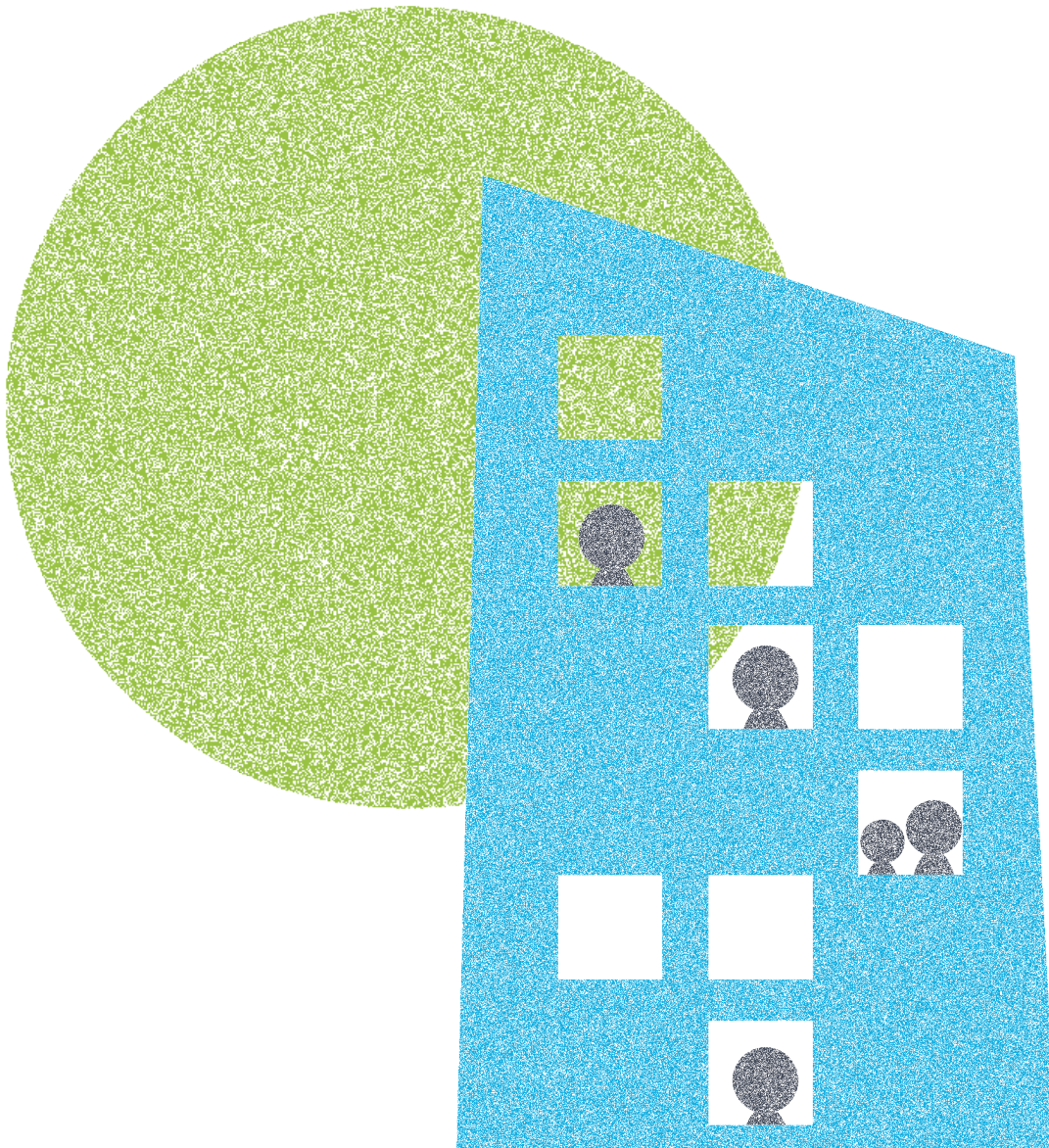




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CITY GOVERNMENTS AND THEIR ROLE IN ENABLING A CIRCULAR ECONOMY TRANSITION

AN OVERVIEW OF
URBAN POLICY LEVERS





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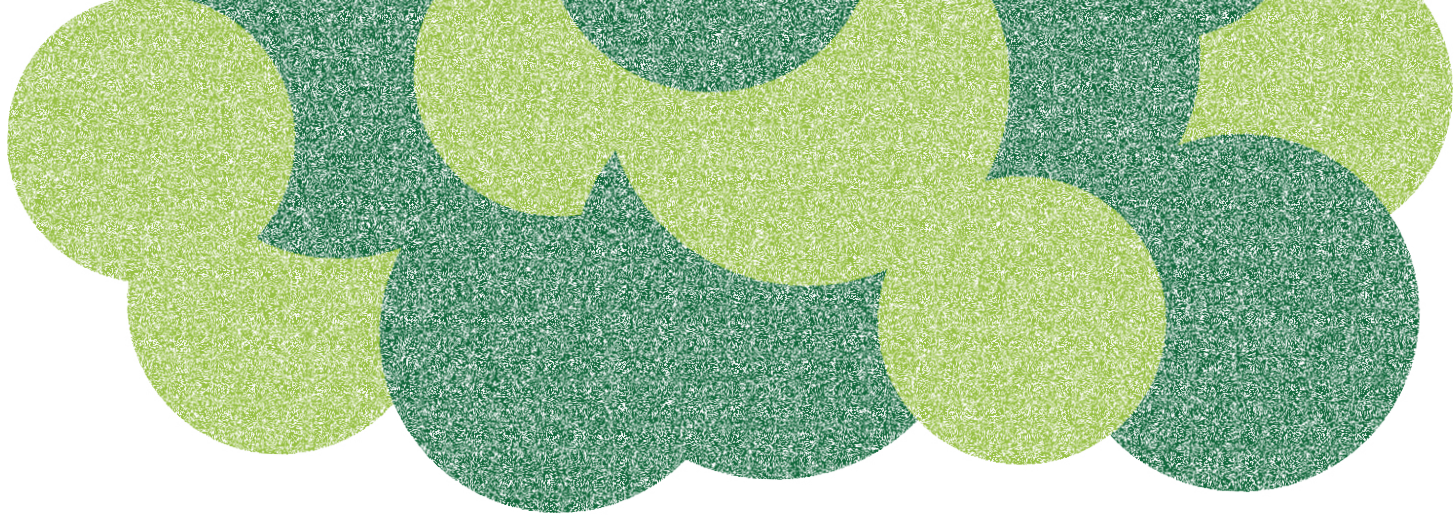
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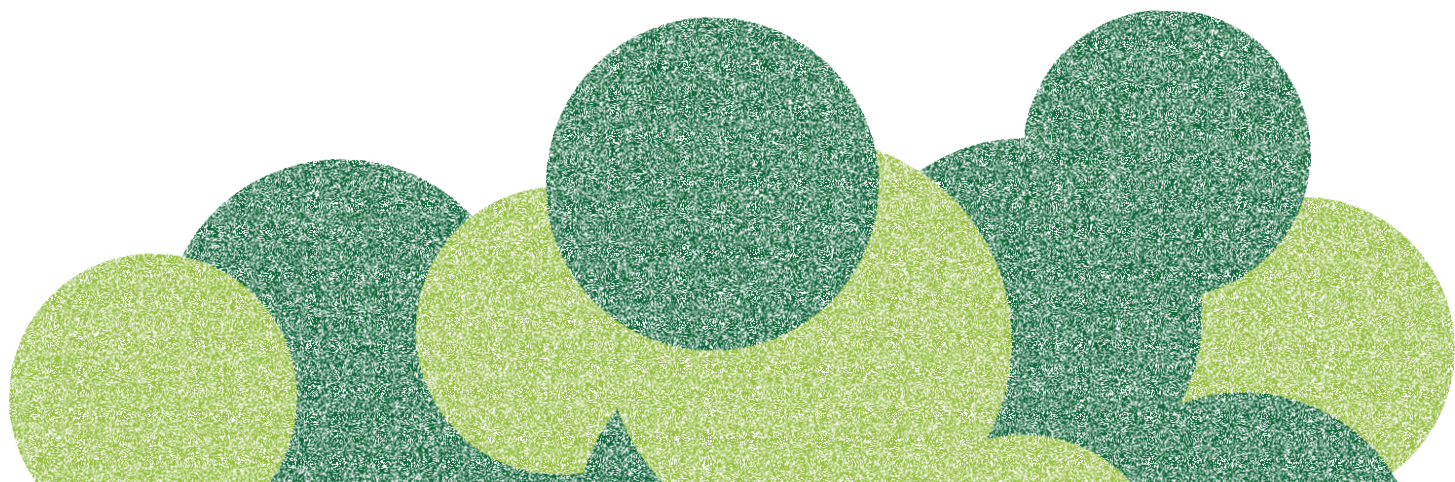
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This paper is part of *Circular economy in cities* by the Ellen MacArthur Foundation, a project that contains a suite of easily accessible reference resources, available online. The resources include:

- A vision of circular economy opportunities in three urban systems - buildings, mobility, products
- Circular economy opportunities and benefits factsheets in the three systems
- This urban policy levers paper
- City-led circular economy case studies focusing on action in the field
- Links to other networks and resources that support circular economy transitions in cities



CITY GOVERNMENTS AND
THEIR ROLE IN ENABLING
A CIRCULAR ECONOMY
TRANSITION



CITIES ARE CENTRES FOR CHANGE

City governments have a key role to play in building thriving, liveable, resilient cities that are regenerative by design. Their proximity to the everyday concerns and needs of urban citizens and businesses, and the policy levers they have at their disposal gives them this key role. City governments see, experience, and often manage the negative consequences of the current 'take-make-waste' linear economy, be it through the public funds spent on solid waste management, the costs incurred from structural waste such as the cost of underutilised buildings, economic costs due to congestion, or health costs due to air and noise pollution. The challenges of a take-make-waste linear economy concentrate in cities but cities are also centres for change. Cities can catalyse wider system transformation. In recent years, city governments have become bolder in leading such change.¹

City governments can engage, incentivise, manage, and set a regulatory framework to set the enabling conditions for cities fit for the 21st century to emerge. They can set a direction of travel. By embedding circular economy principles into urban policy levers, cities can bring about changes to the use and management of materials in cities; and urban priorities around access to housing, mobility and economic development can also be met in a way that supports prosperity, jobs, health and communities. Changes to material choices, uses and management, can also open up local production opportunities.

In cities underpinned by circular economy principles, urban policy levers work to enable:



Waste and pollution to be designed out of products and urban systems

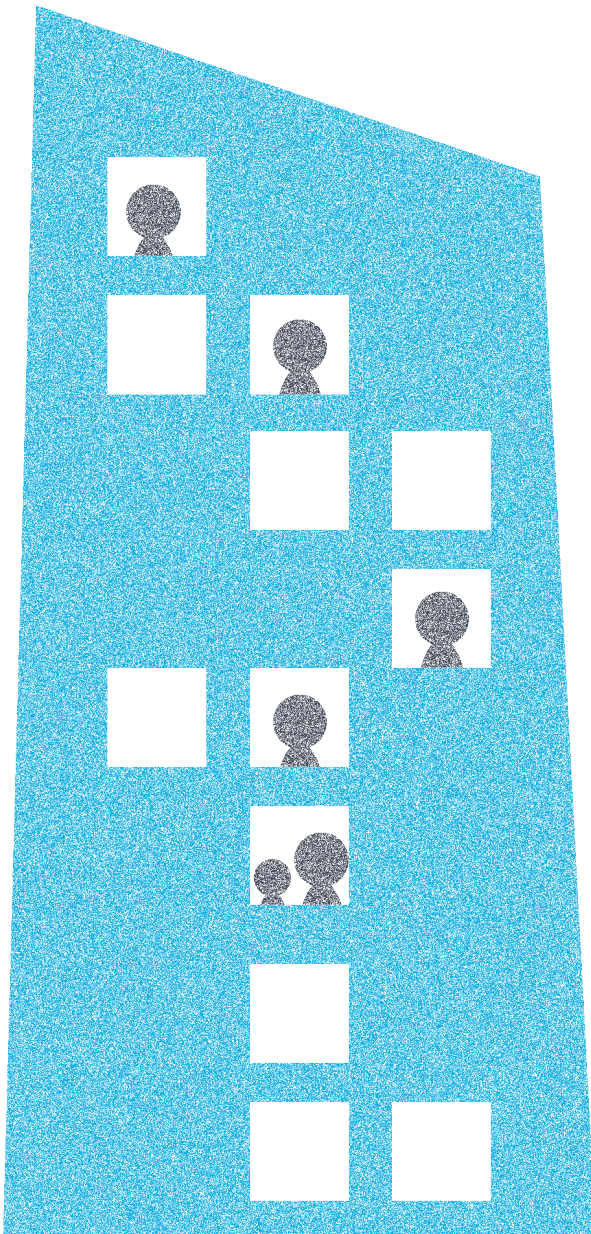


Materials to be kept in use and maintain their value



Natural systems in and around cities to regenerate

The importance of creating responsible consumption and production and taking a new approach to materials and value in line with circular economy principles is also identified in the Sustainable Development Goals. SDG 11 Sustainable Cities and Communities and SDG 12 Responsible Consumption and Production are closely linked. The International Resource Panel has noted that circular economy is key to achieving SDG 12 Responsible Consumption and Production, and that success in this area will have positive benefits for the wider SDGs and can help to mitigate many trade-offs.² Similarly, circular economy is being embraced as a key framework for delivering climate objectives.³



