriving cities and economies

AT A GLANCE

THE INITIATIVE
Circular Glasgow is an initiative of Glasgow Chamber of Commerce and is delivered in partnership with Zero Waste Scotland, Glasgow City Council and Circle Economy. It sets out a circular economy vision for Glasgow, together with practical steps for the city and business community that works towards supporting economic development, resource recovery and reuse, and carbon reductions.

Circular Glasgow was the starting point for a wider programme of cities & regions work across Scotland, led and funded by Zero Waste Scotland in partnership with local chambers of commerce and other key local stakeholders. The learnings and experience from Circular Glasgow have been adapted and developed to suit different cities and regions, and full programmes of regional activity are now underway in the following areas: Circular Tayside (Dundee, Perth & Angus); Circular North East (Aberdeen and Aberdeenshire); and Circular Edinburgh.

BUILDING ON THE EXPERIENCE OF THESE CITIES, SCOTTISH REGIONAL CIRCULAR ECONOMY WORK CONTINUES TO DEVELOP, AND CONTRIBUTES TO MEETING SOME OF THE AMBITIONS OF THE NATIONAL GOVERNMENT’S ECONOMIC STRATEGY AND CLIMATE CHANGE PROPOSALS AND POLICIES, BOTH OF WHICH CITE THE VALUE OF ADOPTING CIRCULAR ECONOMY PRINCIPLES.

TIME FRAME
In 2015, through Zero Waste Scotland funding, Glasgow Chamber of Commerce commissioned Circle Economy, a circular economy consultancy firm, to carry out a city scan, identify circular economy potential and suggest next steps - the report was shared in 2016. Work between all the partners then took place between 2016 and 2018, and Circular Glasgow was launched in 2017. In 2018, Glasgow City Council announced it would lead the development of a circular economy roadmap.

FINANCE
Zero Waste Scotland hold GBP 73 million provided through the Scottish Government and the European Regional Development Fund. The latter’s funding comes through the Resource Efficient Circular Economy Accelerator Programme Strategic Intervention.

A proportion of this funding is used for Zero Waste Scotland’s circular economy business support programme. This programme of work includes Circular Glasgow, and the broader city and regions initiatives.

LEAD POLICY LEVERS

ROADMAPS AND STRATEGIES
CONVENING AND PARTNERING
AWARENESS RAISING
CAPACITY BUILDING
FINANCIAL SUPPORT

For more see Policy Levers

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FOCUS AREAS
Three key focus areas were identified for initial material flow analysis due to their economic significance for Glasgow: healthcare, education, and manufacturing. Selected as a sub-sector of manufacturing, the food and beverage industry was established as a starting point to implement circular innovations and create learnings to carry into future projects. The construction, finance, tourism and creative sectors have since been added.

On a regional scale, focus areas vary from city to city, but broadly align with Scotland’s Circular Economy Strategy 2016 ‘Making Things Last’ which highlights food and drink, bioeconomy, energy infrastructure, and manufacturing as initial centres of interest.

CORE TEAM & PARTICIPANTS
In September 2015, Glasgow Chamber of Commerce partnered with Zero Waste Scotland, Glasgow City Council and Circle Economy. In addition to sharing their circular economy expertise, Zero Waste Scotland provided funding for the initiative, while Glasgow City Council were instrumental in providing city data. The Circular Glasgow report was produced by Circle Economy. Operational meetings are held together on a monthly basis as circular economy activities progress and evolve within the city.

OUTCOMES TO DATE
Since the launch of the Circular Glasgow initiative, several projects are underway within the city, examples of which are noted in this case.

Building on these and with an ambition to become Scotland’s first circular city, the Leader of the City Government for Glasgow announced at the 2018 Circular Economy Hotspot Scotland that they will lead the development of a circular economy roadmap. The roadmap will build on the initial research undertaken in the Circular Glasgow report and will progress initiatives in the following areas:

- Built Environment: capacity building in circular construction techniques, following learnings from the Commonwealth Games Athletes Village
- Food: reducing food waste, addressing food insecurity, supporting local food economy and continuing to work with Sustainable Food Cities
- Textiles: convening with universities and colleges to embed circular design principles in textile design courses and with textile procurement departments of the public sector
- Energy: powering the equivalent of 15% of the city’s homes using renewable energy
- Plastics: developing and publishing a strategy and action plan scheduled for 2019 to address discarded plastic through reducing, recycling and repurposing

As a way of crowdsourcing ideas and increasing public and SME engagement, Glasgow held a Circle Lab Challenge in April 2018 which reached 600,000 people from 13 countries. It resulted in three new projects focused on running large events and conferences in line with circular economy principles.

In 2017, the Scottish Government won the Public Sector category at The Circulars for their work in placing circular economy at the centre of its economy strategy. The Circulars are awards hosted at the annual World Economic Forum meeting, highlighting the achievements of public sector organisations enabling development of circular economy activities. In 2019, Circular Glasgow was selected as a Public Sector finalist.

To date, Circular Glasgow has engaged over 650 businesses through its activities. Building further on the Glasgow experience, Zero Waste Scotland launched Circular Cities and Regions: Scotland, tailoring their approach for individual cities and regions to share circular economy business insights across Scotland.

THE JOURNEY
ORIGINS
The Glasgow Chamber of Commerce (the Chamber) works to create strategic partnerships between organisations to support and promote commerce in Glasgow and beyond - membership is on a voluntary basis. The Chamber recognised the potential of the circular economy for innovating and future-proofing businesses, and via an introduction and funding through Zero Waste Scotland, it commissioned Circle Economy to help signpost the way to a circular economy vision and strategy.

IDENTIFYING THE STARTING POINT
After analysing Glasgow’s past, present and projected activities, and political and economic priorities, the research identified three key sectors: healthcare, education, and manufacturing. Combined, they represent almost 30% of Glasgow’s workforce and 27% of Glasgow’s economy.

A material flow analysis of these sectors was undertaken to map how materials and energy are sourced, used, and discarded and where the most catalytic opportunities to create change lay. The process and findings are outlined in the 2016 Circular Glasgow report, together with material flow visuals and circular innovations.
FROM PLANNING TO ACTION

Selected as a sub-sector of manufacturing, and with many links to local SMEs, the food and beverage sector was established as the most appropriate starting point for further exploration. Innovations in heat recovery, aquaponics and use of residual food streams were highlighted and an action plan outlined a strategy for turning ideas into reality.

In June 2016, the Chamber hosted a multi-stakeholder summit to launch the Circular Glasgow report and deepen understanding of circular economy opportunities. Their guests included entrepreneurs, and private and public sector organisations. The session highlighted areas that would support circular innovation and potential pilots within the food and drink sector.

Consultations have also been conducted with the local business community to identify and develop additional opportunities. The Chamber worked to bring potential partners together and build capacity by signposting businesses to sources of additional support and funding.

Since the launch of the Circular Glasgow initiative, several projects are underway, including:

- Jaw Brew, a family brewery in Glasgow, partnered with Aulds the Bakery to create Hardtack, an award-winning beer brewed from unsaleable bread.
- Revive Eco collects coffee grinds from independent and chain cafes in the city and uses them to produce bio-oils for use in cosmetics, pharmaceuticals, and food and drink.
- Glasgow Coffee Festival 2018 organised by Dear Green Coffee was the first coffee festival globally to ban disposable cups, saving 18,000 cups and composting waste coffee grounds.
- Graven, an independent design studio in Glasgow has partnered with Spreng Thomson, communications specialists, to pilot a circular design led programme with local SMEs.
- Young Enterprise Scotland, a charity working with young people has developed a programme in Glasgow primary schools, challenging pupils to develop circular ideas and products.

Having identified additional sectors ready to benefit from circular economy opportunities, Glasgow Chamber of Commerce hosted a second summit in 2018, tailored to the construction and finance sectors. By March 2019, a white paper will be published sharing the findings of this ongoing sector engagement.

EXPANDING TO A REGIONAL PROGRAMME

Building on the experience in Glasgow, Zero Waste Scotland developed the Circular Cities and Regions - Scotland initiative, working with chambers of commerce and city councils in Edinburgh, Aberdeen, Dundee and Perth. Initial scoping reports have been developed with each city, establishing their priority sectors and key opportunities. The respective city chambers of commerce also work with Zero Waste Scotland to raise awareness, provide occasions to convene and partner, and signpost organisations to further financial or advisory support.

In the future, Zero Waste Scotland plans to develop a toolkit for cities to build capacity independently as it seeks to embed circular economy principles in local economic strategies and infrastructure developments.

MEASURING PROGRESS

Since the launch of Circular Glasgow over 650 businesses have engaged with the initiative. Following creation of a methodology to calculate the current baseline of circular jobs in Glasgow a report on employment stated that 21,000 jobs, representing 6% of all jobs in the city, are connected to circular activities, with an expectation that this will grow.

The Circular Glasgow initiative is being independently evaluated with progress measured on a quarterly basis through a series of key performance indicators related to:

- Carbon and energy savings
- Materials diverted from landfill
- Financial benefits
- Number of organisations engaged

The method for measuring at this scale is still in its early phase and is being developed by the University of Strathclyde. Initial findings are due to be captured during the course of 2019.
REFLECTIONS

Demonstrating what is possible in practice. Collaborations, such as that between Jaw Brew and Aulds Bakery, provide tangible examples of what can be achieved. By providing collaborative opportunities that assist the creation of pilots, Circular Glasgow supports peer-to-peer learning, the potential for new ventures and the development of resilient business models.