URBAN POLICY LEVERS FOR CIRCULAR ECONOMY TRANSITIONS

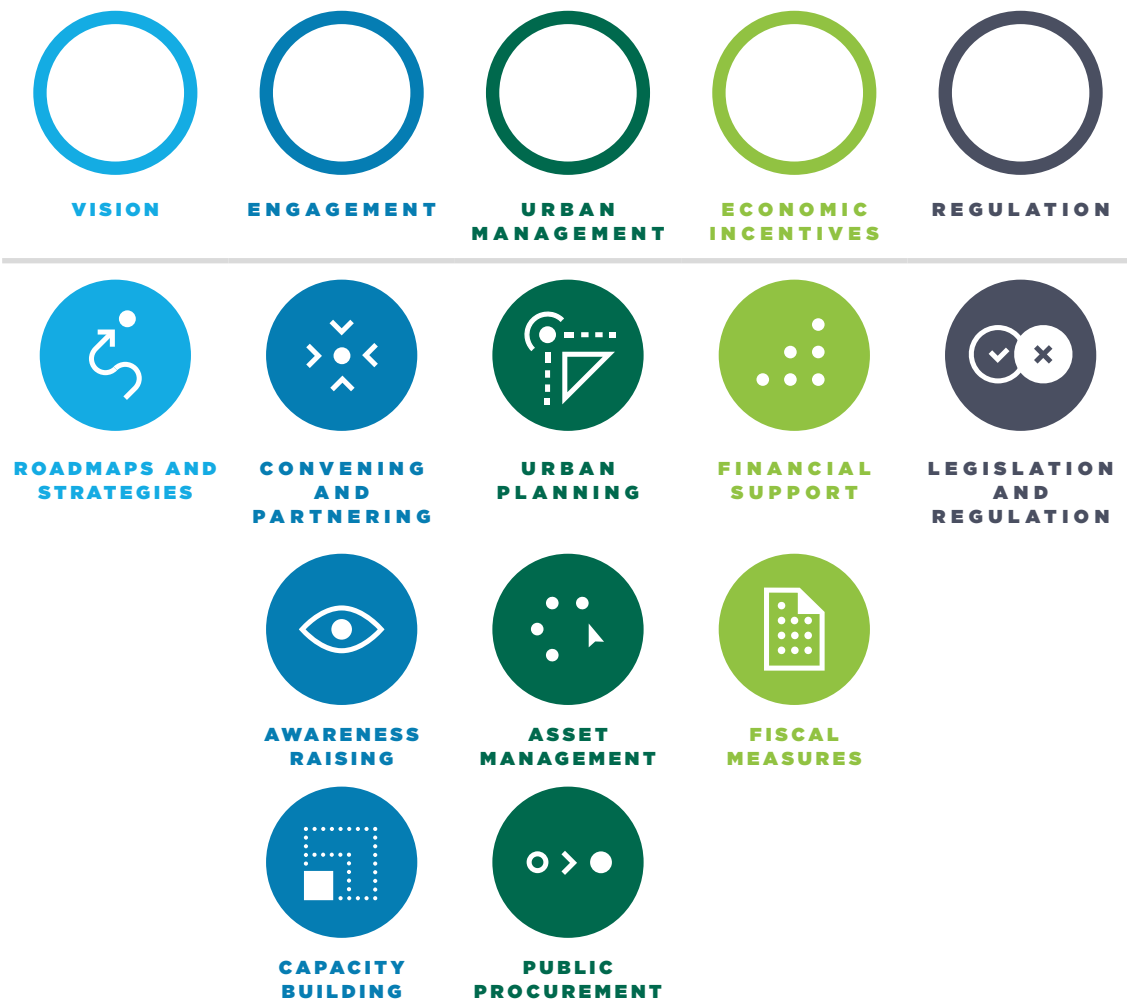
Building on *Delivering the circular economy: A toolkit for policymakers*⁴ and focusing specifically on the city level, this project identifies ten policy levers as key to urban circular economy transitions.

The autonomy and scope to pull these policy levers varies from city to city. Some cities will have a greater ability to use certain policy levers than others, since city powers are not uniform and are dependent on the relationship to other tiers of government.⁵

It is also the case that the various policy levers are strongly interlinked. For example, in order to transition towards circular asset management practices, raising awareness amongst asset managers will be important, as will ensuring that public procurement and financial measures are supportive. A policymaker will naturally have to consider the interrelationships and coherence of different policy levers and specific measures within them, in addition to other factors such as the individual cost-effectiveness and distributional effects of any given policy.⁶

Click on the Policy Lever titles below to jump directly to its respective chapter.

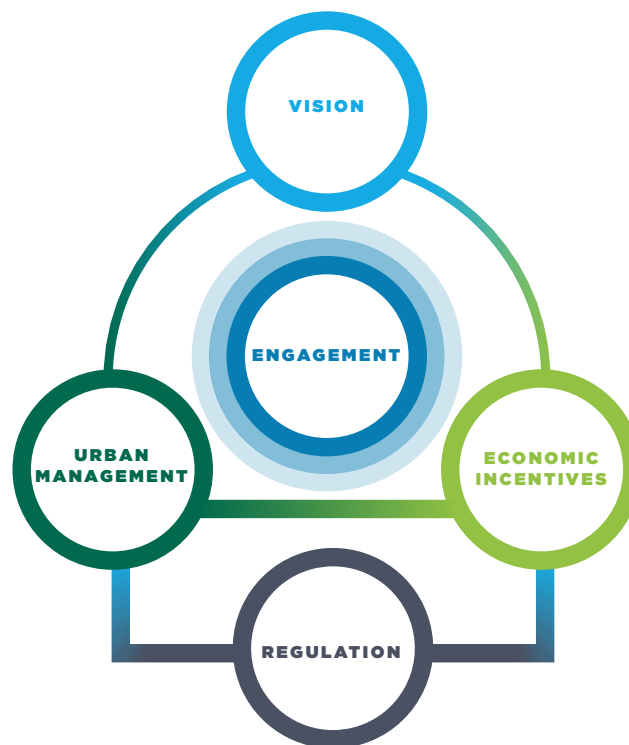
FIGURE 1: URBAN POLICY LEVERS FOR CIRCULAR ECONOMY TRANSITIONS



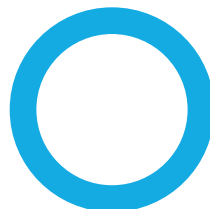
INTERLINKAGES AND RELATIONSHIPS BETWEEN POLICY LEVERS

To capture some of the relationships between the ten policy levers, five categories emerge and their interlinkages are indicated in the diagram below.

FIGURE 2: INTERLINKAGES AND
RELATIONSHIPS BETWEEN POLICY LEVERS

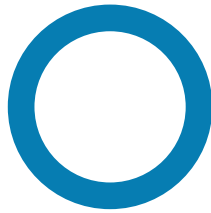


The five categories include:



VISION

Roadmaps and strategies can provide overarching direction. By setting strategic goals, circular economy city roadmaps and strategies can set a direction for a city and inform the development of other policy levers, such as urban planning standards or material and waste classifications and regulations. Engaging urban stakeholders in the development of a roadmap can also strengthen its effectiveness and a sense of shared ownership.



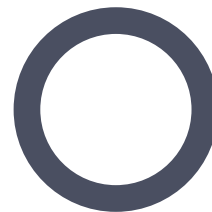
ENGAGEMENT

City governments have a unique ability to engage with multiple stakeholders from across sectors and catalyse action. This is key to the emergence in cities of circular economy opportunities, which require understanding, collaboration, and action within and between sectors. Policy levers in this category are *Convening and partnering*, *Awareness raising*, and *Capacity building*. Engagement policy levers can raise awareness of circular economy opportunities, and strengthen the capacity of others to seize them (such as capacity building programmes for SMEs or skills training programmes). Convening and engaging with stakeholders in a variety of ways can also support the design and application of other policy levers, such as creating a sense of shared ownership of a circular economy city roadmap, working with businesses to identify regulatory barriers, and understanding how other policy levers can best be developed. Convening stakeholders can also lead to collaborations and partnerships that might not otherwise have emerged.



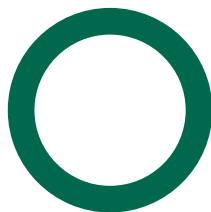
ECONOMIC INCENTIVES

City governments can use financial support to help foster innovation and new markets, whilst fiscal measures such as taxes, penalties, and charges, can help incentivise or discourage behaviours. Policy levers in this category are frequently referred to as economic tools and fall into two main categories - *Financial support* and *Fiscal measures* - both of which can incentivise circular economy opportunities. The degree of autonomy cities have to pull these levers varies greatly and they are therefore often developed in partnership with higher tiers of government.



REGULATION

Legislation and regulation is a core domain of government and can play an important role in shaping markets, influencing behaviour, and removing barriers that inhibit progress. In doing so, it can reinforce and support other policy levers (such as regulations regarding housing density or affordability impacting the the process of urban planning). Legislation and regulation is frequently developed together with regional or national governments.



URBAN MANAGEMENT

City governments have a strong influence over the physical development of a city, the management of its assets, and the procurement of public goods and services. Policy levers in this category are *Urban planning*, *Asset management*, and *Public procurement*. Each relates strongly to the choice, design, use, and flow of materials in a city, making them key to the transition to a circular economy. They also relate strongly to each other: the way in which land-use is planned by a city has an influence on how assets on that land can be managed; and circular asset management practices can inform public procurement standards and vice-versa. As with other levers, urban management levers are not self-contained and can be guided by circular economy strategies and regulations, involve significant collaboration and partnerships, and benefit from economic incentives.

Traditionally, powers delegated to cities such as urban management policy levers and economic incentive policy levers, as well as regulation, have been associated with the greatest ability to achieve change. However having limited power in these areas need not hinder a transition to a circular economy.⁷ As urban challenges have grown more complex and interconnected, governance environments more fragmented, and public resources often diminished, the importance of traditionally softer, engagement-related policy levers to deliver policy goals has increased.⁸ In this vein, a study of climate actions taken by city governments around the world noted that “the way cities use their powers is more important than the dimensions of powers they have”.⁹

CULTURES AND APPROACHES THAT CAN SUPPORT A CIRCULAR ECONOMY TRANSITION

The benefits of a collaborative governance approach, particularly with regard to tackling systemic issues, are growing. The study on city government climate actions noted that “a collaborative approach to governance can deliver twice as many actions compared to less partnership-based approaches”.¹⁰

A collaborative governance approach can be supported by three underlying culture traits:¹¹

1

A culture in which integration across topic silos is nurtured and supported. To take a systemic view and develop solutions built on circular economy principles, working with and across different topics, skills, and disciplines can be key, such as in cross-cutting

thematic teams or departments. This can bring a new lens and unearth new solutions that meet multiple policy objectives. Strategic, system-focused, and open environments can nurture integration across silos.¹²

2

A culture of innovation in which experimentation, iteration, and learning is supported. Circular economy by its very nature demands innovation in business models, design and production, and the ways in which materials are

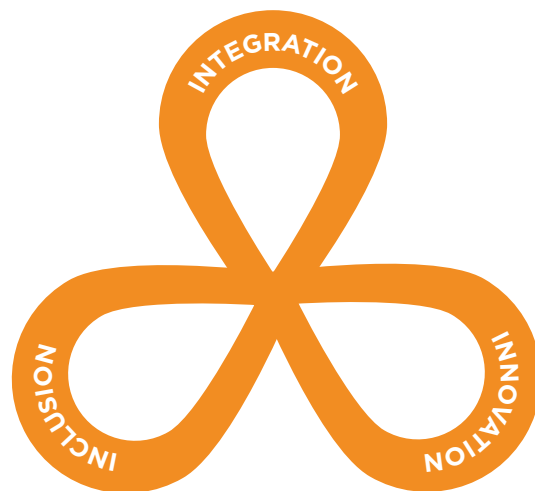
accessed, used, and reused. To enable and incentivise these new practices, while managing the risks, policymaking can also benefit from a culture of innovation. Visionary, facilitating, and supportive environments can help nurture a culture of innovation.¹³

3

A culture of inclusion and participation to support and develop locally impactful solutions. Cities are about people. Taking an inclusive approach to urban policy making allows for residents' priorities and needs to

be addressed and their experiences drawn on. Participation in urban policy making also leads to a deeper level of engagement with residents and can bring value to cities. Collaborative, supportive, and empowering environments can enable a culture of inclusion and participation.¹⁴

By taking a collaborative approach to governance, system linkages and opportunities can be uncovered. Systems thinking is essential for transitioning to a circular economy and is apt to apply to cities, which are complex, adaptive, dynamic systems made up of interconnected, often interdependent parts. Cities can be seen as urban ecosystems with natural resources, energy, raw materials, food, and goods interacting and impacting on the daily lives and economic activity of the people within them.¹⁵ For example, changes to the materials and construction methods used in buildings can impact human and environmental health, and changes in retail business models can impact patterns of resident and freight mobility. The circular economy opportunities in buildings, mobility, and products are explored in the *Circular economy in cities Factsheets*.