Supporting local businesses by providing an enabling environment. Integrating circular practices often requires a willingness to experiment and try new ways of operating, which can compete with existing priorities. However, businesses have demonstrated an appetite exists for convening, partnering and learning together. Circular Glasgow’s broad engagement across multiple sectors is key to creating environments in which organisations can connect, while also being signposted to strategies and financial support.

Designing a city initiative that can be expanded regionally. Learning from the Circular Glasgow experience, Zero Waste Scotland continue to apply a similar approach in cities across Scotland. By applying bespoke city scans, key city priorities and economic activities can be addressed. Expansion of the programme further complements the vision set out by the Scottish Government in the Circular Economy Strategy for Scotland 2016.

FOR MORE INFORMATION

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This case study is part of Circular economy in cities, Ellen MacArthur Foundation.
AT A GLANCE

THE INITIATIVE
To support small and medium-sized enterprises in the transition to a circular economy, London Waste and Recycling Board has created Advance London - a circular economy programme that offers business advisory services and investment guidance to SMEs that meet specific size, turnover and focus criteria. Engagement with the SMEs is tailored to their individual activities, and includes exploring new circular economy markets, revenue streams and business models. By transforming waste challenges into business opportunities, the work of Advance London also contributes to meeting the city’s goal of zero waste to landfill by 2026.

TIME FRAME
Advance London is a three-year programme, running from January 2017 to December 2019. It will likely seek further funding to scale up support over a longer term following positive SME demand and impactful results.

FOCUS AREAS
Participating SMEs are addressing the five focus areas that were identified in London’s Circular Economy Route Map issued in June 2017: built environment, food, textiles, electricals, and plastic.

CORE TEAM & PARTICIPANTS
A core team of six staff sits within the London Waste and Recycling Board (LWARB) - the statutory body dedicated to waste management across London and chaired by the Mayor of London’s representative. The team is supported by LWARB colleagues, and an external advisory group.

FINANCE
Advance London is co-funded by LWARB and the European Regional Development Fund (ERDF). Each contributes GBP 0.7 million.

In parallel, LWARB is a cornerstone investor in three stand-alone funds (separate to the co-funding above) which are open to the qualifying SMEs. Each fund targets a different stage of enterprise development - from support for those creating a Minimum Viable Product; to venture support for those needing series A and B funding (funding for early stage businesses), to growth support for those with a proven cash flow and profit that are looking to scale.

LEAD POLICY LEVERS

For more see Policy Levers
OUTCOMES TO DATE
By the end of 2018, Advance London had held five collaboration events with the aim of brokering relations between SMEs and corporates, as well as 20 technical learning workshops on topics such as an Access to Finance Masterclass, Compelling Communications for your Circular Innovations, and Design Thinking.

Advance London has also provided 700 hours of bespoke support to 112 SMEs. By December 2019, the programme aims to provide:

• 100 SMEs with at least three hours of bespoke support in the early stages of the programme, which includes eligibility assessment and circular diagnostics
• 80 SMEs with at least 12 hours of bespoke support further along the programme, which includes growth and transition support

One in three SMEs engaged in the programme have secured grant, equity or loan funding within 18 months of first receiving advice.

The programme also helped to facilitate 20 product-market collaborations which by the end of 2018 had generated five new circular products or services. These are:

• Plumo, a unique thermal packaging material made from surplus feathers
• CupClub™, a returnable packaging service designed for hot or cold drinks
• Expansion of OLIO, the food sharing app, to include local shops so that surplus food and other items can be shared rather than thrown away
• Launch of a refillable scheme for perfume bottles by 4160 Tuesdays, a London based perfume manufacturer
• Launch of Biohm’s small-scale production of mycelium (branching filaments of fungi) based construction products

THE JOURNEY

ORIGINS
In 2017, LWARB published London’s Circular Economy Route Map in which SMEs are identified as integral to developing circular economy in the city due to their contribution to private business sector turnover. The route map helped LWARB identify the challenges these businesses face as they embed circular economy approaches into their activities, particularly in relation to obtaining appropriate financing, developing transformative mindsets, promoting products and getting support from supply chains and support services. To help overcome some of these aspects LWARB created the Advance London programme.

NEXT STEPS
To create a compelling programme, LWARB not only harnessed learnings from SMEs already working to make the transition to a circular economy, but also from its wider network. It engaged with investors, accelerators, workspaces and organisations such as Circularity Capital, Central Research Lab, Clean City Awards Scheme, and the Ellen MacArthur Foundation’s CE100 network.

LWARB also formed partnerships with the Federation of Small Businesses, the London Growth Hub, local chambers of commerce and business improvement districts. These partnerships helped LWARB identify and attract SMEs best placed to benefit from the programme.

In addition to a core team, LWARB appointed a dedicated advisory group that meets quarterly to track the achievements of the programme and inform its future direction, ensuring Advance London continues to best serve and engage as many SMEs as possible. The group reflects a mix of expertise with representatives from London councils, the investment sector, the corporate world and circular economy experts and academics.
THE PROCESS

Advance London focuses on two main strategic support areas:

- SMEs with existing circular economy offerings
- SMEs that want to transition to a circular economy business model

Through initial calls with prospective SMEs, the Advance London team works to understand the SME’s business model and how circular economy principles could be leveraged to unlock economic, environmental, and social benefits. The businesses eligible for support are then invited to the Circular Business Masterclass. At this early stage, baseline data on each SME is gathered to allow for quarterly tracking of progress.

All businesses that become part of Advance London’s programme receive between a minimum of three hours to ten days of bespoke support, ranging from advice on business models, to how to market and scale, or ways to obtain the finance appropriate to their goals and development stage. SMEs also receive invitations to workshops to build their capacity, and benefit from a range of networking and collaboration opportunities.

SMEs that want to move forward with securing investment are put in touch with expert investors from the relevant stand-alone funds or are signposted to other funding opportunities.

The relationship with the SMEs on the programme is on-going and will last for as long as the programme is running.

MILESTONES

The programme commenced in January 2017 with a launch event held in City Hall in April 2018. Some 45 SMEs attended, alongside the many experts involved in the programme’s creation.

During their time on the Advance London programme, several of the participating SMEs have achieved significant milestones:

- **ZigZag Global** was the first SME supported by the programme to be nominated for and accepted onto the Ellen MacArthur Foundation’s CE100 programme as an Emerging Innovator in March 2017. In 2019 it was a finalist in **The Circulars**, hosted annually at the World Economic Forum meeting in Davos.
- **Nu Wardrobe** and **Encycled**, supported by an Advance London circularity boot camp, won grant funding at the London City Fashion Challenge, run by the London Legacy Development Corporation (LLDC) and East London Fashion Cluster in November 2017.
- In October 2017, **CupClub** was announced as one of the winners of the USD 2 million New Plastics Economy Innovation Prize in the circular design category which seeks to address small items that are commonly not recycled or discarded in the environment or landfill.
  - The first portfolio company to attract major investment, **OLIO**, closed a USD 6 million Series A raise led by **Octopus Ventures** in June 2018.
  - Also in summer 2018, with the support of the Advance London programme, **Plan Zheroes**, a food redistribution charity in London, implemented a new income-generating model that resulted in a robust business case for food redistribution, introduction of a new charging structure, and improved financial sustainability through the development of an independent income stream.

To celebrate the one-and-a-half year mark in June 2018, Advance London, in collaboration with LWARB’s Circular London programme, hosted London’s first Circular Economy Week where 18 SMEs had the chance to broker relations with 21 corporates, several of which led to contract opportunities.

During this same week, Advance London hosted the UK’s first brokerage event between SME innovators (e.g. Biohms, Skipping Rocks Lab, Customem) and traditional waste management companies (e.g. Bywaters, First Mile, SWR Newstar, REAL) to initiate dialogue and identify ways to increase the composting rate of biodegradable products.
MEASURING PROGRESS
Currently, the programme reports quarterly on two main outcome areas:

- The introduction of new products, services or processes
- The creation of new job opportunities

A bespoke methodology being developed for multiple stakeholders including, for example, LWARB, ERDF and future funders, will also capture outcomes and impacts across the widely varying SMEs including:

- Increased SME profitability
- Waste diverted from landfill
- CO2 emissions saved

Additionally, the team has worked on the development of a framework that assists with establishing each SMEs’ baseline circularity and areas for potential innovation. Between July and December 2018 the framework was tested on 30 businesses and is being rolled out across the programme in 2019.

REFLECTIONS
Increasing reach through collaboration and agility. The programme’s collaboration with LWARB’s wider activities, networks and initiatives (such as Circular London), and with the Greater London Authority’s policy initiatives (such as the Mayor’s Entrepreneur Award), has contributed to its development. It has increased the programme’s depth, reach and ability to address key needs. Advance London also regularly evaluates its activities, convening SMEs and other stakeholders to assess its added value, and adapting its activities to maximise impact.

Developing tailored programmes to support circular economy business and policy transitions. Having direct contact with SMEs through the bespoke elements of the programme has allowed the Advance London team to have a real-time understanding of SME needs and challenges. This not only informs the evolution of the programme but can also inform wider policy development.

Measuring progress to give Advance London and SMEs visibility on impact and inform future developments. The dedicated framework developed for the programme allows the team and SMEs to capture baseline measurements and circular economy progress in the form of economic and job opportunities rising from the shift to circular business models. The measurement also helps businesses identify relevant areas for innovation across their value chains.

Creating resilient local economies and innovative business cultures. The programme helps local SMEs to be at the forefront of circular economy innovations, which in turn helps unlock the associated economic, environmental and social benefits that are being captured in the measurement framework. The programme also opens up partnership opportunities and knowledge exchange with larger organisations, helping to drive an overall culture of business innovation.

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This case study is part of Circular economy in cities, Ellen MacArthur Foundation
AT A GLANCE

THE INITIATIVE
Peterborough is committed to becoming a circular city by 2050. The Circular Peterborough Commitment brings together local partners who share the ambition to integrate circular economy principles in the city to drive economic growth and resilience, meet local needs, connect communities, and reduce environmental impact, including greenhouse gas emissions.

Tracking progress against their circular city ambitions is key to demonstrating benefits and building momentum. Peterborough is developing a three-pillared measurement framework composed of i) a Circular Economy Maturity Model that can offer a qualitative circularity tracker for businesses and the city, ii) a selection of Key Performance Indicators, and iii) a tracking of material flows in the city. Whilst it is still work in progress, Peterborough’s in-house work has raised the city’s profile nationally and internationally.

TIME FRAME
The Circular Peterborough initiative began in 2015, starting with the Circular Peterborough Commitment, followed by development of the measurement framework via the 7 Rs in 2016, the launch of the Share Peterborough Platform in 2017, and in 2018-19 a consultation on draft Plan and Performance Circular City Roadmap.

FOCUS AREAS
Circular Peterborough’s measurement framework is designed to support both businesses and the city as they track their progress towards a circular economy, with a view to achieve full circularity by 2050. The framework includes both qualitative and quantitative measurement metrics.

- The quantitative focus includes economic growth, GHG emissions reduction, business awareness of circular economy principles and opportunities, waste reduction, and recycling
- The qualitative focus includes tracking behavioural, cultural and operational shifts

ORGANISATIONAL STRUCTURE
The Circular Peterborough programme is a key element of the city’s Future Peterborough Programme. The latter is jointly run by Peterborough City Council and Opportunity Peterborough (a Council-owned not-for-profit economic development company). The alignment with the Future Peterborough Programme supports integration of circular economy principles into the smart city programme, as well as its economic development and inward investment activity.

Circular Peterborough has 1.5 full-time equivalent staff based within Opportunity Peterborough. They work to bring relevant sector and circular economy knowledge to the Council. Core to this is their convening of businesses, third sector organisations, and individuals from across the city.

LEAD POLICY LEVERS

For more see Policy Levers
FINANCE
In 2012, Peterborough was one of four UK Future City Demonstrators to be awarded a GBP 3 million grant from Innovate UK, the country’s innovation agency. Amongst other things, the grant helped the Circular Peterborough programme to emerge as a part of the city’s Future Peterborough ambitions. The grant continues to contribute to Circular Peterborough’s core costs, including staffing, software development and marketing as well as the development of the measurement framework.

Investigation of further funding opportunities to support the work of Circular Peterborough is ongoing. Drawing on the experience of commercialising Peterborough’s Smart City Leadership Programme, the measurement framework should become a long-term replicable, scalable and potentially commercialised tool for small and medium cities similar to Peterborough.

OUTCOMES TO DATE
Circular Peterborough has found it is increasingly gathering partners around the goal of achieving a circular city by 2050. ‘We’re not becoming circular for the badge, we’re becoming circular because it is helping us address real challenges in our city.’ Circular Peterborough.

THE JOURNEY

ORIGINS
Being able to track and measure progress has been an important component of Peterborough’s work - not least as the work has helped to engage other city departments and local businesses and organisations. Since measuring progress of circular economy at a city scale is inherently complex, and Peterborough has needed to develop the model internally, its path has been one of innovation and discovery.

DEVELOPING THE THREE-PILLARED MEASUREMENT FRAMEWORK
Starting from its original 7 Rs Maturity Model, trials and testing have led to the emergence of a more diversified three-pillared framework.

Pillar 1 - A qualitative Maturity Model that helps businesses and the city track progress. The Maturity Model was first developed through desk-based research in 2016. The model was designed to map and track local business activity against Circular Peterborough’s 7 Rs (rethink, redesign, repurpose [reuse and share], repair, remanufacture, recycle, and recover) with a view to more circular use of materials. As a relatively new way of thinking about and tracking the activity of local businesses, the 7 Rs have first been used by local businesses to signpost how circular economy opportunities can work for them. Peterborough is developing a 7 Rs Circular Business Guide and in 2019 early tracking data should emerge.

The programme has raised the city’s profile nationally and internationally, and in 2019 it hosted the Future Circular Cities Conference, building on recognition gained at the 2015 Smart City Awards and its inclusion in the World Economic Forum’s circular cities studies. The event attracted over 90 delegates, including national and international city representatives, businesses, and third sector organisations, eager to learn from best practices and investigate collaboration opportunities.

So far, almost 70 organisations have signed the Circular Peterborough commitment and over 315 users have registered on the Share Peterborough platform since mid-2017. This activity has led to 77 product or service shares, avoiding over GBP 2,141 in new purchases and landfill fees, and diversion of over 220kg of resources from landfill. Five circular economy workshops have also been held to harness learnings and raise awareness in the food and agriculture, manufacturing, service, and third sectors. Peterborough has also partnered with University College London and Cranfield University to further develop their indicator set, develop scenario plans for the city and support training opportunities for students.
Pillar 2 - Quantified Key Performance Indicators. To develop quantitative measurements for circular economy inspired outcomes, Circular Peterborough turned to the existing Sustainable Cities and Communities ISO 37120 standard, which provides indicators for city services, quality of life, and smart and resilient cities. Peterborough selected quantitative measures that would be specific to measuring circularity in their city, such as in waste, transport and energy production.

This approach has allowed Peterborough to develop performance indicators that are generally already tracked by city administrators thereby making best use of the city’s existing resources. These indicators will be tracked over a set timeframe, for example the amount of materials sent to landfill, resources recycled and the amount of energy produced from renewable sources, although Peterborough is looking to push beyond these traditional metrics. This work is ongoing and Peterborough plans to launch this second pillar in 2019.

Pillar 3 - Urban Material Flows. To develop a quantified picture of material inputs into the city and internal city material flows, Circular Peterborough will initially focus on the City Council’s supply chain - identifying major providers of goods and services, and the nature, size and movement of related materials. As with pillar 2, Quantified Key Performance Indicators, Peterborough intends to capture the overarching trends in the period 2018-2021 to match the timeframe of the Plan and Performance Monitoring Framework and obtain visibility on progress at the city scale.

REFLECTIONS

Building a community of understanding around circular economy principles and measurement. The measurement of circular economy activity on an individual business basis is contingent on building up high levels of awareness and activity. This helps to both grow new circular economy practices in the city and uncovers pre-existing circular economy practices that weren’t previously being recognised. Broad engagement across sectors increases awareness of the opportunities presented in a circular economy and has helped Circular Peterborough identify tools that can support local businesses - such as the development of the 7 Rs Circular Business Guide and the identification of metrics.

Selecting suitable indicators to start the process. One of the current challenges with measuring circularity is finding standardised, comparable indicators. By consulting the existing Sustainable Cities and Communities ISO 37120 standard, Peterborough has selected approximately 75 commonly tracked indicators which makes comparisons to baseline possible, and creates visibility on progress towards a circular economy at a city scale over a given time period.

Collaborating closely with Peterborough City Council and learning through peer-to-peer networks. A close organisational link to Peterborough City Council enables Circular Peterborough to work towards integrating circular thinking into wider city economic development projects and policies and to draw on city data to baseline and track progress. While collaboration with a range of academic institutions, Innovate UK’s Knowledge Transfer Network, and multi-stakeholder networks of businesses, third sector organisations, cities and governments helps to bring in new ideas, progress the Circular Peterborough initiative and measurement framework, and share this work with others.

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The Initiative

In spring 2018, the City of San Francisco passed legislation that all carpets installed in city departments would be at least Cradle to Cradle Certified Silver and must not contain antimicrobials, fluorinated compounds, flame retardant chemicals, or other chemicals of concern. Similar requirements apply to carpet adhesives. Carpet tiles are to be used for ease of replacement and avoidance of waste. Additionally, both the carpet fibres and backing materials must contain minimum amounts of recycled materials, and ultimately be recyclable at end-of-use.

San Francisco led this initiative as part of its drive to reduce the amount of discarded carpets sent to landfill (currently over 80% in the USA), and ensure the well-being of visitors and staff in San Francisco City departments. From the outset it was important to ensure the process not only inspired material and business innovation but also allowed for a competitive bid process. It therefore required extensive research and stakeholder engagement.

Time Frame

Research began in summer 2016 and, following a period of consultation, the regulation was passed in Spring 2018.

Focus Areas

By focussing on the built environment supply chain, San Francisco was able to work towards meeting environmental and material health goals within city buildings and create new opportunities for suppliers to win city contracts.

Core Team & External Participants

The development of San Francisco’s ‘green carpet requirements’ was a collaborative effort between: the Department of Environment’s Zero Waste, Toxics Reduction, and Green Building teams, the Municipal Green Building Task Force, an external consultant from HDR (an architectural, engineering and consulting firm), and city staff involved in public procurement.

Finance

The research and execution of the regulation was financed from the Department of Environment’s budget, ultimately derived from city refuse fees, and totalling approximately USD 15,000.

Lead Policy Levers

Roadmaps and Strategies

Convening and Partnering

Awareness Raising

Public Procurement

Legislation and Regulation

For more see Policy Levers
OUTCOMES TO DATE

The regulation is still in its early days of implementation so economic, environmental and social benefits are yet to be fully quantified. In the near term, the creation and passing of the regulation has meant:

• The Department of Environment has been in consultation with other city departments to embed the requirements into large projects.