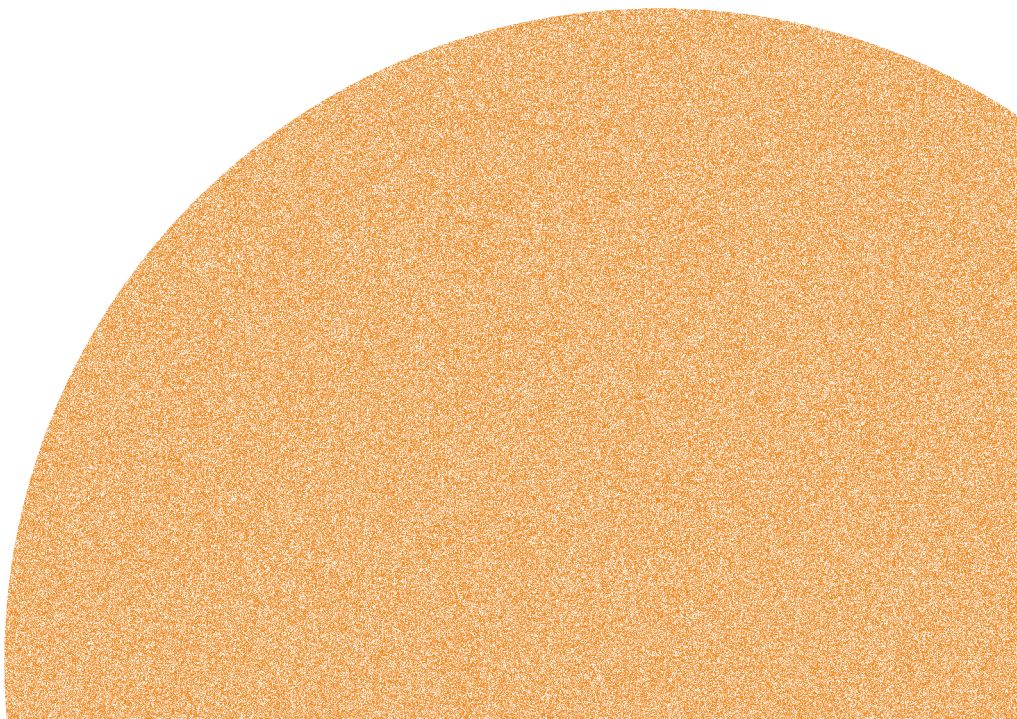


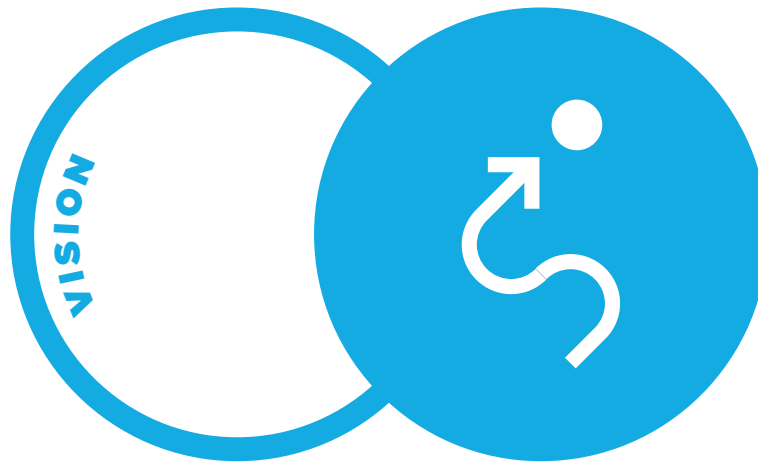


URBAN POLICY LEVERS

The following section discusses the ten urban policy levers city governments can use, depending on their powers, to enable the emergence of a circular economy. Over 100 cases from more than 70 cities around the world have been included to provide short, practical examples of the various policy steps taken by city governments in the journey towards building thriving, liveable, and resilient cities that are regenerative by design. Of course no single measure can deliver a complete transition, nor are the examples given here exhaustive. It is in combination, and with ever deeper understanding of circular economy, that policy can develop and set strong enabling conditions.

In this section, please note the following:

- Where a city government example is given, the city's name is noted in the [colour](#) of the policy lever.
 - Where a city's name is in [colour and in bold](#), this signifies that the example is included within the city-led case study module of the ***Circular economy in cities*** project, as of March 2019. More city-led case studies may be added over time.
 - To jump back to the policy lever overview on page 5, click on the [link](#) located at the top of each policy lever page.
- 



ROADMAPS AND STRATEGIES

Circular economy city roadmaps set a direction of travel for a city, help orientate other policy levers, and offer an invaluable opportunity to raise ambitions and engage stakeholders in addressing future opportunities for the city. Near, mid and long-term goals can be defined, and connection points and opportunities across different sectors identified. Strategies for sectors (such as transport) or specific policy levers (e.g. public procurement, urban planning, asset management) dive into more detail.

An increasing number of circular economy roadmaps and policy strategies are emerging at all tiers of government, from local to international. At the city level, strategies are emerging in capitals such as Amsterdam, London, Paris, major cities such as Auckland and Charlotte, or smaller cities such as Venlo and Peterborough. These circular economy city roadmaps and strategies combine aspiration with practical next steps and inform developments across other policy levers.

Reflecting on the emergence of circular economy city roadmaps, several observations can be made:

NO SINGLE ROUTE FOR DEVELOPING CIRCULAR ECONOMY CITY ROADMAPS EXISTS

Some cities are developing circular economy policy strategies that tie directly into national visions, such as [Shenzhen's](#) Circular Economy 13th Five Year Plan that ties directly to China's 13th Five Year Plan. Others are developing city plans in parallel with national plans, such as [Paris'](#) Circular Economy Plan¹⁶ issued shortly ahead of France's Circular Economy Roadmap¹⁷, or in Slovenia with the city of [Maribor's](#) strategy¹⁸ issued shortly after Slovenia's Roadmap for a Circular Economy.¹⁹ Others are creating roadmaps prior to national visions being set out such as [London's](#) *Circular Economy Route Map*²⁰, [Brussels'](#) *Regional Programme for a Circular Economy*²¹ and [Charlotte's](#) *Circular Charlotte* vision development.²² European cities have also drawn

from the European Union's Circular Economy Action Plan when developing circular economy city strategies.²³

MAKING USE OF URBAN METABOLISM TOOLS

In the development of circular economy roadmaps and policy strategies, several cities have used urban metabolism tools to assess urban resource flows and connect these to circular economy opportunities and intervention points. Depending on the breadth of the tools used, the flow of materials, energy, people, and information can be explored to understand how these flows shape cities, meet residents' needs, and impact on surrounding areas.²⁴ [Brussels](#), [Charlotte](#), [Glasgow](#), [São Paulo](#), and [Sorsogon](#) have all used variations of urban metabolism tools to develop their circular economy roadmaps.

TAKING A SECTOR-BASED APPROACH

Several cities have developed circular economy roadmaps that focus on priority sectors within their cities. Buildings and construction, mobility and logistics, and food and the bio-economy have been frequent focus areas. [Vancouver](#) is an example of a city that has developed a bespoke circular economy plan in the fashion and textiles sector.²⁵ [Rotterdam](#) has developed a vision of a future bio-based port that builds on circular economy principles.²⁶

CO-DEVELOPING CITY VISIONS WITH A WIDE RANGE OF URBAN STAKEHOLDERS

Bringing together businesses, civil society, and residents with government in the design of a city's vision can raise awareness, uncover unexpected opportunities, and create a sense of shared ownership of and commitment to a plan. The development of the **Brussels**²⁷ and **Paris**²⁸ circular economy roadmaps both involved upwards of 100 stakeholders (see *Convening and partnering*, and *Awareness raising*).

IDENTIFYING INDICATORS AND METRICS AGAINST WHICH TO MEASURE PROGRESS

In order to measure progress in a transition to a circular economy, cities such as **London** and **Toronto**, as well as smaller cities such as **Peterborough**, are working to develop key indicators as part of their circular economy city roadmaps or as a natural next step. Existing resource-based indicators, such as reductions in landfill and incineration rates and increases in recycling rates, are important as are existing indicators around emissions, air, water and soil quality, and increases in energy from renewable sources. However, those indicators should not be considered individually or in isolation and need to be connected to achieving the principles of a circular economy. Indicators measuring other positive impacts of circular economy projects and initiatives, such as jobs, skills and patents or open designs can play a key role in a city's measurement framework. The development of a comprehensive set of indicators to monitor circular economy progress at the city level is ongoing, and various groups, such as the Urban Agenda for the EU, are seeking to develop guidance documents on circular economy indicators for cities.²⁹

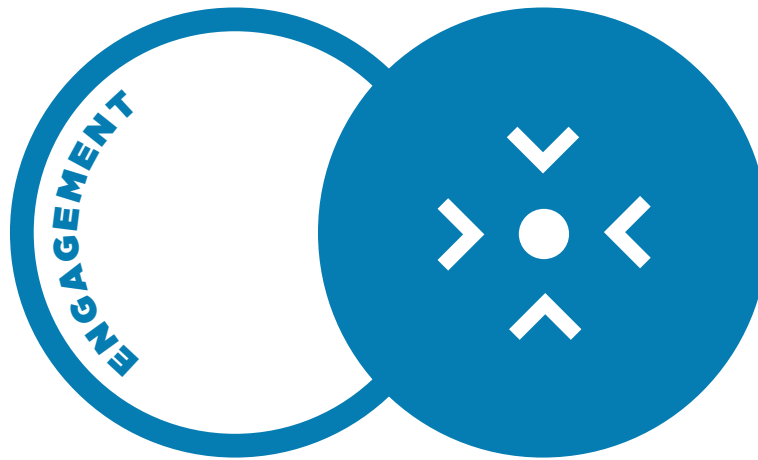
In follow up to circular economy roadmaps, in parallel, or as stand-alone initiatives, several cities are mainstreaming circular economy into specific policy strategies:

MAINSTREAMING CIRCULAR ECONOMY PRINCIPLES INTO SPECIFIC POLICY LEVERS

Integration into public procurement frameworks has been a key early focus area for cities. **London** has updated its Greater London Authority Group Responsible Procurement Policy using circular economy principles in parallel to developing the London Circular Economy Route Map.³⁰ **Toronto** has also focused on developing a Circular Economy Procurement Implementation Plan and Framework that can be embraced across city departments.³¹ Urban planning strategies have also emerged as an important policy area in to which circular economy principles can be integrated. **London** is integrating circular economy principles into its 'draft' London Plan³² and **Venlo** has integrated circular economy principles into its Spatial Structure Plan to provide a guideline for area development.³³ **Paris'** Circular Economy Plan also identified urban planning, and public procurement, as key areas into which to integrate circular economy principles in order to achieve Paris' 2017-2020 circular economy plan.³⁴

MAINSTREAMING CIRCULAR ECONOMY INTO OTHER CROSS-CUTTING POLICY STRATEGIES

Circular economy principles are being recognised as key to delivering on cross-cutting policy objectives such as resilience strategies, as is the case in **Rome**³⁵, and climate action plans, as is the case in **Paris**.³⁶



CONVENING AND PARTNERING

Local governments have the ability to convene, facilitate, and spur collaboration between public, private, and civic leaders.³⁷ Engaging multiple stakeholders in public policy creation and delivery is particularly valuable when innovating and making system changes, as is the case when enabling and developing circular economy opportunities. Convening and partnering with stakeholders can also help to achieve greater scale, shared ownership, and mutually beneficial impact.

Transitioning to a circular economy involves changing systems - an objective no single actor can achieve alone. Governments have an unparalleled ability to convene multiple stakeholders and city governments are no exception. Stakeholder engagement is often key to the development of effective circular economy roadmaps and policy strategies (see *Roadmaps and strategies*). The ability to convene stakeholders can also help to raise awareness of circular economy opportunities (see *Awareness raising*), whilst partnerships can help build capacity for innovation and the scaling of circular economy practices in the city (see *Capacity building*). Convening and partnering with stakeholders within city departments, in other sectors, and in other cities can help reveal solutions to current barriers. The process of being involved in policy making can create a shared ownership and commitment to city goals that are mutually beneficial.