• An online platform is available to city departments looking to install new flooring and seeking direction on suppliers of compliant products.

• An informal network of champions from different departments has been identified, and consists of individuals motivated to create change within their area and who can assist with consultations on future product categories, such as furniture and countertops.

THE JOURNEY

ORIGINS

San Francisco’s Environment Code contains ordinances designed to guide city activities to protect citizens, safeguard the environment and preserve natural resources, while also supporting economic activity. City activities are guided by the premise that the choices least harmful to health and environment, based on the most applicable scientific evidence, will take precedence at all times thus preventing costly subsequent interventions and irreversible damage to people and nature. For example:

• The Environmentally Preferable Purchasing Ordinance seeks to “reduce negative impacts to human health and the environment through the development of specifications for city purchases”

• The Green Building Requirements for City Buildings Ordinance seeks to protect humans and the environment, in addition to contributing to meeting the California Energy Commission goals of Zero Net Energy in all new commercial construction in California by 2030 with a retrofit to Zero Net Energy in 50% of existing commercial buildings.

The ‘green carpet’ requirements were developed under the mandate of these two ordinances; under leadership of the San Francisco Department of Environment, with overarching support from the elected mayoral leadership and Board of Supervisors in the city.

LAUNCHING

From 2016, the Department of Environment hired an external consultant from HDR Inc. for about a year, to provide advice on carpet constituents in municipal construction projects. HDR Inc is an engineering, architecture, environmental and construction service. Early in the process the City Toxics Reduction team was engaged, alongside other departments to understand where technical adaptations to the carpet criteria may be required.

Carpet specifications were then drawn up, with the aim of avoiding chemicals of concern and to include recycled content and maximum recyclability potential.

In the search for suitable products, initially the team sought independent third-party certification or eco-labels that met its objectives. Cradle to Cradle Certified (C2CC) was the closest fit. As one of the schools of thought that underlies the circular economy, Cradle to Cradle principles promote design that allows for continuous material recovery and reutilisation, and the use of materials and products that are safe for human health and the environment. It considers all materials to be nutrients that can be returned to either a technical or biological system.

To meet its material recovery and health goals the city went further, however, requiring the inclusion of three additional specifications:

1. Full exclusion of certain chemicals, most notably perfluorinated and polyfluorinated alkyl substances (PFASs)
2. Inclusion of recycled content
3. Manufacturers’ material transparency

After draft carpet specifications were agreed upon, a manufacturers’ survey was created to establish achievable standards and identify sufficient compliant products to ensure a competitive bid process, with enough options to meet design needs of city architects and project managers.

Ultimately, the team identified three manufacturers who were able to meet the strict requirements.
MEASURING PROGRESS
It is early days in the life of San Francisco’s green carpet regulations and as such environmental and economic benefits have not yet been calculated, however work is being undertaken to begin to paint the picture and quantify the amount of compliant carpet installed - 2018 data received from one supplier alone equates to 1,621 yards² (1,355 m²) of compliant carpet tile, for example.

Assisting this process, a system will be installed in 2019 to track compliant carpet purchases for all LEED certified city buildings. For non-LEED projects the city is investigating other options for capturing purchasing data, notably through its new financial and budgeting software system.

REFLECTIONS
Using the creation and implementation of regulation to open up new opportunities for suppliers and new standards in city procurement and asset management. Under the Environmentally Preferable Purchasing Ordinance, this regulation is mandatory. Its development has shown that more circular economy specifications are viable and can be used to develop the market and make material recycling and capture-for-reuse more common. The support of the legislation by the City and County of San Francisco’s elected mayoral leadership and Board of Supervisors also encourages the development of similar initiatives that support the city’s economic, environmental and social goals.

Collaborating with other city departments and manufactures to secure input, awareness and commitment. To secure changes in city purchasing practices it was important to work with other departments to ensure that the new standards provide sufficient compliant products to meet city departments’ needs. The Department of Environment also continues to hold regular meetings with department purchasers to raise awareness of the ordinances under the Environment Code whilst also working with the informal champions network to support the implementation of the new regulation.

Engaging in robust research to understand product components, material transparency and the potential of standards and certificates. Identifying compliant products took many months, since the selected requirements extended beyond those of Cradle to Cradle Certified. To support the ongoing assessment of product compliance by city purchasing departments, it is hoped that third-party certifiers will continue to evolve their standards and material transparency in products will increase.

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This case study is part of Circular economy in cities, Ellen MacArthur Foundation
CIRCULAR ECONOMY
PROCUREMENT IMPLEMENTATION
PLAN AND FRAMEWORK

Creating systemic change through public purchasing power

AT A GLANCE

THE INITIATIVE
Toronto’s Circular Economy Procurement Implementation Plan and Framework (the Framework) is positioned to become a major tool in creating economic growth, enhancing social prosperity and moving towards zero waste in the city. Toronto’s annual purchasing contracts amount to approximately CAD 2 billion in value, which represents considerable potential for suppliers who have long-standing circular economy offerings or who are beginning to integrate circular economy into their existing business models. The Framework outlines the city’s circular economy procurement objectives in addition to a number of opportunities for the city to leverage its buying power. The Framework is consistent with the direction and approach set out in the city’s 2016 Long Term Waste Management Strategy.

TIME FRAME
Coordination on the development of the Framework took place between January and June 2018. It will initially be implemented in pilot procurements for three years from June 2018 with ongoing business consultation, engagement and capacity building. Final recommendations will be presented in 2021.

FOCUS AREAS
Initially, the Framework may potentially be implemented in the following target sectors: food and catering; waste management; information and technology; textiles and clothing; construction and engineering.

CORE TEAM & PARTICIPANTS
Development of the Framework was co-led by city staff from the Solid Waste Management Services Division (SWMS) and the Purchasing and Materials Management Division (PMMD).

Sitting within SWMS is the Unit for Research, Innovation and a Circular Economy (UFRICE), which coordinated the work and convened a cross divisional working group on circular economy including one or two senior representatives from SWMS and PMMD in addition to eight other ‘champion’ divisions, namely: City Planning; Economic Development & Culture; Environment & Energy Office; Facilities Management; Parks, Forestry & Recreation; Transportation Services; Toronto Water; and Toronto Public Health. Other divisions are also open to join.

Toronto is also engaging suppliers in the project, to ensure that the Framework’s implementation is informed by potential bidders and business stakeholders.

FINANCE
CAD 1.8 million has been allocated to UFRICE over three years to cover the costs of various projects and initiatives, including staffing, studies, grants, partnerships, pilots, conferences, membership fees, and travel.

LEAD POLICY LEVERS

ROADMAPS AND STRATEGIES
CONVENING AND PARTNERING
AWARENESS RAISING
CAPACITY BUILDING
PUBLIC PROCUREMENT

GOVERNANCE
Toronto City Council

POPULATION
3 million (2018)

GDP
308 billion USD

DENSITY
4,769 per km$^2$

TORONTO

CIRCULAR ECONOMY
PROCUREMENT IMPLEMENTATION
PLAN AND FRAMEWORK

Creating systemic change through public purchasing power

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**OUTCOMES TO DATE**

UFRICE developed and submitted guiding principles to the Toronto’s Government Management Committee, and a plan for integrating circular economy approaches into city procurement processes. UFRICE is also determining a baseline and suitable metrics to track the economic, environmental and social outcomes.

Since inception, the project has launched into pilot phase and has begun not only identifying existing circular procurement activities, but also integrating new requirements within call documents.

**THE JOURNEY**

**ORIGINS**

The development of Toronto’s Long Term Waste Management Strategy involved over 40 events, public meetings, and approximately 3,400 survey responses between 2014-2016. The strategy provides a 30-50 year masterplan for Toronto’s municipal solid waste management. To fulfill the objectives SWMS will be guided by circular economy principles that aim to fundamentally change how resources are regarded, for example, by designing systems and products that enable greater recovery of materials.

In November 2017, as one of the recommendations of the strategy, UFRICE was formed to deliver on and implement circular economy transformation. Its role is to support innovation and economic growth through a wide range of activities, including convening businesses, engaging new technologies, and building public and private stakeholder awareness and capacity.

In support of the strategy, a local councillor had also proposed updating the 2007 Environmentally Responsible Procurement Policy to bring it in line with circular economy principles. Ultimately, this is what led to the creation of Toronto’s Circular Economy Procurement Implementation Plan and Framework coordinated by UFRICE.

**SUPPORTIVE ACTORS**

Toronto’s Government Management Committee, which governs all city agencies and bodies, was supportive of the initiative, helping to place it high on the agenda. Local agencies and environmental organisations participated in a UFRICE-funded workshop that has spurred conversations promoting circular economy-related activities in areas close to Toronto, and has raised capacity among local staff.

Capacity building also extends to vendors, which could include circular economy training that helps them recognise opportunities for their businesses. The additional businesses which engage with the city on circular economy procurement may meet new contract criteria and the potential to be awarded city contracts.

**MEASURING PROGRESS**

In these early stages, progress is in part measured by tracking the number of engagement interactions with suppliers and fully fledged pilots.

Reporting on progress has been an important consideration and the city has identified core indicators against which to start tracking. These are:

- Economic - cost savings for the city, waste reduction savings
- Environmental - the percentage of waste diverted from landfill, CO2 savings, percentage of recycled content, raw materials avoided
- Social - number of associated jobs created, number of city staff who have received circular economy training, asset sharing activities
REFLECTIONS

Supporting key institutions and complementary policies to help create change. The November 2017 direction from Toronto’s Government Management Committee (now called General Government and Licencing Committee) to report on a strategy for procurement allowed this initiative to get off the ground and put it on the agenda of the working group champions. In addition, the project is in alignment with PMMDs Supply Chain Management Transformation Project, which includes implementing Category Management and Strategic Sourcing. Furthermore, the city supports extending responsibility to owners and packaging manufacturers for the life cycle of their products and the waste they generate. In 2018, the city’s Policy for the Addition of New Materials to the City’s Waste Diversion Programs was created. Also, at the provincial government level, support for Extended Producer Responsibility is included in the Waste-Free Ontario Act 2016, which enacted both the Resource Recovery and Circular Economy Act (2016) and the Waste Diversion Transition Act (2016).

Timing and collaboration is key. Given the selection of suitable procurement pilots is not a straightforward process, timing and collaboration is critical. To ensure circular specifications are included in new procurement contracts, coordination with teams responsible for the developing contract is required. This could include communicating between divisions drawing on the contract, specification engineers, legal services, insurance managers, and PMMD staff.

Testing, piloting, convening and partnering leads to rich learnings. The collaborative work across multiple city government divisions, with suppliers and field experts has been integral to the identification of circular opportunities, the ongoing development of the Framework, and the shaping of future procurement in the city.

Opening up new opportunities for businesses. The framework opens up new opportunities for businesses to win contracts. The evolution of procurement in the city, alongside the assistance and motivation for businesses to innovate, supports Toronto’s wider goal of creating economic growth, enhancing social prosperity and moving towards zero waste in the city.

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This case study is part of Circular economy in cities, Ellen MacArthur Foundation
AT A GLANCE

THE INITIATIVE
From the outset, it was decided that the design of the new Venlo City Hall (NL) should be Cradle to Cradle (C2C) certified and situated in an area in need of regeneration. The vision was to create a building that would enable better connections between different city departments, and that would show consideration for the health of workers, visitors and the surrounding environment. These considerations were in addition to the aim of creating long-term cost benefits from material choices and energy saving technologies.

As one of the schools of thought that underpin the circular economy, C2C design allows for continuous material recovery and reutilisation in a technical or biological system. Through healthy material choices and design for disassembly, it is possible to recoup some of the original investment, at a later date, as materials can be sold back to manufacturers through a ‘buy and buy-back’ scheme, and ultimately used again. In designing Venlo City Hall, careful attention was given to the structure of the building, and also to the interior fit-out and furniture installed. The close attention to detail extended to the procurement of products within the building, such as soap.

TIME FRAME
In 2007 it was decided that all new city buildings would be designed using C2C principles. The design of Venlo City Hall began in 2009. Construction commenced in 2012 and was completed in April 2016. The building opened for use in August 2016.

FOCUS AREAS
While the primary focus for this initiative was in the built environment, it was driven by the aims of capturing long-term economic savings, protecting the environment and human health, and promoting skills and ambition in the city.

CORE TEAM & PARTICIPANTS
Of more than 50 initial proposals submitted in response to the specifications of the tender, five were shortlisted before the ultimate choice was made. The final project team consisted of eight people, including a lead civil servant, technical advisors, financial advisors and the architects. The team created roadmaps for each of the different areas that the project would need to address - from the planning of the building, to the user needs, to the financing of construction. Overall sign-off resided with the mayor, council and aldermen.

FINANCE
The city council’s allocated budget for the project was EUR 53 million. It was supported by a loan from Bank Nederlandse Gemeenten - a local government funding agency. When the project came in under budget, EUR 900,000 were returned to the city council for reinvestment in other areas.

LEAD POLICY LEVERS

ROADMAPS AND STRATEGIES
AWARENESS RAISING
URBAN PLANNING
ASSET MANAGEMENT
PUBLIC PROCUREMENT

For more see Policy Levers
OUTCOMES TO DATE
The new city hall has played a key role in updating the city’s image - traditionally associated with agriculture and logistics, Venlo is now increasingly associated with innovation and circular economy opportunities that are attracting both businesses and skills. The 18-24 year-old city population has increased, as well as the number of companies basing themselves in the city. The city hall has itself received over 32,000 visitors between 2016 and 2018 and the outcomes of the project have led to Venlo making C2C compliance a part of all its future construction projects.

THE JOURNEY

ORIGINS
In 2006, in an effort to evolve its image and economy, the city of Venlo along with the Chamber of Commerce committed to embed C2C principles into the city’s economic activities. When it became necessary to renovate the original city hall these principles were kept in mind, however the structural layout of the old building did not allow for a suitable transformation of the physical space or its function in terms of power generation, energy savings, improved air quality, grey water processing, heating or cooling. The mayor, council and aldermen therefore approved the case for a new city hall to be built using C2C principles and located in an area that would benefit from the investment.

In line with EU regulations, a European design tender was issued, with a brief to provide the most innovative vision for a C2C town hall. The winning bid would need to meet the overarching ambition to design and build a space that would benefit people, the environment, and the economy.

BUILDING DESIGN
Venlo City Hall was built on the edge of the River Meuse in an area that would benefit from regeneration and economic development. The new building has already catalysed renovation of an old neighbourhood factory which now contains living accommodation. An additional 72 new dwellings are also being constructed next to Venlo City Hall using C2C principles.

The building’s living north facade comprises over 100 plant varieties which serve to improve the air quality outside the building. This living facade not only converts carbon dioxide to oxygen and filters particulates, it also provides a level of noise insulation and creates a habitat for birds and insects. An interior green wall helps to add moisture to the air inside the building.

Venlo has continued to grow its expertise in C2C and circular economy practices. In 2010, the Cradle to Cradle consultancy C2C ExpoLAB was founded in Venlo, with a focus on supporting and advancing government and built environment projects that specifically seek to harness the benefits of using C2C principles. In 2012, the first Cradle to Cradle Product Certification Training centre in Europe was opened in Venlo by the Cradle to Cradle Product Innovation Institute of San Francisco, USA to train consultants who will guide companies as they seek certification for products and manufacturing processes. In Spring 2019, a Circular Economy Expertise Platform is due to open in the region to support innovation, material loops and product take-back schemes. Venlo is also collaborating with nearby Dutch and German cities.

The building’s connections to natural systems also minimises the draw on resources. Rainwater is collected on the roof where it makes its way to a helophyte filter, a type of reed bank, along with wash basin and pantry water. The filtered water is then used for flushing toilets. In addition, 1,300 m² of solar panels have been added to the exterior to provide power and shade.

Two solar chimneys also passively heat and cool the building. One is on the top of the building and the other is on the upper levels. In simplified terms, these solar chimneys capture heat from the sun and create thermals which circulate air throughout the building. Heat exchangers and air wells are used to regulate the temperature according to the seasons. The design is both attractive and saves money and energy as the building doesn’t require traditional heating or cooling systems. In addition, when temperatures range between 18-22°C, the pleasant open space inside the solar chimney on the upper levels can be occupied by workers.

The components in the building are documented in a digital ‘material passport’ that discloses the material constituents, along with how to disassemble, then recycle or return them to the manufacturer - thereby recouping a proportion of the original investment. By creating a log of the residual material value within the building it becomes possible to quantify the potential value of buildings as material banks.

In a similar vein, the furniture in the building is also provided under a ‘buy and buy-back’ arrangement and is easy to disassemble for maintenance, ensuring workable components can be reused. Material choices within the furniture facilitate recyclability.

Certain materials have also been avoided – in this case paint and glue, in part due to the lack of ingredient transparency and in part to ensure material health and aid the future recovery of materials.
MEASURING PROGRESS
To establish a baseline measure against which to track progress, measurements were taken from the previous city hall such as air quality, temperature, air moisture and fine dust particles. In spring 2019, Venlo City Hall will conduct a comparative study. The University of Maastricht is also measuring the connection between improved air quality and the reduction in the number of employee sick days compared to those in other buildings. It is already known that the building’s green facade absorbs 30% of sulphur and nitrogen oxides in the air in the vicinity of the building, offsetting the emissions of particulate matter from local traffic.

Alongside the productivity, health and environmental benefits, the project is also forecast to deliver a 12.5% return on investment by 2040 and some returns from the C2C and bioclimatic design of the building are already being realised. The procurement of C2C furniture alone leads to an 18% cost saving in part achieved through the embedded value of the materials, which can be returned to the original manufacturer at the end of the product life through the buy and buy-back scheme, recouping a percentage of the original investment.

REFLECTIONS
Developing a long-term vision. In 2006 Venlo officially embraced C2C principles in its building projects as a means of generating innovation and economic growth. This paved the way for C2C principles to play a central role in the tender for the new Venlo City Hall. By embracing a new approach Venlo has been able to showcase what is possible in how we can build, design and service the built environment.

Creating a culture of innovation and integration to unlock circular economy opportunities and benefits in the city. Multiple cross-disciplinary meetings were held to create and communicate the ideas, vision and business case for the new building and several scenarios were developed to understand and demonstrate the potential long and short-term benefits of different choices. The project also required the support and courage of the city to invest upfront, in order to unlock savings in the long term.

Securing leadership endorsement, trust and commitment. The willingness of Venlo’s Mayor, Council and Aldermen to take a different approach to supporting the city’s prosperity was key to the overall project’s success. Biannual meetings were held with the city council and the aldermen to confirm the project was on track. They gave the project team the trust and space to move construction forward which was integral to the project’s ability to innovate and ultimately to create a building that represents far more than a place of work.