Cities are using this policy lever in a variety of ways to help deliver transformation:

CONVENING STAKEHOLDERS TO STIMULATE COLLABORATION AROUND CIRCULAR ECONOMY OPPORTUNITIES

Developing circular economy networks and commitments between city governments, businesses, and civil society can be a first step to deeper partnerships and actions. In [Copenhagen](#),

as a continuation of their Resource and Waste Plan 2019-2024, the city hosted a workshop where people could come together, and share ideas on how the municipality and private companies could work together, to transform waste into circular economy products and services.³⁸ In [Seoul](#), the city created Share Hub, an offline and online community, that brings together the city government, companies, and residents interested in sharing economy opportunities in the city. It is a space where knowledge can be exchanged, initiatives presented, and connections made to services and organisations that share public and private resources.³⁹ In [London](#), the Circular London programme works to bring a wide range of stakeholders together for collaboration and helps to reinforce the circular economy business support and investment opportunities provided by the Advance London programme (see *Capacity building*, and *Financial support*).⁴⁰ Several cities have also worked closely with their local Chambers Of Commerce to convene local businesses and identify circular economy opportunities. The [Glasgow](#) Chamber of Commerce hosted a number of multi-stakeholder summits that stimulated public and private sector engagement as well as deepened understanding of the opportunities for specific sectors in the city.

WORKING WITH PARTNERS TO IDENTIFY REGULATORY BARRIERS

When regulations, bylaws or conditions are present

that inhibit circular economy development within the city, city governments can consider revising or removing those obstacles (see *Legislation and regulation*). This process can require collaboration with different tiers of government. To stimulate innovation on the circular economy and help identify regulatory barriers, the [European Commission](#) has, for example, put in place Innovation Deals⁴¹ on Circular Economy.⁴² In the [Urban Agenda for the EU](#), a body of European urban stakeholders drafted the Circular Economy Action Plan that included a focus on amending existing and designing future waste and water legislation. The aim is to enable the re-use of discarded waste and water in cities without compromising current levels of protection of public health and the environment, while also limiting legislative burdens.⁴³ In [Brussels](#), a Circular Regulation Deal was setup through its Regional Programme for a Circular Economy that brings together public and private sector actors to work together and help identify regulatory barriers in different sectors.

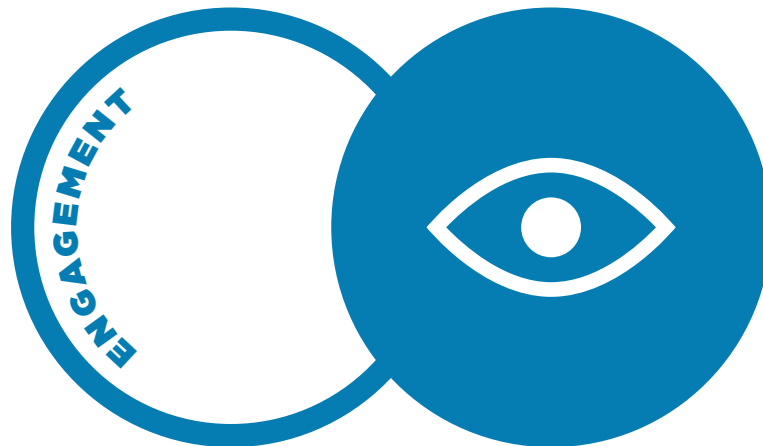
SHARING KNOWLEDGE WITH OTHER CITIES TO SUPPORT A CIRCULAR ECONOMY TRANSITION

City governments are also developing best practice solutions by sharing and learning from each other and engaging in multi-stakeholder networks. Cities actively participate in the circular economy networks of the Ellen MacArthur Foundation, that include businesses, universities, and governments.⁴⁴ Cities also join multi-topic governmental networks such as EUROCITIES, ICLEI, and the Covenant of Mayors that each include circular economy focus areas. Topic focused city networks, such as C40 and 100 Resilient Cities, include circular economy opportunities as key delivery mechanisms for meeting climate and resilience objectives, hence the inclusion of circular economy in these strategies (see *Roadmaps and strategies*). A C40 waste and resource network event, also gave [Milan](#) the opportunity to learn from cities such as [Tokyo](#), [San Francisco](#), and [Seoul](#) with regard to food waste collection, supporting Milan's own efforts that went on to exceed the European Union food waste recycling target.^{45,46} Local city networks are also valuable. In [Scotland](#), Zero Waste Scotland is supporting multiple cities to develop circular economy opportunities following its involvement with [Glasgow](#) and through the process, is creating a regional network. In [Portugal](#), a local city network for circular economy knowledge-exchange is emerging with support of the national government.⁴⁷ The CircE Interreg project brings together eight European regions and cities to share and learn from each other about how policy levers can be used to support the transition.⁴⁸ Other networks focused on specific circular economy elements also exist. For example, the Sharing Cities Alliance that brings together cities working on sharing economy policies, which includes [Amsterdam](#).⁴⁹

USING PARTICIPATION MECHANISMS TO UNCOVER CIRCULAR ECONOMY OPPORTUNITIES

The participation of residents and local actors helps to ensure that system changes are locally appropriate. Participation mechanisms include:

- **Policy innovation labs** create space for a city government to work with residents and local actors in the identification, piloting and scaling up of ideas. Such labs can encourage co-creation and experimentation, and can support human-centred localised solutions to emerge. Within a broad civic research agenda, [Boston's](#) New Urban Mechanics team has engaged residents and local actors in housing innovations to make the best use of urban space and existing buildings, leading to pilots around compact living and intergenerational home sharing.⁵⁰ Laboratorio para la Ciudad, in [Mexico City](#), plays a similar role bringing local voices into policy development.⁵¹ The non profit organisation, City Innovate, runs a Startup in Residents (STIR) programme that brings start-ups and city government teams together in applicant cities in North America to work on issues ranging from encouraging multi-modal and walking transits, to using data to aid urban planners and resource management initiatives.⁵²
- **Participatory budgeting** encourages the involvement of residents in policymaking, helping to develop locally appropriate solutions. Where residents have participated in the design and implementation of a policy measure, this can enhance the policy's overall impact. While just a small portion of a city government's budget is allocated to participatory budgeting, the concept has spread across continents since it started in Porto Alegre, Brazil.⁵³ [Paris](#) has created the largest participatory budget programme, with 5% of its investment budget allocated, equating to half a billion euros for the 2014-2020 period.⁵⁴ Projects span a wide range of issues, from city greening, to improving walking, biking and mass transit, to tool libraries.⁵⁵ [Seoul](#) has also stressed the importance of resident engagement by allocating KRW 50 billion annually to its residents' participatory budget scheme.⁵⁶ Both cities have set up online proposal systems for residents to share their ideas and vote on them, alongside in-person engagement that deepens understanding and insight sharing.
- **Crowdsourcing and challenge mechanisms** can also draw public-private-people partnerships together to co-create local solutions. In 2018, [Glasgow](#) held a Circular Lab Challenge, to crowdsource ideas and increase public and SME engagement in the city's circular economy vision. Also in 2018, the cities of [Pittsburgh](#), [Miami](#), and [Grand Rapids](#) partnered and collaborated with Ford in the City of Tomorrow competition in the quest to crowdsource new ideas around urban mobility that cut emissions, improved the flow of people and goods, and improve urban productivity.⁵⁷ Similarly, cities have participated in the Bloomberg Mayors Challenge leveraging citizen participation and co-design principles.⁵⁸ Circular economy opportunities have been among the many ideas included in the challenge, such as the creation of space and skill sharing platforms and ride-share partnerships.



AWARENESS RAISING

Raising awareness of circular economy opportunities is key to supporting local transitions. Knowledge sharing and communication campaigns are some of the ways in which cities can increase awareness of circular economy best practices, initiatives, and market opportunities.

From waste elimination to economic development, city governments have an incentive to foster an understanding of circular economy opportunities amongst businesses, civil society, and residents. Many roadmaps involve a large element of awareness raising, through their inclusion of stakeholders, to the identification of the potential size of the benefits in lead sectors. The London Circular Economy Route Map estimated that London could receive a net benefit of up to GBP 7 billion a year by 2036 if the city would accelerate its transition towards a circular economy.⁵⁹ In Auckland, a net benefit of up to NZD 8.8 billion by 2030 is estimated.⁶⁰ Other tools such as communications campaigns and showcase projects can be important in helping disseminate the opportunities that a circular economy can bring locally. To residents, this can mean gaining an understanding of areas in the city where they can share, rent, repair or recycle their products, while for companies this could mean gaining insights from best practice examples.

City governments are raising awareness in a variety of ways, including:

MAKING INFORMATION ON CIRCULAR ECONOMY CITY PLANS AND INITIATIVES EASILY ACCESSIBLE ONLINE

Several city governments and departments have developed websites and webpages that inform the public of circular economy city plans and strategies, such as **Toronto**.⁶¹ Cities have also developed bespoke websites for circular economy

city initiatives, such as **Brussels**⁶², **Glasgow**⁶³, and **Rotterdam**⁶⁴, that provide an opportunity to showcase emerging and local best practices. Cities including **Amsterdam**⁶⁵ and **Peterborough**⁶⁶ have also combined circular economy information alongside smart city information, raising awareness of the enabling role technology can play in circular economy opportunities.

HOSTING AND SUPPORTING AWARENESS-RAISING EVENTS

As part of **London's** communications and awareness raising efforts, it has hosted a circular economy week to showcase local activity and work to reach a larger audience.⁶⁷ **New York City** has backed a similar circular economy week in New York.⁶⁸

USING COMMUNICATION CAMPAIGNS TO ENCOURAGE NEW HABITS

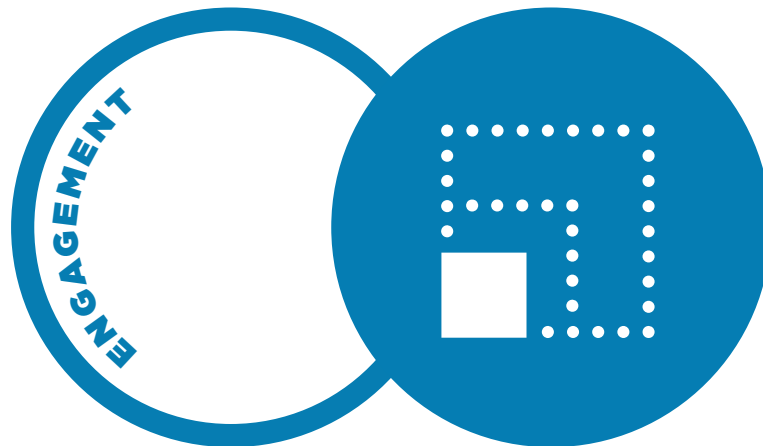
Awareness raising campaigns can play a key role in supporting behaviour change.⁶⁹ For **Ljubljana**, communication was core to achieving a 61% separated collection rate for different material streams in 2014.⁷⁰ The public waste management company launched the “*Get used to reusing*” campaign and organised media field trips to help encourage waste reduction, reuse, and responsible consumption. Other campaign examples include **Amsterdam's**⁷¹ “Amsterdam makes a difference” and **London's**⁷² “Love not landfill”, “Recycle for London”, and “Love food hate waste”. The aims were to reduce waste, stimulate the sharing economy, and improve the collection, recapture, and reuse of valuable resources.

SHARING INFORMATION ON LOCAL SERVICES AND NEEDS TO SUPPORT CIRCULAR ECONOMY PRACTICES

City governments are getting involved in sharing information on local sharing, reusing, and repair services in the city. [New York City](#) has created the DonateNYC website, connecting businesses, schools, university campuses, and non profit organisations looking to donate and receive donated goods.⁷³ As part of Make Fashion Circular, [New York City](#), fashion brands, collectors, and recyclers, have joined forces to engage residents to encourage them to return their unwanted clothes through various routes, instead of throwing them away. The “wearnext” campaign shares an online map created by the City of New York that guides people to more than 1,000 locations across the city where they can take clothes they no longer wear.⁷⁴ In [Gothenburg](#), the local government has co-launched a digital Smart Map that informs residents of where they can rent, share, borrow, give, and exchange.⁷⁵ The initiative is a civic-public partnership that through the reuse of materials also works to build a local community and facilitate urban commons and access over ownership. In [Vienna](#), the city has raised the profile of local high-quality repair services by helping to establish and run a digital network.⁷⁶ In [Kirklees](#), the city council helped establish an online platform for the sharing of space, services, and skills - benefiting from a reduction in waste and an increase in local economic activity and community engagement.⁷⁷ These sorts of activities not only raise awareness but also build local capacity around reuse and exchange opportunities and establish community capacity for sharing by helping match supply and demand virtually, while optimising material flows (see *Capacity building*).