FOR MORE INFORMATION
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This case study is part of [Circular economy in cities](http://www.ellenmacarthurfoundation.org/our-work/activities/circular-economy-in-cities), Ellen MacArthur Foundation
BELO HORIZONTE
COMPUTER RECONDITIONING CENTRE
Combining resource recovery, skills training, and digital inclusion

AT A GLANCE

THE INITIATIVE
The Computer Reconditioning Centre (CRC) is an integral element of the city of Belo Horizonte’s digital inclusion, skills development and waste reduction efforts. In this electronics remanufacturing facility, citizens from low income communities receive extensive training to restore donated post-use IT equipment into full working condition. This refurbished equipment goes on to support over 300 ‘digital inclusion sites’ operated by the city, where Belo Horizonte locals have free access to computers and internet as well as varied training opportunities in basic digital literacy. The CRC is run by Prodabel, the city’s information and technology provider, as part of the ‘Computadores para Inclusão’ (Computers for Inclusion) Federal Government initiative that establishes local partnerships to set up similar centres around the country.

TIME FRAME
The Belo Horizonte CRC was launched in 2008 as an enabling component of the city’s pre-existing BH Digital programme. It became one of the first local chapters of the Federal Computadores para Inclusão initiative. Ten years on and the Belo Horizonte CRC continues to be an exemplar component of the Computadores para Inclusão network and the backbone to Belo Horizonte’s skills development, waste diversion and digital inclusion efforts, the latter having earned Belo Horizonte the title of Brazil’s most digitally advanced city in 2011.

FOCUS AREAS
The initiative focuses on the electronics sector as a priority area for achieving its social inclusion, skill development and waste diversion ambitions.

FINANCE
The CRC operation is largely funded by the Brazilian Federal Government, under the Computadores para Inclusão programme. Every two years, the Ministry of Science, Technology, Innovation and Communications (MCTIC), issues a public call for new programme applicants or funding requests. Since its establishment, the Belo Horizonte CRC has signed multiple funding agreements with MCTIC to guarantee the initiative’s continuity. Federal grant funding has totalled approximately BRL 2.4 million. The City of Belo Horizonte has also invested resources in the operation, including the provision of an 897m² building offered by the Municipal Secretariat of Education to house the facility.

LEAD POLICY LEVERS
For more see Policy Levers

ROADMAPS AND STRATEGIES
CONVENING AND PARTNERING
AWARENESS RAISING
CAPACITY BUILDING
FINANCIAL SUPPORT

GOVERNANCE
Prodabel - Empresa de informática e informação do município de Belo Horizonte S.A

POPULATION
2.5 million

GDP
88 billion BRL

DENSITY
7,167 per Km²
CORE TEAM AND PARTICIPANTS
A core team of eight people from the Digital Inclusion department are responsible for overseeing the programme. These include a director, a superintendent, a learning manager and a representative in charge of overseeing remanufacturing activities and the digital inclusion sites, in addition to four Prodabel officers.

The team is aided by public bodies and NGOs that donate physical spaces and resources to set up and operate digital inclusion sites, as well as CRC monitors and other contributors to its capacity building offering.

The computer remanufacturing training programme, held at the CRC, is mostly directed at young (16-24) Belo Horizonte locals from low income communities that are looking to acquire new skills for first employment. At the same time, the digital inclusion sites based in public and private buildings particularly in low-income areas, are open to citizens of all ages in search of digital literacy, with aims to democratise access to information and facilitate tasks such as submitting online job applications and paying bills.

OUTCOMES TO DATE
In the first years of the Belo Horizonte CRC since its 2008 launch:

- 7,000 post-use IT products (CPUs, monitors, printers) were restored in the first nine years of the initiative and offered to digital inclusion sites and similar initiatives
- 15,000kg of post-use electronics have been diverted from landfill every year on average, since 2008, thanks to this initiative. This adds up to 165,000kg by 2018.
- 10,446 citizens have been trained in basic technological skills, environmental education, and computer remanufacturing to date
- Belo Horizonte was recognised as Brazil’s most digitally advanced city in a 2011 ranking
- The initiative became a city priority with annual targets for 2018-2021 on remanufacturing, skills training and digital inclusion (see measuring progress)

THE JOURNEY

ORIGINS
In response to citizens’ demands for greater digital inclusion in the Belo Horizonte area, particularly in low income communities, the city government launched its BH Digital programme in 2005 to expand infrastructure in under-served areas of the city and provide digital literacy to all. The Digital Inclusion Department was created within Prodabel, the public-private city information and technology provider, to execute this strategy which included setting up digital inclusion sites around the city. Given the electronic and electrical equipment (EEE) waste landscape in Belo Horizonte, and a growing demand for post-use electronics treatment solutions, it was agreed that these sites should be equipped exclusively with refurbished computers.

Once the need for a computer remanufacturing facility was confirmed, the project team applied for funding from the MCTIC’s Computadores para Inclusão programme, whose strategic aims are threefold: to foster digital inclusion in low income areas of large Brazilian cities; to build capacity among low income young Brazilians so that they have increased opportunities to enter the job market; and scaling up activities that keep electronics circulating in the economy in high-value uses and out of landfill. A proposal for the Belo Horizonte CRC was submitted by the Digital Inclusion team at Prodabel and approved by the MCTIC. The facility was set up in a space provided by the Municipal Secretariat for Education and operations commenced in April 2008.

PROCESS
IT equipment donations by public and private institutions are intermediated by the MCTIC. Institutions who would like to make a donation must submit a detailed list of the equipment and its state to the Ministry of Planning. The Digital Inclusion Department at the MCTIC then indicates whether there is an interest from one of the CRCs and directs the IT equipment donations accordingly. Private individuals can donate IT equipment directly to a local CRC. Belo Horizonte locals must contact Prodabel via telephone or email to organise a collection visit. On the agreed date, Prodabel employees assess the products in situ and select the items that can be used in the CRC (such as computers, printers and keyboards)
which are then transported back to the facility. In the past, private IT equipment donations had to be deposited at Prodabel’s offices, but since 2018 the company has been operating a door-to-door collection system using rental vans. An increase in donations is expected in this new model, which makes the overall donation process more convenient.

Once donated IT equipment reaches the CRC, it is assessed and grouped into two categories based on whether they are suitable for remanufacturing. Those submitted to the remanufacturing process are either restored to working condition or used for spare parts. Approximately one-third of the total volume of donations leaves the CRC as restored IT equipment. The entire process is conducted by technicians in training and overseen by instructors.

Restored equipment is grouped into ‘donation kits’ and offered to either Prodabel-run digital inclusion sites or other registered institutions (such as public schools and libraries). Parts and materials that cannot be used in the remanufacturing processes are auctioned off by the city of Belo Horizonte to registered companies which then direct them to recycling. The city feeds the revenues generated back into the CRC training programme.

MILESTONES

The Belo Horizonte CRC began its operations in April 2008. Later that year, in December, a launch event was hosted by the Secretary of Logistics and Information Technology (SLTI) at the Ministry of Planning. Prodabel’s President and Digital Inclusion Director, various municipal authorities, and representatives from other CRCs were among the event’s attendees.

In 2010, the city of Belo Horizonte signed an agreement with MCTIC worth BRL 371,000 in government funding to guarantee the continuity and enhancement of its digital inclusion initiatives, including the CRC. It expired in late 2012, and government funding for the CRC has since been renewed twice.

In addition to the continued ministerial support in programme funding, two important milestones have reinforced the initiative’s growing relevance, both at city-level and nationwide. In 2005, with the establishment of the Digital Inclusion Department in Prodabel, the city launched its Government Action Plan (PPAG), a four-year strategic plan for the city, which for the first time included specific targets relating to the CRC operation, thus reinforcing its status as a city priority. This was reiterated several times, the most recent being in 2017 for the 2018-2021 PPAG.

MEASURING PROGRESS

The funding agreement with MCTIC is dependent upon CRCs meeting a set of basic criteria. These are monitored via quarterly reports submitted by Prodabel, who must also produce a final progress report at the end of the contract. Targets within each contract period include, (MCTIC):

- A minimum of 100 young citizens trained in basic IT skills
- A minimum of 100 young citizens trained in computer maintenance
- Revitalising at least ten local digital inclusion sites

In addition, the City of Belo Horizonte has included the following annual targets for Prodabel in its 2018-2021 Government Action Plan, (PPAG):

- Remanufacturing at least 1,000 items in the CRCs per year until 2021
- Maintaining the 302 existing digital inclusion sites until 2021
- Providing 600,000 people with access to Telecentres in 2018; 650,000 in 2019; 700,000 in 2020; and 750,000 in 2021
- Providing IT training to at least 2,000 people every year
REFLECTIONS

Leveraging connections to build impactful initiatives. Cities' powerful networks and unparalleled reach suggest that they are best placed to lead initiatives of this sort. With access to various city secretariats, technology businesses, entrepreneurship authorities, and many more, city authorities can articulate robust action plans with relevant stakeholders while ensuring that all efforts are extended to communities in need. The successful Belo Horizonte CRC operation has prompted the MCTIC to revise programme guidelines allowing city governments to apply for the grant directly. The network of registered CRCs now includes another two city-led operations, located in João Pessoa and Curitiba.

Shaping mindsets is critical for creating lasting transformations. Prodabel and the City of Belo Horizonte as a whole acknowledge the need to incorporate circularity into professional training activities. This is an opportunity to educate young citizens and future professionals that are inclined to make the most of technology, products and materials to generate value in a circular economy rather than exacerbating today's wasteful linear model.

Adopting a multi-faceted approach to innovation. Belo Horizonte is already regarded as a national reference in terms of digital capabilities. The city has now raised its level of ambition, aiming to become a widely recognised smart city. A multi-faceted approach that integrates innovation, social inclusion, and environmental considerations will be needed in order to achieve this.

Scaling the initiative will require a new level of commitment. Currently the CRCs are established and run on a voluntary basis and only three out of nine existing facilities are city-led. Outcomes to date have proven the relevance of the Computadores para Inclusão programme and transforming this into a national policy would be an important step towards scaling electronics remanufacturing and digital literacy in Brazil, Latin America's top EEE waste generator.

FOR MORE INFORMATION
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This case study is part of Circular economy in cities, Ellen MacArthur Foundation
SHENZHEN
SWITCHING TO AN ELECTRIC MOBILITY SYSTEM IN THE CITY
Developing electric mobility in the public bus system and beyond

AT A GLANCE

THE INITIATIVE
In 2017, Shenzhen became the first city in the world to electrify all public buses with a view to cutting emissions, reducing noise pollution and improving air quality. The initiative also helped to further develop electric mobility. The adoption of new service models incentivises manufacturers to design vehicle components so that they are maintained and kept in use, retaining value. There are now over 16,000 electric public buses (e-buses) on the road.

In addition, the city has engaged heavily in urban infrastructure, incorporating more than 500 bus charging stations and 5,100 bus charging points. While e-buses have replaced fuel vehicles - which were estimated to be contributing towards 20% of the city’s air pollution - further development is underway to increase the provision of renewable energy sources in line with circular economy principles. Work is also underway to improve battery technologies to encourage their reuse, charging speeds and suitability for a wider range of vehicles.

TIME FRAME
In 2009, Shenzhen was selected by the national government as one of 13 electric vehicle pilot cities. In 2017, the city became the first in the world to reach a goal of 100% electrically run buses. Further work is ongoing, including on opportunities to expand the programme to other vehicles such as taxis.

FOCUS AREAS
The focus has been on the mobility sector as a whole, including infrastructure, electric vehicle technology, and business models.

FINANCE
This public mobility initiative has been supported by a combination of national government funding and subsidies from the Finance Commission of Shenzhen Municipality.

The project financing has also made use of, and benefited from using, cost-effective service models.

LEAD POLICY LEVERS

ROADMAPS AND STRATEGIES
CONVENING AND PARTNERING
URBAN PLANNING
PUBLIC PROCUREMENT
FISCAL MEASURES
FINANCIAL SUPPORT
LEGISLATION AND REGULATION

Shenzhen Municipal People’s Government

For more see Policy Levers

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Core Team and Participants

Directly overseen by the Shenzhen Mayor, various departments within the municipality are involved in the implementation:

- The Development and Reform Commission of Shenzhen Municipality, which receives direction from the National Development and Reform Committee of China and coordinates local implementation.
- Urban Planning, Land and Resources Commission of Shenzhen Municipality, which identifies suitable developed and underdeveloped land and oversees locations of the charging points and stations.
- District government, which supports the provision of land permits for the charging points and charging stations.
- Transport Commission of Shenzhen Municipality, which facilitates e-bus movement by granting preferential road access.

Outcomes to Date

In 2011, two years after being selected as an electric vehicle city pilot, Shenzhen hosted the Summer Universiade, a world student games event, at which 200 e-buses and 300 e-taxis were deployed. The first fully electrified bus route was launched in 2012.

Starting in 2015, bus companies have been able to rent e-buses and batteries from manufacturers through service models, relieving the bus companies of large upfront investments and the need for technological expertise, thereby increasing the uptake of vehicles.

The national piloting scheme has encouraged the development of the electric vehicle industry in China, which was estimated to be worth CNY 100 billion in 2017. Many companies across the value chain have also benefited from this development. For example, BYD, the largest Chinese electric vehicle producer headquartered in Shenzhen is now selling e-buses to 300 cities in Japan, Europe, the USA and other countries globally.

The lessons from the pilot are being extended to other mobility forms. Shenzhen now has electrified 16,000 buses and 23,000 taxis in the city.

The Journey

Origins

The development of this initiative is heavily driven by local and national policy with a view to cutting emissions, reducing noise pollution and improving air quality - in addition to managing current overcapacity of electric power. The Shenzhen New Energy Industry Development Plan 2009-2015, the Shenzhen New Energy Industry Development Policy and the 13th Five-Year Plan for Strategic New Industry Development, together reinforce the priority of developing this sector.

The Route to a City-Wide E-Bus System

Shifting to a 100% electric vehicle system creates opportunities and potential for additional revenue streams. As organisations make use of new business models that improve material management and costs, and receive public financial support, it encourages the initiative to scale, and infrastructure and technologies to develop.

Vehicles

Prior to 2016, an e-bus was priced at approximately CNY 1.8 million. Through the use of service models, third-party financial institutions purchase the assets and rent them to bus operating companies who are thus relieved of large upfront capital investments. For example, eight-year rental agreements are arranged through a third-party financial institution which, for a limited time period, take on the financial risk if the vehicle or components fail. Shenzhen Eastern Bus Company (a state-owned organisation) and Shenzhen Western Bus Company Ltd (a public-private organisation) have both rented e-bus services from locally headquartered BYD and other manufacturers via third-party financial institutions such as China Development Bank Leasing and China Construction Bank Financial Leasing. In such service models, manufacturers remain responsible for maintenance and repair of the key components, keeping them in use. It also incentivises circular designs for durability and reuse.

Photo credit: Shenzhen Eastern Bus Group

© Ellen MacArthur Foundation, March 2019
Bus manufacturers are also provided with national government subsidies, which are matched by the city government. In the case of Shenzhen, bus manufacturers can apply for approximately CNY 500,000 from each, totalling around CNY 1 million to be deducted from the price. As the electric vehicle industry matures, the national and municipal subsidies have reduced and will eventually cease.

**Batteries**

At the end of their usable life, batteries will be sent to government approved recyclers with a view to extracting useful materials, such as rare earth elements. This practice is expected to grow with the development of Extended Producer Responsibility policies which are due by 2020.

Many electric vehicle batteries are estimated to start reaching end of life status in 2019, which will increase the quantity of batteries available for recycling, in turn augmenting the demand for the required recovery skills and technologies. Material sourcing, design for multiple use, and design for recycling are amongst the circular economy priorities for the EV industry.

**Electric charging technology and infrastructure**

The technology and infrastructure required for charging vehicles involves large capital investment. In addition to government subsidies, new partnerships have been key. Shenzhen Eastern Bus Company, for example, partnered with charging point manufacturing businesses, which post-construction, are also responsible for the maintenance and upgrade of charging points. Charging point manufacturers receive a service fee through units of electricity used, which facilitates further development of the infrastructure. The Shenzhen Eastern Bus Company’s e-bus versus charging point ratio reached 2:1 as at the end of 2018.

One charge will sustain an e-bus for a full day, meaning that charging can take place at night when buses are not in use and when demand on the grid is less. Rapid charging technology is under development to increase charging speeds that improve bus turnaround rates. Regulations are also applied to ensure new charging facilities complement population size and land availability.

**MEASURING PROGRESS**

Combustion engine buses used to contribute to 20% of air pollution, but through the transition it is now estimated the city will see an annual reduction of 4.316 million tons of particulate matter. In addition, the average GHG emissions per e-bus kilometre is 40% less than a diesel vehicle, which, as of 2017, had reduced carbon emissions in the city by 0.63 million tons.

A further benefit is that the e-buses produce less noise and heat, thereby contributing to a reduction in urban noise pollution and heat island effects.

At present, renewable energy sources only make up approximately 1% of the total energy mix in the initiative and further development is required to increase this. China’s 13th Five-Year Plan also highlights the overall requirement for a shift from fossil fuels. The partners in the initiative are also looking at metrics to capture the material benefits resulting from the increased focus on remanufacturing and public transport use.
REFLECTIONS

Policy providing a mandate for change. A combination of national- and city-level policy measures have created the enabling conditions for an electric mobility system in the city to develop. This includes the national government’s ambition to expand the electric vehicle sector, China’s 13th Five-Year Plan, the Strategic New Industry Development Plan, the Shenzhen New Energy Industry Development Plan 2009-2015, Shenzhen New Energy Industry Development Policy, and Shenzhen’s status as China’s first Special Economic Zone, permitting Shenzhen to have bespoke trading and business rules to stimulate economic activity and innovation.

Enabling innovation through the use of new business models and financial support. Financial support from national subsidies and match funding from the city government has enabled the initiative to grow enough to become self-supporting. In addition, the provision of e-buses on a rental basis has also alleviated initial capital outlays, mitigated against potential ongoing financial risks for the bus companies, and supported the refurbishment and reuse of components and parts.

Development of the broader electric vehicle industry has also been encouraged through the pilot. For example, incentives such as free licence plates for e-vehicle drivers and the removal of a passenger levy for fuel in e-taxis. Improvements in urban air quality and reduced noise are also bringing broader environmental, health, and productivity benefits to the city.

In a circular economy, power is generated through renewable resources and materials are kept in use. Research to increase the percentage of renewable energy provided to the charging poles is underway, as is the research to improve the circularity of battery technology.

FOR MORE INFORMATION
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Contact: This case study has been developed in partnership with ICLEI East Asia.