DEVELOPING PROJECTS THAT CAN INSPIRE AND SHOWCASE THE POTENTIAL OF A CIRCULAR ECONOMY

Setting up exemplar projects in strategic places in the city can be an inspiring way to demonstrate what is practically possible and demonstrate the opportunities that circular economy can bring to a city. In advance of [Aarhus'](#) European City of Culture year, 2017, the city contributed to the development of Dome of Visions 3.0, an experimental modular building that could showcase new material consumption and construction techniques.⁷⁸ This temporary dome was used to host conferences and community debates on cities and buildings of the future.⁷⁹ Guided tours and open days at [Venlo's](#) City Hall showcase the opportunities that cradle-to-cradle (C2C) design and circular public procurement can achieve (see *Public procurement*). Other C2C projects within the city can be explored via bicycle tours with an accompanying information app.⁸⁰ In the [Hague](#)⁸¹ and [Copenhagen](#),⁸² city recycling centres have been designed using circular economy principles to showcase the potential of material reuse, and support learning about recycling and repair.



CAPACITY BUILDING

Capacity building refers to the training and advisory support city governments can provide to individuals, companies, and organisations. Cities can work in partnership with local actors to develop practical training and business capacity building programmes to help mainstream circular economy understanding and practices within society.

Supporting, developing, and building capacity around circular economy opportunities is key to shifting systems. City governments can work with businesses, the community, and individuals to build capacity. Workshops, training programmes, and skills development are important tools. City governments can also develop incubator programmes and material exchange platforms that give businesses and individuals the ability to engage in and realise circular economy opportunities. Such capacity building programmes can be underpinned by financial support (see *Financial support*).

City governments are building capacity in a variety of ways. Initiatives to build individual, community, and business capacity to help drive circular economy activities include:

STIMULATING SKILL DEVELOPMENT

City governments in Brazil, such as **Belo Horizonte**, have worked in partnership with the national Computers for Inclusion programme, to actively support and provide training to young people regarding computer refurbishment, repair, and reuse. The initiative supports three policy objectives around reducing electrical waste, providing skills development, and improving digital inclusion. **Curitiba** has a similar programme.⁸³ Within **Brussels'** Be Circular initiative, the city supports skills development programmes that include various training modules in the construction sectors.⁸⁴

RUNNING CAPACITY-BUILDING WORKSHOPS AND DEVELOPING GUIDES

To support the implementation of **Toronto's** circular economy procurement plan, the city, together with the state, is setting up sector-specific workshops that provide city officials, vendors, and suppliers information on circular procurement and how they can be delivered in practice.⁸⁵ In **New York City**, the local government has developed the Zero Waste Design Guidelines, in collaboration with leading experts, to inform architects, planners, and developers on how to design-out waste in various sectors and applications.⁸⁶ Building capacity within government can be as important as building capacity externally. In **Amersfoort**, the local government offered workshops for city officials on the circular economy and the steps they can take to enable change.⁸⁷

SUPPORTING PHYSICAL COMMUNITY INNOVATION AND REPAIR HUBS

By funding and convening stakeholders working on the circular economy, city governments can help to create community hubs that can build skills among local businesses and residents in innovation, repair, and reuse (see *Financial support*, and *Convening and partnering*). Halle2 in **Munich** is a municipality initiative that is both a reuse lab and a second-hand store where different groups of society come together to share knowledge, innovate, and sell their recycled, repaired, reused, and upcycled products.⁸⁸ The city of **Charlotte** is similarly

committed to creating a community and local business hub, called the Innovation Barn,⁸⁹ while **London** has given funds to Participatory City,⁹⁰ a local resident and community hub supporting the local economy and product repair.

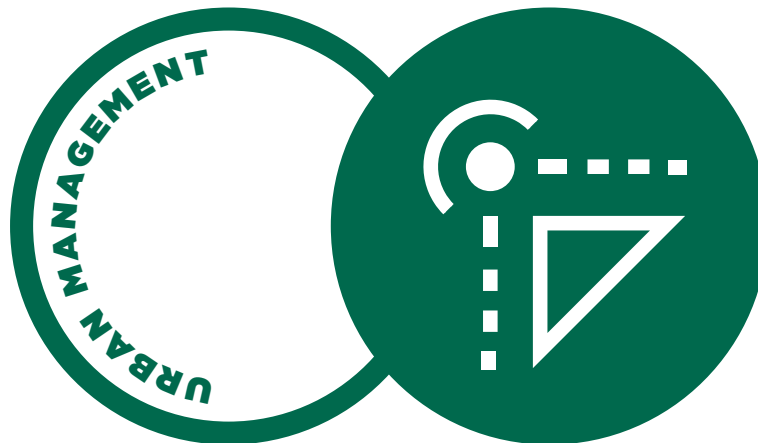
DEVELOPING MATERIAL MARKETPLACES AND SKILLS FOR NEW MATERIAL APPLICATIONS

City governments can develop initiatives that support cross-sector material exchanges and innovative circular economy solutions. The city of **Austin** has developed a Materials Marketplace that creates a market for businesses to sell used and unneeded materials to businesses who can use them as new input materials.⁹¹ Putting in place a materials marketplace also sparked the idea to build local entrepreneur capacity by developing the [Re]verse Pitch Competition.⁹² Every year a new set of participants is challenged to find innovative, scalable, and profitable reuse solutions for the residual waste generated by companies ranging from grape skins, to polyester napkins, and office chairs.⁹³ Contestants are offered mentoring and guidance as well as the opportunity to pitch

their ideas with the potential of receiving project funding and value-in-kind support.

DEVELOPING TAILORED CAPACITY BUILDING PROGRAMMES FOR LOCAL BUSINESSES AND ENTREPRENEURS

In line with economic development goals, several city governments have focused on supporting the development of circular economy opportunities among entrepreneurs, and small and medium-sized enterprises. **London**'s Advance London Accelerator programme offers bespoke circular economy advice to qualifying small and medium-sized enterprises. The programme offers skills training and mentorship, and connects them to appropriate circular economy finance opportunities.⁹⁴ In **Paris**, Paris&Co, offers a circular economy business advice programme to stimulate the transition to and scaling of circular economy business models among local innovators and enterprises.⁹⁵



URBAN PLANNING

Urban planning refers to the physical shaping and development of a city. It assesses physical, social, and environmental factors and determines the allocation, development and usage of urban structures such as buildings, infrastructure, and parks. Urban planning has a powerful impact on how people and goods move around a city and can have a strong impact on whether materials, products, and nutrients can be re-captured and kept in use. It can also create long-term housing, mobility, and behavioural lock-ins. It is therefore invaluable to include circular economy principles in urban planning decision making.

With populations growing, cities are expanding, areas are being redeveloped, and new cities are being built. The UN expects there to be 43 megacities by 2050.⁹⁶ Urban planning is predominantly a local task.⁹⁷ Decisions made in urban planning contribute significantly to how materials, products, and nutrients flow between people and sites in the city. They can also influence how people work and travel, and how organisations operate. According to the Organisation for Economic Co-operation and Development, (OECD), “better integrating the governance of transport and the governance of spatial planning - which are, respectively, main fields of work for 70% and 60% of OECD metropolitan governance bodies - can contribute significantly to higher growth and well-being”.⁹⁸

Urban planning has a key role to play in unlocking circular economy opportunities in the various interlinked urban systems. It can help create a regenerative system in which the flow of people, products, and materials is facilitated while core needs around housing, mobility, and access to goods and services are met. Factors such as size, configuration, density, and compactness each play a role.⁹⁹ Urban systems that minimise waste, stimulate the circulation of valuable resources, and make productive use of city assets have the

opportunity to create new value and thriving, liveable, and resilient cities.

Cities are using urban planning in a variety of ways to help deliver circular economy transformations:

URBAN PLANNING FOR COMPACT CITY DEVELOPMENT TO IMPROVE ACCESS TO SERVICES AND CIRCULATION

Stimulating compact city development to create high-density, mixed-use, and transit-oriented development can help improve access to services, support agglomeration economies,¹⁰⁰ reduce resource and energy demands, and improve the provision of utility and infrastructure. Johannesburg’s Integrated Development Plan 2040, developed with broad consultation, collaboration, and public participation, is designed to strengthen the built environment and mobility systems of the city for improved flow and productivity. It includes concepts of land use densification and diversification; mixed-use residential development; and integrates sub-urban areas.¹⁰¹ Through the plan, residents would experience reduced commuting times, and better access to services within a city that is clean, green, and regenerative. In Guangzhou, the neighbourhood of Liuyun Xiaoqu was designed for mixed-use, meaning the neighbourhood provides

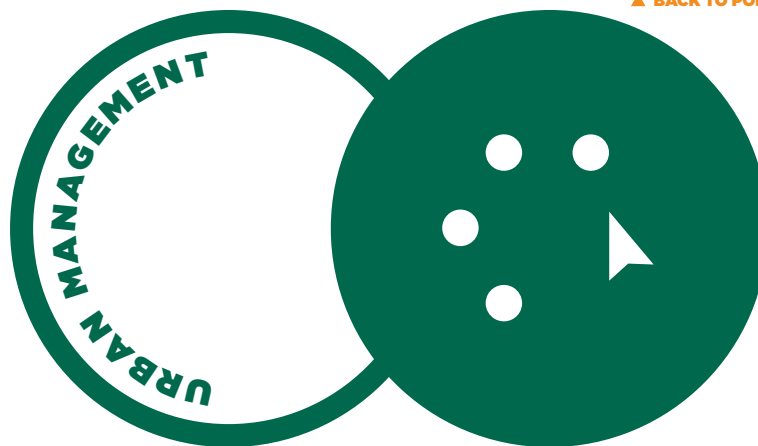
a mix of residential and commercial uses while offering improved accessibility to a variety of amenities.¹⁰² Benefits of this type of urban planning have also been illustrated in [London Ontario](#), where a study estimated that shifting towards a compact, mixed-use urban structure could provide CAD 1 to 4 billion of annual savings in capital and operating expenditure as well as greater fuel efficiency, less commuting, reduced pollution, and increased access to services.¹⁰³

SITE PLANNING FOR CIRCULAR MATERIAL USE AND NUTRIENT FLOWS

Integrated urban planning that supports circular economy principles can also be applied to local urban neighbourhood sites, and industrial and business parks. In [Venlo](#), the construction of a new town hall site was based on cradle-to-cradle (C2C) principles to eliminate the concept of waste from the build and to consider the interactions with the local area.¹⁰⁴ In [Haarlemmermeer](#), C2C principles were used in the master planning and development of Park 20/20, a mixed-use business park development, to integrate “access and mobility, connectivity, passive design, and integrated energy, water and waste management systems”.¹⁰⁵ Spaces are designed to be flexible and adaptable offering a variety of services. Materials are designed to be reusable and recyclable. Integrated landscaping strategies support the biocycle and ecology of the site while building orientations support the use of solar and wind energy. Integrated energy, water, and waste management systems also increase the capacity and flexibility in the overall site system. Within [London](#), the Mayoral Development Corporation for the regeneration of Old Oak and Park Royal proposed in its draft Local Plan a set of design standards built on circular economy principles.¹⁰⁶ It suggests that 640 hectares of urban space is developed with a view to minimising waste generation on the site once inhabited, designing spaces to be adaptable to changing uses, and enabling materials to be optimally circulated.

MOBILITY PLANNING FOR LOWER EMISSION AND BETTER-CONNECTED CITIES

Urban mobility plans can design public transit systems that help to lower carbon emissions as well as improve the movement of people and goods in cities. The focus is often on improving both the quality of life of residents and stimulating economic development. Urban transportation plan, Reinvent [Montreal](#), supports the city’s Master Plan, and emphasises the need for alternative forms of transport to automobiles. The plan was designed to put greater emphasis on walking, cycling, and public transit to create a healthier and better-connected city. Some of the outcomes have included a bicycle renting system, introducing dedicated parking for car shares, increasing the bicycle network to 800 km, and reserving central lanes for public transit among other elements.¹⁰⁷ In [Barcelona](#), the city government has introduced a new mobility plan based upon creating superblocks in the urban spatial plan. Working from the existing urban grid system, superblocks have been formed around nine existing blocks around which traffic flows and the internal roads open up to the community, facilitating greater local exchange and greening. The ultimate aim is to reduce traffic by 21% while improving air quality, freeing up 60% of streets from vehicles, and enabling foot, bike, and public transport.¹⁰⁸ Cities can also make use of agglomeration economies in urban planning to generate benefits around resource efficiency and productivity (see [Mobility Factsheets](#)). A study by Deloitte estimated that in [Sydney](#), relocating certain industrial activity in the Southern Industrial Area (SIA) and developing the SIA into a mixed-use area could create regional freight efficiencies of up to AUD 6.5 million a year. This benefit comes from more productive vehicles and bringing supply chains close together.¹⁰⁹



ASSET MANAGEMENT

Asset management refers to the management of city-owned physical assets. Physical assets can include land, buildings, roads and bridges, water and sewage systems, amongst other items. Asset management plays an essential role in evaluating the life cycle¹¹⁰ costs of city-owned assets to develop cost-effective strategies that deliver long-term quality service. The use of circular economy principles can help to unlock opportunities ranging from cost-savings to maximising resource value, use, and circulation.

City governments can own large portfolios of assets, with infrastructure¹¹¹ often the largest asset managed.¹¹² According to the OECD, “in EU countries around 70% of public investment is spent on maintenance costs associated with past infrastructure investments”.^{113,114} However, some cities struggle or have insufficient funds to maintain and replace their assets. This can lead to the deterioration of assets. At the same time a large proportion of city-owned assets are underutilised. This can leave revenue generating opportunities untapped as well as lead to the premature deterioration of an asset due to lack of upkeep, which can cost the city money. According to the 2006 UK National Audit Office report, making more productive use of city-owned assets, such as municipal buildings, can lead to estimated savings of GBP 1.5 to 2 billion per year.¹¹⁵

A circular economy approach to asset management can help alleviate a number of these challenges. It can help increase the effective utilisation of existing assets and increase resource and cost savings during an asset’s management. Operational costs can, for example, be reduced by renovating assets to be energy efficient or by making use of predictive maintenance.¹¹⁶ Assets designed for durability and robustness can lead to minimal maintenance requirements. Assets designed for modularity and repair can facilitate maintenance such that the per unit cost of repair is reduced. These types of designs increase the lifetime of an asset and can reduce net capital investment requirements. Upfront

capital investment can also be reduced by using recovered material in construction. Tapping into such opportunities requires closely aligning with other policy areas.

The field of asset management brings together urban planning, finance, engineering, and operations to maximise benefits, minimise risk, and provide the required levels of service to residents.¹¹⁷ In particular, adequate practices in public procurement and funding can support a circular approach to the management of assets (see *Public procurement*). It is by working together that these policy levers can unlock circular economy opportunities in the management of assets.

Applications of a circular economy approach in asset management include:

USING DATA TO IDENTIFY CIRCULAR ECONOMY OPPORTUNITIES

A comprehensive asset database within local government, such as that developed by the city of [Winnipeg](#)¹¹⁸, can help provide a clearer picture of the share and type of city assets that are underutilised, underperforming, and deteriorating due to poor maintenance, design or end of use.¹¹⁹ Knowledge of this sort can lead to improved use and maintenance of assets. Additional datasets, such as data from asset material passports for buildings and infrastructure, can build an understanding of how the resources in assets are being managed and maintained.¹²⁰ Developing such datasets and circular economy performance indicators can help build an understanding of the financial, social, and environmental benefits that

circular economy measures in asset management can create, such as operational and capital cost savings, improved use, resource benefits, and reduced carbon emissions (see *Roadmaps and strategies*). Data sets on mobility flows can also reduce waste and pollution and improve the use of city assets. In **London**, the public transport agency, Transport for London (TfL) collects anonymised data on how people and public vehicles move around the city.¹²¹ With such data, TfL can optimise public transport flows and reduce congestion and emissions in the city. By making such data open access, TfL has also been able to generate an estimated GBP 130 million a year in benefits¹²² for the city and TfL users.¹²³ In addition, data on the location of physical assets, even ones that are not city-owned, can also form an evidence base to support wider government policies. Google Project Sunroof created a tool to calculate the share of roofs within cities that would be viable for solar panel installations. Cities such as **Denver** are using such insights to help to inform city policies that can incentivise the take up of solar energy.¹²⁴

MAKING MORE PRODUCTIVE USE OF CITY-OWNED ASSETS

The sharing, leasing and renting of city-owned assets can ensure that assets are never left unused, eliminating 'wasted space' in cities. In **Seoul**, the local government has opened up the basement of the city hall to the public for it be used as a meeting area and for holding events. The shared public facility programme has also been expanded to include district offices, community centres, schools, and religious facilities.¹²⁵ In other cases, no longer needed transport stock can be repurposed. In **London**, former underground trains are repurposed for reuse on main line railways.¹²⁶ The repurposed trains are made to be more fuel efficient, easier to maintain, and benefit from reduced capital costs due to the reuse of major components.¹²⁷ City governments can also take measures to ensure city assets are productively used. In **San Francisco**, the Municipal Transportation Agency collaborated with academia and the private sector to deliver *SFpark*, a project that uses dynamic pricing for parking to encourage drivers to park in underused areas and garages, reducing demand in overused areas.¹²⁸ Meter and garage pricing are adjusted periodically to match demand, making the search for parking spaces easier and faster. The benefits include optimised use of existing parking resources, reduced congestion and emissions.

IDENTIFYING LONG TERM RESOURCE SAVING OPPORTUNITIES FOR THE MANAGEMENT OF CITY-OWNED ASSETS

A city has to continuously maintain, renovate, and replace their building stock and infrastructure. For asset managers, a key responsibility is to ensure cost effectiveness and low operation costs. A circular economy approach can enable this by ensuring resource savings. Renovations and asset replacements could, for example, consider designs that are energy efficient, modular, repairable and adaptable, durable or robust, and made with secondary materials. Though some designs may require a higher capital investment, they can be countered by having low operation costs over the long term. Other designs can increase the lifespan of an asset, postponing replacement costs. Working together with finance and public procurement departments is therefore essential to ensure that

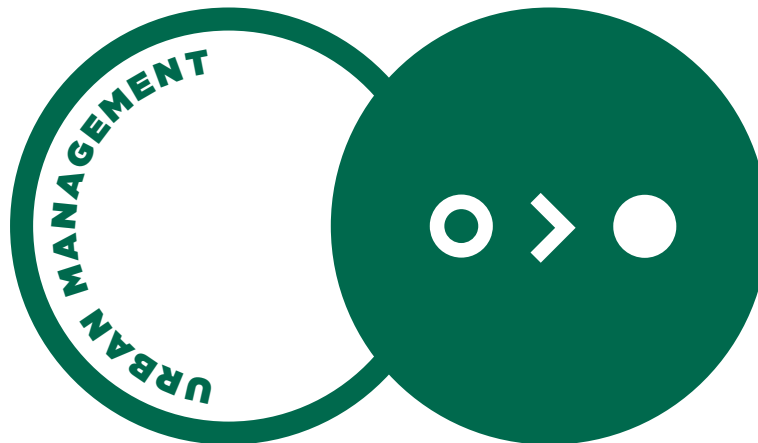
assets are procured based on circular economy criteria. In **Buenos Aires**, resource efficiency and lower carbon emissions were achieved by renewing public lighting systems with LED technology, in line with circular economy principles. Through a public-private partnership, Philips delivered a lighting asset management system to the city that enabled energy savings of 50%, a fivefold increase in lighting assets' lifetime, reduced maintenance costs, and improved visibility and security.¹²⁹ To enable optimal operation, a telecommunication platform was created to monitor the light points as well as to program potential replacements and predict future maintenance tasks. In the **United Kingdom**, the M25 motorway was widened while displaced materials were reused and recycled and waste minimised. By including requirements to design out waste and consider future material use in the tender process, the selected project saved more than GBP 15 million and sent zero waste to landfill.¹³⁰ Though the project is at the national level, it shows what can be achieved through asset management.

MANAGING CITY-OWNED LAND ASSETS FOR PRODUCTIVE USE

Circular economy opportunities and benefits also relate to the management of city-owned land assets. Much of the circular potential of a plot of land is influenced by urban planning (see *Urban planning*). Infrastructure and zoning plans create opportunities for city-owned land to be managed more productively while saving resources. In **Amsterdam**, the city is facilitating and supporting the development of Buiksloterham into a circular district. Underutilised city-owned land is being leased for construction projects on the basis of circular economy and sustainability criteria (see *Public procurement*).¹³¹ The build for the circular district will address themes around intelligent use of materials, energy, climate resilience, mobility, and the development of new models for production, consumption, distribution, and logistics.

USING CITY-OWNED ASSETS TO FACILITATE THE EXCHANGE OF MATERIALS BETWEEN CONSTRUCTION, RENOVATION, AND DECONSTRUCTION PROJECTS

Asset management can help identify strategic locations in a city that can support transport and material exchanges between renovation and construction projects taking place in the city. Mapping project location and construction stages can aid the process by providing insights on resource demand, usage, and disposal needs between different construction projects in the city. **London's** Infrastructure Mapping Application provides an overview of current and future infrastructure development projects and their locations in the city.¹³² Though the application is not currently used for a circular economy purpose, such information could be used to facilitate the reuse and exchange of materials between urban construction projects.¹³³ In **Vancouver**, the city gained funding for the creation of its Deconstruction Hub where salvaged materials from disassembled buildings can either be restored, repurposed, or resold for use.¹³⁴ Having several of these hubs in strategic locations could help facilitate the exchange and reuse of materials, thus adapting an industrial symbiosis approach at city level.



PUBLIC PROCUREMENT

Public procurement is the purchase of goods and services by the public sector. It can range from the purchase of everyday office goods to services to large-scale urban infrastructure projects. Integrating circular economy criteria within public procurement policies and practices can stimulate the circular design, provision, management, and servicing of goods.

City governments have a large purchasing power which gives them the ability to create demand and shift the market to new ways of providing goods and services, from the individual product level to the system level.¹³⁵ In Europe, public procurement makes up 14% of GDP (EUR 2 trillion annually), while in developing countries it is around 30%.¹³⁶ In Paris, city public procurement is worth EUR 1.6 billion.¹³⁷ Public procurement policies and practices can therefore play an important role in developing markets and boosting local economies.¹³⁸

By integrating circular economy criteria into public procurement policies and tenders for goods and services, city governments can play a significant role in enabling a circular economy. It can incentivise circular economy market innovation and can stimulate the increased use, reuse, and repair of products through service-based business models. To enable this, capabilities and skills in concepts such as total cost of ownership (TCO) and measures of material circularity can be built in procurement departments and teams. Public procurement policies and targets can be set at the national level and this can have a significant influence on regional and local governments. For example, in the Netherlands, the national government set targets in 2005 for 100% sustainable public procurement¹³⁹ by 2010 and subsequently extended the target of 100% by 2015 for local public authorities.¹⁴⁰

Circular economy principles are fusing into public procurement policies and practices in a number of ways:

USING CIRCULAR ECONOMY CRITERIA IN THE PUBLIC PROCUREMENT OF PRODUCTS

City governments can set criteria in their procurement tendering processes that challenge the market to develop innovative product solutions - from increasing the durability of a product to ensuring that the materials used are non-harmful, repairable, and reusable. In **San Francisco**, the city government has adopted such an approach into the procurement criteria for carpets installed in municipal buildings and construction projects. The purchasing requirements, set into regulation, include that all future publicly procured carpet fits are cradle-to-cradle silver certified, with no polyurethane used, and with 45% recycled content.¹⁴¹ For the new city hall of **Venlo**, the city government tender process included procuring high-quality furniture that would be easy to disassemble, repair, refurbish and reuse, and use non-harmful materials.¹⁴² The tender also specified that products had to be part of a take-back system to ensure their recovery after a ten-year period. In both these examples, working with industry and businesses in the development of circular economy procurement criteria can help to build understanding of circular economy needs, as well as market capabilities, requirements, and readiness (see the example of **Toronto** in *Capacity building*). The new offices of the **London Waste and Recycling Board** have also applied circular economy principles to the fit-out requirements ranging from office furniture to carpets and paint.¹⁴³ In **Ghent**, the local government procured cradle-to-cradle 'bronze' certified cleaning, hygiene and polishing products for all of its buildings and facilities, and packaging was made to be recyclable and contained recycled materials.¹⁴⁴

USING CIRCULAR ECONOMY PUBLIC PROCUREMENT CRITERIA IN THE RENOVATION AND MAINTENANCE OF CITY-OWNED AND OPERATED BUILDINGS AND INFRASTRUCTURE

With infrastructure being one of the largest assets managed by city governments, circular economy procurement can play a significant role in stimulating the use of circular economy principles in the renovation of city-owned assets (see *Asset management*). The city of **Brummen** needed to procure an extension to their city hall, with a life-span of 20 years, that kept their original historic building intact but also allowed them the flexibility to adapt the site to future requirements.¹⁴⁵ The winning proposal offered the city a 20-year service contract for a modular extension that could also pilot ‘building as material banks’ practices.¹⁴⁶ The extension was designed for disassembly and reuse, and made use of high-quality, renewable, and prefabricated materials. At the end of the contract, building components can be returned to their suppliers. In **Eindhoven**, circular public procurement is being piloted in the construction and renovation of schools.¹⁴⁷ In **Apeldoorn**, it is being applied to the renovation of roads in the neighbourhood of De Parken with the goal of reusing materials and conducting the renovation with minimal waste.¹⁴⁸

USING PUBLIC PROCUREMENT TO STIMULATE CIRCULAR ECONOMY BUILDING DEVELOPMENTS ON CITY-OWNED LAND

City governments can use their urban management policy levers (see *Urban planning*, *Asset management*, and *Public procurement*) to develop city-owned land based on circular economy principles. This is particularly relevant in countries where most of the land is owned by the local government, such as in the Netherlands. The extent to which this is possible is largely determined by urban planning - zoning, infrastructure, and development plans largely influence where city-owned land is available for issuing and for what category of development (see *Urban planning*). Much of a plot’s circular economy potential is therefore determined before the land is issued. When made possible in the urban plans, city governments can determine whether to sell or lease city-owned land for a circular economy objective (see *Asset management*). To support such a process, **Amsterdam** has developed its Roadmap for Circular Land Tendering that includes 32 performance-based indicators for circular

economy building developments.¹⁴⁹ The city developed such a circular land tender process in the Zuidas area.¹⁵⁰ A multifunctional mixed-use building will be designed to include a material passport, reclaimed resources, and design for disassembly, alongside the highest BREEAM sustainability standard.¹⁵¹ Collectively these features can support the value appreciation of the city asset.