This case study is part of Circular economy in cities, Ellen MacArthur Foundation
NEW YORK CITY
The #WearNext campaign
City and industry in collaboration to save clothes from landfill

AT A GLANCE

THE INITIATIVE
The #WearNext campaign united local fashion industry players in an effort to encourage all New Yorkers to keep clothes in use and out of landfills. The New York City Department of Sanitation (DSNY) and the New York City Economic Development Corporation (NYCEDC) joined forces with the Ellen MacArthur Foundation’s Make Fashion Circular initiative, fashion brands, collectors, recyclers, and resale companies to launch the campaign in 2019. An online interactive map created by DSNY marks more than 1,100 public and private collection points across the city where people can return clothes they no longer wear. New Yorkers were encouraged to get involved by donating, repairing, reselling or swapping their old clothes to give them a new life. People were invited to share their stories using the hashtag #WearNext. Using the infrastructure already in place in the city, the campaign which appeared on New York City bus shelters, LINK NYC, as well as social media aimed to increase collection and reuse of unwanted clothes.

TIME FRAME
Following a three-month preparation phase, the campaign ran from 4th March to 9th June 2019 in New York City.

FOCUS AREAS
The campaign connected public authorities, the fashion industry, collectors, recyclers, resellers, media, and social media influencers in New York City to reduce clothing waste. It also showed New Yorkers they have the power to redirect their clothing away from landfills and towards a new lease of life.

CORE TEAM & PARTICIPANTS
The City of New York Department of Sanitation (DSNY), New York City Economic Development Corporation (NYCEDC) along with the Ellen MacArthur Foundation’s Make Fashion Circular programme initiated the campaign. Retail partners included ASOS, Athleta, Banana Republic, Gap, H&M, Reformation, and Zara. Other participants included textiles collectors, resellers and recyclers, Hallotex, I:CO, Lenzing, and ThredUP. The campaign partners also collaborated with Art Partner and BPCM - two media agencies, to develop branding for the project and communicate the efforts across well-known media.

NEW YORK CITY

For more see Policy Levers
**THE JOURNEY**

**ORIGINS**

Each year, New York City landfills around 100,000 tonnes (or 200 million pounds) of clothing — equivalent to more than 440 Statues of Liberty. From production to disposal, the textile industry as a whole is extremely wasteful and polluting. Globally, the production of textiles emitted an estimated 1.2 billion tonnes of CO₂ in 2015. Furthermore, 75% of the materials used to produce clothing are landfilled or burned at the end of their life, while less than 1% of old clothing goes on to be made into new clothing. This model, which relies heavily on landfilling, is not only damaging to the environment, it is also hugely expensive — in New York alone the disposal of residential waste costs taxpayers USD 300 million per year.

Despite having the infrastructure to collect and reuse unwanted clothing, New York City still sends a large amount of clothing and textiles to landfills. To make it easier for New Yorkers to give their unwanted clothes a new life, DSNY created an interactive online map which plots over 1100 drop-off locations across the city. The department had previously created a similar map of drop-off locations for electronics. Due to the DonateNYC initiative and NYC’s publicly accessible collection bin law, DSNY was already aware of a number of textile collection points across the city and were able to put the map together within a few months. To spark the conversation in the city about where unwanted clothes end up, the City of New York joined forces with the Ellen MacArthur Foundation’s Make Fashion Circular initiative. By connecting local authorities, fashion brands, collectors, recyclers, and resellers, the project aimed to demonstrate the benefits of a new collaborative way of working. By tapping into pre-existing infrastructure, the initiating organisations aimed to boost textile collection rates. Highlights from local swap events and inspiring examples of how clothes can be reused were shared on social media. The aim was to engage with designers and brands to shift their thinking towards redesigning clothes for enhanced durability and recyclability at the end of use.

**LAUNCH**

The campaign was launched in March 2019 at Circular City Week, an open collaborative festival promoting the Circular Economy in New York. The event attracted 2,185 participants and was the result of collaboration between 64 different organisations.

**FINANCE**

The City of New York and Make Fashion Circular contributed to the project with DSNY and NYCEDC allocating weekly staff resources in support. Additionally, each brand participant contributed with 1-3 hours per week, and Make Fashion Circular supported on project management and communication. The budget financed campaign posters that were posted at bus shelters throughout New York City. The project relied largely on contributions of time and in-kind services, as well as collaboration between local city actors, such as Global Fashion Exchange, NYC x Design, donateNYC, and Stop ‘N’ Swap.

**OUTCOMES TO DATE**

By raising awareness of the huge quantities of clothing being sent to landfill and by sharing the map of drop-off locations on social media, the campaign helped to boost views of the map by almost 40 times (from around 3,000 to over 118,000 views). Clothing collection volumes have increased by an average of 15% across seven drop-off locations in 2019. Of the sites that shared data, an increase of 583 tonnes of collected clothing was recorded across the city compared to the same time period in 2018. Furthermore, three retail partners have cumulatively collected two tonnes of clothing over the course of two months as part of the campaign.

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# WearNext was a communications campaign aimed at reducing clothing waste in New York City by maximising the use of existing infrastructure in the city. The Ellen MacArthur Foundation’s Make Fashion Circular initiative teamed up with Art Partner, a leading artist management agency, to design campaign posters. The posters were displayed at bus shelters at 75 locations across the city and on LinkNYC (a communications network that runs digital advertisements across the five boroughs) during the teaser campaign. In addition, HSBC shared the campaign messages on ATM machines around New York. Fashion models such as Louise Follain and Marina Testino, actor Kelly Rutherford, and celebrated fashion photographer Harley Weir were among those supporting the campaign. The project partners shared information about the campaign on their social media platforms, their organisations’ websites, and through a press release. They actively spread awareness about the amount of clothing the city was sending to landfill and what New Yorkers could do to improve the situation. DSNY’s interactive online map was widely shared on social media to make it as easy as possible for New Yorkers to find their local drop-off point. In parallel, the campaign also shared inspiring stories of how clothes can be kept in use. Several of the project partners participated as panellists at the Circular City Week, the NYxDesign and the NYxReuse activation events which amplified the campaign’s message. Athleta, H&M, and I:CO had stands at the NYxCreatives and innovative reuse expo which helped them to connect with the community. In addition, Athleta, Banana Republic, and Gap installed textile collection bins in their stores provided by DSNY through the refashionNYC programme.

Throughout the campaign, DSNY gathered data about collection volumes at several drop-off points and two surveys were circulated among the project partners to assess the campaigns’ achievements.

### Increased views of the map
Before the launch of the campaign, DSNY’s interactive map had received approximately 3,000 views. As the campaign wrapped up at the end of June, the map had recorded more than 118,000 views. New York already had a large network of over 1,100 clothes drop-off points, but there was a lack of awareness among New Yorkers. DSNY has limited resources to promote its work and programmes, therefore the campaign’s biggest success was to draw attention to the already existing infrastructure and the agency’s work. In addition, the retail partners running clothing collection initiatives were added to the map, boosting the number of drop-off points listed.

### Increase in collection volume
DSNY collected data on the volumes of clothing donations, comparing 2018 to 2019 at different locations. These volumes increased by an average of 15% across seven drop-off points. Several drop-off points experienced a significant increase in collection volumes. For instance, two drop-off locations experienced a 38.5% and 48% increase in donation volumes. Yet, two other locations experienced a decrease of 2.4% and 18% respectively. The three participating brands (Gap, Athleta, and Banana Republic), in eight different locations across the city, collected a total of two tonnes of clothing in the space of two months, saving it from landfill. Gap, H&M, and Zara also ran their own garment collecting initiative during the campaign. Other factors that may have contributed to a rise in donations include a growing general awareness of textile waste, other similar campaigns, the Marie Kondo effect, or changes in operations by collectors.
REFLECTIONS

Consolidation and increased use of existing infrastructure. Applying circular economy principles to a traditional waste management issue can unlock opportunities to keep products and materials in the economy and reduce waste. #WearNext has been successful in raising awareness about New York City’s existing clothing collection infrastructure and the work of the local authorities. Informing the general public about the existing infrastructure and programmes in place can help increase the use of these resources in turn boost reuse and recycling rates. In general, creating maps based on crowdsourced information (such as clothing collection points) can be a simple way to increase awareness, while supporting more direct stakeholder engagement. Similarly, the city of Gothenburg, together with local residents, has developed a smart-map (Smarta Kartan), which shows where residents can find things to hire, borrow, share, and swap.

Creating a culture for collaboration. The retail partners saw the value of participating in a joint effort with the support of the local authorities, as it was an opportunity to make new contacts across different organisations. As these organisations are now more knowledgeable about textile recycling opportunities and the community in New York which work in this area, future collaborations have been made easier. The campaign provided an opportunity for DSNY to collaborate with several brands through their refashionNYC programme.

Increasing circular economy interest in the fashion industry. Having several fashion brands align on this project demonstrated growing willingness within the apparel industry to drive change. #WearNext was an opportunity for fashion brands to incorporate circular economy in their marketing and public relations strategies, and by receiving information on industry-wide clothing collection programmes and customer interest in take-back initiatives, the retail partners could more easily adapt their messaging and engagement.

Creating a blueprint for #WearNext in other cities. Following the New York #WearNext campaign, several cities both large and small, have contacted Make Fashion Circular with interest to run a similar campaign. The hashtag #WearNext has taken on a clear identity for keeping clothes in use. It is still being used by the public to share their stories and exchange ideas for giving unwanted clothing a new lease of life. As the #WearNext campaign in New York required quite a lot of coordination and preparation, the campaign partners recommend that for anyone willing to run a similar campaign, at least six months should be allowed for the campaign planning.

FOR MORE INFORMATION

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