USING PUBLIC PROCUREMENT TO ENCOURAGE THE USE OF CIRCULAR BUSINESS MODELS

Rather than procuring a product, city governments can also procure the ‘use’ of a product. This can incentivise the vendor to lengthen the lifespan of a product and reuse it multiple times. Using procurement in this way can mean procuring via pay-per-use, take-back, and leasing models. These can result in operational cost savings for city governments, a reduction in waste, and can further develop the market for products that are designed for performance, repair, and material recapture.¹⁵² The city of **Zurich** is among several to lease printing equipment rather than buying it outright, thus only paying per page printed and incentivising better printer performance and energy use.¹⁵³ The city of **Herning** made use of a service-based model to lease uniforms for their operations department.¹⁵⁴ The uniforms were designed for longevity, repairability, reuse, and recycling. When it comes to large-scale construction projects, city governments can make use of public-private partnership performance frameworks or Design-Build-Finance-Operate (DBFO) procurement models¹⁵⁵ to help mitigate and share risk.¹⁵⁶ Including circular procurement criteria, or outcomes, as early as possible allows for a whole-lifecycle approach to infrastructure projects would help to deliver cost efficiencies as well as keeping assets and materials at their highest value for longer.¹⁵⁷ DBFO service business models can lend themselves well to managing large-scale circular economy construction projects as they facilitate the monitoring of an asset from inception to end of use and thereby capture long-term financial and environmental values that are being created during use.



FINANCIAL SUPPORT

Financial support refers to grants, subsidies, direct and indirect investments, and public-private partnerships through which city governments can enable city development towards a circular economy. The funds may draw on existing budgets and revenues or be raised in addition and specifically to support circular economy initiatives.

The World Bank estimates that more than 80% of GDP is generated in cities and 57% of public investment is at the regional or local level, though this varies from country to country, depending on the degree and share of power that cities are given.¹⁵⁸ For example, sub-national public investment in Chile is 13% compared to 88% in Canada.¹⁵⁹ Within city governments, asset management, public procurement, and capacity building make use of financial support to enable and support physical urban development, market development, and business/organisational growth.

Financial support by city governments can encourage circular economy innovations in products and services. This can be especially relevant for research, and business innovation, as well as early-stage and large high-risk projects that need additional financial support. Public financial support can be provided via direct provision, public procurement mechanisms, co-financing schemes, investment funds, and municipally-owned corporations.¹⁶⁰ To enable infrastructure development, public-private partnership financing models can be important, both with the private sector and with other tiers of government, and at times in conjunction with each other.¹⁶¹ These can play an instrumental role in enabling circular economy development in cities.

Examples of city governments making use of financial support to stimulate circular economy initiatives and projects include:

DIRECT FUNDING FOR RESEARCH AND DEVELOPMENT

Cities can fund research development to help further understanding of urban circular economy opportunities. The city of **Amsterdam** established a ten-year partnership with the Amsterdam Institute for Advanced Metropolitan Solutions to help further the development of knowledge around the circular economy.¹⁶² In **Brussels**, the public agency INNOVIRIS funded the Brussels Circular Economy Transition (BRUCETRA) research project. The project aims to analyse the economic and environmental potential of the waste streams for a transition towards a circular economy model of material management in the Brussels Capital Region.¹⁶³

CO-FINANCING TO SUPPORT CIRCULAR ECONOMY INCUBATOR AND INVESTMENT PROGRAMMES

Incubator and co-investment programmes can support the development of innovative circular economy business propositions. The **Advance London** programme provides advisory support for qualifying small and medium-sized enterprises (see *Capacity building*).¹⁶⁴ It is complemented by an investment programme that includes various funds of which the London Waste and Recycling Board (LWARB) and the Greater London Authority are co-investors.¹⁶⁵ Another example is **Phoenix's** Resource Innovation and Solutions Network (RISN) incubator, developed in partnership with Arizona State University.¹⁶⁶ Both have funded the incubator together, along with a grant from the US Economic Development Administration.¹⁶⁷ The programme

accelerates and scales the development of early-stage ventures that focus on waste diversion and improvements in processing. Some also focus on the utilisation of waste as a raw material for new products or energy. Such initiatives are designed to support the city's goal of diverting 40% of waste landfilled in the city by 2020 and growing the local circular economy.¹⁶⁸

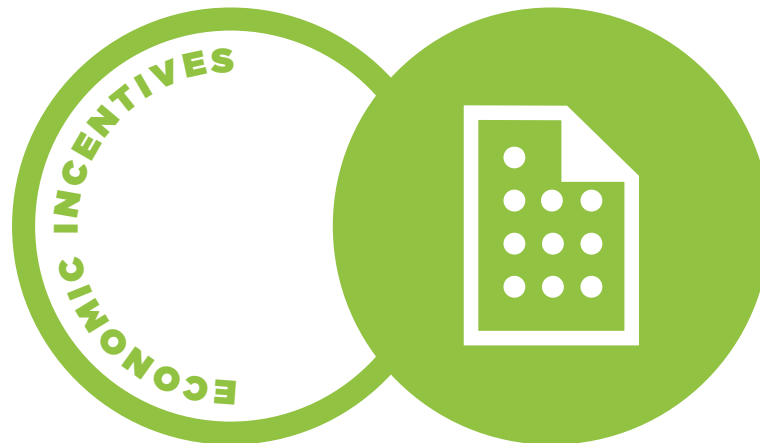
CO-FINANCING TO SUPPORT THE DEVELOPMENT OF CIRCULAR ECONOMY RELATED PROJECTS

Co-financing can be used to stimulate innovations that meet public commitments such as zero waste and climate commitments. Examples include co-financed low-carbon development and retrofit projects in [Amsterdam](#),¹⁶⁹ and co-funded public bicycle sharing systems in [Copenhagen](#).¹⁷⁰ To counter financial constraints and manage risk, co-financing has been encouraged in [Hamburg](#) where the Hamburg Investment and Development Bank, an institution owned by the city, provides financial support to businesses that invest in resource efficient measures.¹⁷¹

PUBLIC-PRIVATE INVESTMENT FUNDS FOR PROVIDING FINANCIAL SUPPORT FOR HIGHER RISK CIRCULAR ECONOMY PROJECTS IN CITIES

Public-private partnerships and ventures are collaborative investment schemes often used to share, reduce, and mitigate associated risks of impactful and costly projects. Investment funds, with funding from the public and/or the private sector, can provide financial support to enable, accelerate, and enhance urban projects. Urban sustainable investment funds, such as JESSICA, resulted from a partnership between the Council of European Development Bank (CEDB) and the European Investment Fund, the latter having provided EUR 2.1 billion in co-investment in circular economy projects since 2015.¹⁷² The EU JESSICA Urban Development Funds¹⁷³ contain financial contributions from EU member states, cities, and other public and/or private sources.¹⁷⁴ These are then invested in the form of equity, loans, and guarantees for projects that support sustainable

urban development and regeneration in cities. In [London](#), the city co-funded the Tate Modern's extension via the London Energy Efficiency Fund, a subset of the JESSICA London Green Fund, made up of funding from the European Regional Development Fund, London Development Agency, and London Waste and Recycling Board.¹⁷⁵ The extension was designed for energy efficiency, using 54% less energy and generating 44% less carbon than regulations demanded.¹⁷⁶ The design included natural air circulation, daylight, and the use of building materials that can store heat naturally.¹⁷⁷ In the United States, the Closed Loop Fund, a consortium of major corporations that have created a USD 100 million fund, provides municipalities with zero-interest loans for the development of infrastructure for comprehensive recycling programmes. Since the Closed Loop Fund was launched in 2014, nearly USD 20 million has been invested in nine projects, unlocking over USD 50 million in co-investment from municipalities, as well as banks and impact investors.¹⁷⁸ The city of [Memphis](#) has benefitted from this fund and invested in 80,000 single stream recycling carts for households. Within the first year of the investment the city managed to increase recycling rates by 61%.¹⁷⁹ To enable European cities to take risks and test innovative solutions to urban challenges, the Urban Innovation Action Funds, an initiative of the EU, was created.¹⁸⁰ The fund co-finances 80% of a city's project. The city of [Lappeenranta](#), in partnership with stakeholders, has made use of the fund to establish the Urban Infra Revolution Project. The project aims at testing and adapting circular economy and low-carbon technologies and business models that can help revolutionise the urban construction engineering sector.¹⁸¹ Circular economy measures include stimulating recycling, using residual and recycled waste as raw materials, and using local and alternative low-carbon emitting materials in construction. The goal is to reduce CO₂ emissions by 80% by 2030, compared to the 2007 level, and eliminating waste by 2050.



FISCAL MEASURES

Fiscal measures raise revenue, be it in the form of taxes, charges, fees or fines. To enable a shift in city practices towards a circular economy, this tool can be used to incentivise or discourage certain behaviours and market developments.

Fiscal measures have the power to incentivise behaviour change among businesses and residents. Having cities and higher tiers of government work together in the development and implementation of fiscal measures that provide enabling conditions for a circular economy can prove to be particularly effective. Areas can include tax benefits for circular economy products or businesses, tax reductions on the use of recycled materials, tax increases on undesirable waste streams, and tax reductions for activities involved in the share, repair, and recycle business.¹⁸²

Examples of city governments taking fiscal measures to stimulate circular activity include:

TAX BREAKS TO STIMULATE CIRCULAR ECONOMY

Tax rebates and discounts, provided by local governments and consistent with policies from higher-tier governments, can play a strong role in incentivising and establishing a conducive environment for circular economy products, businesses, and projects. In [Shanghai](#), the city granted VAT reductions to a chemical recycling company involved in the city's circular economy and cleaner production project.¹⁸³ To stimulate the construction and purchasing of green buildings in the city, [Cleveland](#)¹⁸⁴ and [Cincinnati](#)¹⁸⁵ have offered 100% tax abatements for 10-15 years for new construction and existing building retrofits that are LEED certified.¹⁸⁶ The aim is for such energy- and resource-efficient building redevelopment projects to help stimulate the local economy while contributing to a healthier and more resilient environment. The city of [Shandong](#) has focused on stimulating the opportunities that prefabricated

modularised components can offer. The city offers a number of schemes such as VAT refunds to manufacturers of prefabricated modularised components alongside cost reimbursements for the use of prefabricated walls, subsidies for corporates investing in research and development, and reductions in quality assurance deposits for prefabricated building construction projects.¹⁸⁷ [Milan](#) has introduced a 20% discount on waste tax for businesses that donate their food waste to charities.¹⁸⁸ In combination with other measures, such as city-to-city knowledge exchange, high citizen participation (see *Convening and partnering*), and door-to-door collections, Milan has already managed to significantly exceed the EU target of 50% recycling rate for organic waste by 2020.¹⁸⁹

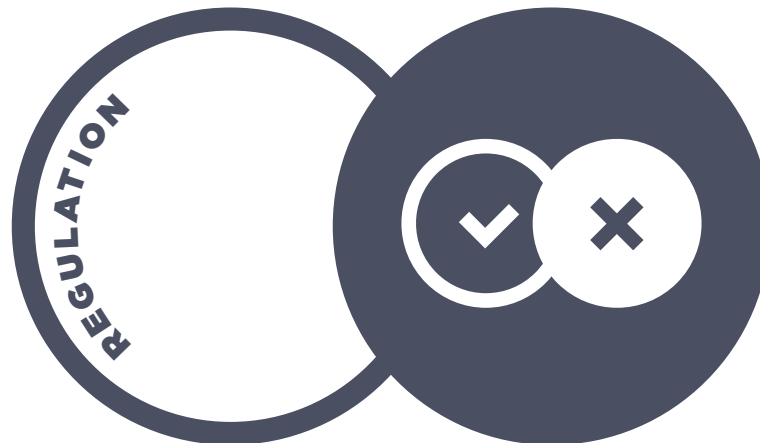
CHARGES AND TARIFFS TO INCENTIVISE BEHAVIOUR CHANGE

City governments are also making use of charges and discounts to incentivise behavioural change. In 2010, [Washington, D.C.](#) placed a USD 0.05 charge on plastic and paper single-use bags to reduce bag litter.¹⁹⁰ This led to a 60% drop in the use of single-use bags in the city. To tackle traffic congestion, [Singapore](#) introduced a pay-as-you-use road pricing system.¹⁹¹ An in-vehicle-unit sets a flexible rate depending on vehicle type, road driven, traffic levels, and time of day. The system has managed to encourage the use of public transport during peak hours, reduced traffic, and cut travel times in the city. This has led to lower carbon emissions, in line with circular economy principles. Congestion charges have also emerged in other cities including [Athens](#), [London](#), [Milan](#), [Oslo](#) and [Stockholm](#).¹⁹² In [Cremona](#), the city government introduced waste collection fees on residents that vary according

to the number of bags thrown away and are currently testing the introduction of tariffs on waste that cannot be recycled.¹⁹³ Similarly, in [San Francisco](#), businesses pay a fee respective to the volume of waste discarded.¹⁹⁴ Discounts are given when separate sorting collection bins are used. In [Auckland](#), a pay-as-you-throw charging system was introduced, as well as a fee for kerbside waste that varies by amount and type of waste produced. In combination with other measures, the city managed to reduce in-house waste generation by 30% by 2014.¹⁹⁵

FINES TO DISCOURAGE THE UNDER-USE OF ASSETS OR TO DISCOURAGE HARMFUL, POLLUTING ACTIVITIES

In Spain, the Catalan government implemented a law that allowed [Barcelona](#) and more than 100 municipalities to fine banks with properties on their books that have been empty for more than two years.¹⁹⁶ The aim is to increase the utilisation of space and the availability of housing. In [Turin](#), the local government has used penalties to help incentivise businesses that do not sort their waste effectively. Penalties are, for example, given to businesses that abandon waste or throw away recyclable and compostable items.¹⁹⁷



LEGISLATION AND REGULATION

Legislation and regulation refers to bylaws, standards, rules, and requirements that city governments can set. Cities can set regulations that can guide the development of circular economy opportunities and can reinforce and underpin all other policy levers. Working with other tiers of government to develop and inform legislation and regulation is also key.

Legislation and regulation has the power to set in motion bylaws¹⁹⁸, standards, requirements, and bans that promote circular practices. Legislating and regulating is an impactful policy lever that is often used in conjunction with other policy levers such as public procurement, urban planning, and fiscal measures. The majority of regulatory capacity typically resides with national governments. For example, in OECD metropolitan areas¹⁹⁹, less than 25% of metropolitan governance bodies can impose binding regulations.²⁰⁰ Nevertheless, city governments can work with national governments to help shape regulation and address regulatory barriers (see *Convening and partnering*).

To generate circular economy opportunities in cities, regulations can, among other things, be developed to promote the reuse and recovery of resources, limit the creation and disposal of waste, and facilitate sharing platforms.²⁰¹ Other cases require clearer rules on how to best stimulate the safe reuse of waste streams including sludge, reclaimed water, and recycled waste. On the other hand, some circular economy opportunities will require the removal of regulations that currently lock-in linear practices and inhibit circular economy innovations.

City governments can make use of legislation and regulation to stimulate circular activities in a variety of ways, including:

SHAPING BYLAWS THAT STIMULATE CIRCULAR ECONOMY PRACTICES IN THE CITY

To create enabling and regulated conditions for circular economy practices in the city, several cities have been adapting and developing local bylaws. In New York City, a rule has been set to expand the organic waste treatment requirements for large commercial food retailers and food service establishments with the aim of increasing the amount of organic waste diverted from landfill that can be put into beneficial use.²⁰² In Suzhou, the municipality mandated restaurants to send their organic waste to Jiangsu Clean Environmental Technology Co. for treatment, in exchange for annually renewed operation certificates. This intervention secured a high quality and quantity of feedstock for the plant.²⁰³ Other city governments have introduced regulation to enable circular economy development within specific sectors in their city. In the building sector for example, circularity can be incorporated into zoning plans, building standards, building codes, and land tenders. Such developments can help shape the circular redevelopment of specific areas of the city (see *Urban planning*, and *Public procurement*). In California, the City of Palm Desert has issued an ordinance stating a building permit can only be given if a Waste Management Plan has been submitted demonstrating “maximum reuse and recycling of debris and other waste generated during demolition, new construction, roofing, landscape, and other construction projects”.²⁰⁴ In Amsterdam, the city is considering setting up

circular zones within the city where localised circular economy urban developments can take place with supportive regulation.²⁰⁵ In the mobility sector, cities such as Vancouver are stimulating the car sharing economy by issuing permits and offering parking space for car-sharing cooperatives such as Modo.²⁰⁶

REVIEWING AND UPDATING EXISTING BYLAWS TO MANAGE UNINTENDED CONSEQUENCES

Innovations and new approaches in all spheres can run the risk of unintended consequences. This also applies to circular economy innovations. Cities can work with innovators to manage adverse unintended consequences and regulate as necessary. For example, while property sharing can make better use of space and generate income, it can also have unintended impacts on local long-term rental markets. A number of cities have taken action to manage such challenges. **Amsterdam** currently allows residents to rent out their homes for a maximum of 30 nights per year. Berlin is substituting the cap on short-term rents with the requirement that owner/occupiers rent less than 50% of the area of the home, and second homes can only be rented for a maximum of 90 days a year; beyond these limits a permit is required.²⁰⁷ Likewise, Paris has introduced a cap on short-term rents and hosts are required to be registered so that compliance can be monitored.²⁰⁸ In the mobility sector, similar measures have been taken to manage congestion and parking. Governments are also working to take account of new employment models. In New York City, a cap on the number of for-hire vehicles, such as Uber and Lyft, has been issued along with a new license requirement and a minimum wage for drivers.²⁰⁹ In Toronto, parking sharing apps such as Rover and Parking Cupid allow residents to rent their garages and driveways as potential parking spots, but these can run into conflict with zoning bylaws where commercial activity is not

allowed in residential zones and multiple cars cannot be parked in a single driveway.²¹⁰ The city is deciding on the legality of such services and how to best use regulation to manage the unintended consequences that residential communities may face such as redirected traffic and safety concerns. To regulate the sharing economy in the transport sector, a number of European cities have enforced bans on ride-hailing services that fail to comply with existing regulations e.g. having unlicensed drivers.²¹¹ Meanwhile, in cities like Baltimore²¹² and New York City,²¹³ zoning regulations have been amended to remove impediments for the construction and retrofitting of green buildings.

USING BANS TO PROHIBIT THE CIRCULATION OF GOODS AND MATERIALS THAT ARE PROBLEMATIC OR HARMFUL TO SOCIETY AND THE ENVIRONMENT

In New York City, the city government imposed a ban on styrofoam packaging for food and drink, since the material is not profitably recyclable and creates costly urban litter.²¹⁴ In other cases, bans are enforced by higher tiers of government to aid cities in preventing valuable resources going to waste. In Scotland, a ban on the landfilling of biodegradable municipal waste will be put into effect from January 2021, with one of the aims being to stimulate the recovery and recycling of food waste in cities.²¹⁵ Like several other cities, Amsterdam has increasingly been introducing stricter regulations with respect to environmental urban zones.²¹⁶ Polluting vehicles such as diesel lorries, delivery vans, buses, and taxis are currently banned from entering low emission zones. Cities such as Oslo, Paris, Athens, and Madrid have scheduled a ban on diesel vehicles to be enforced in the coming years in order to support efforts to improve urban air quality.²¹⁷

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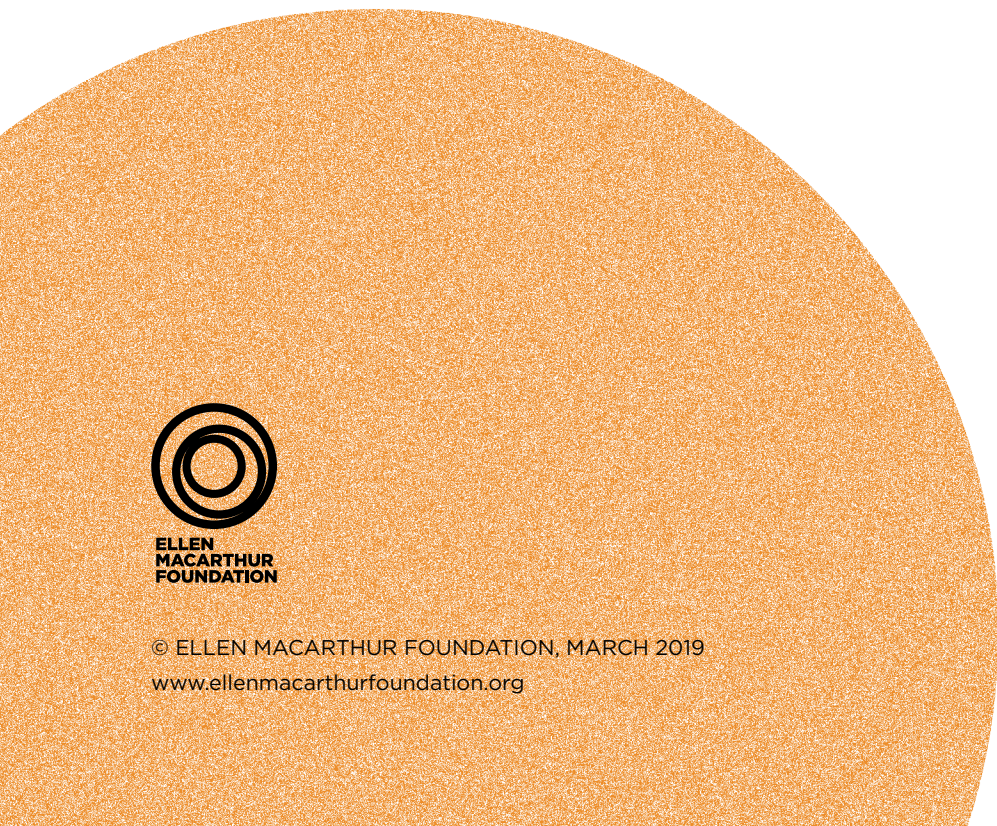
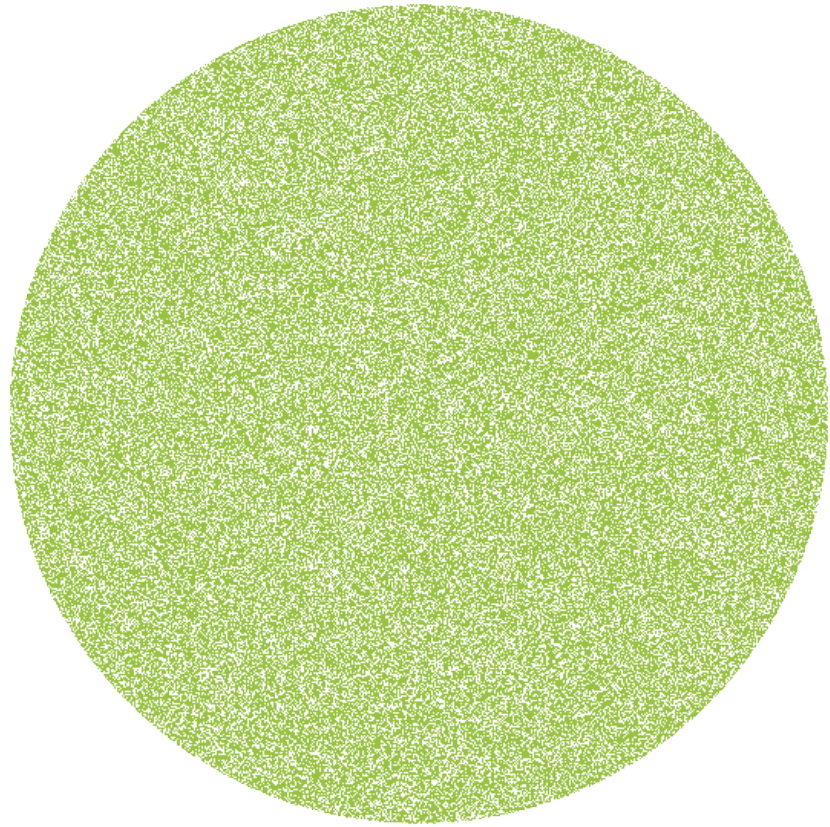
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