



Circular cities: Building regenerative urban ecosystems for a life-centred economy





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Introduction



Introduction

The shift towards **circular cities** marks a transformative reimagining of urban systems, positioning them as regenerative ecosystems where resources are continuously reused, reshared and renewed. Beyond the traditional focus on recycling, circular cities integrate closed-loop systems across energy, water, mobility and the built environment – fundamentally reshaping urban life to foster resilience, economic prosperity and inclusive growth.

In this emerging model, circular cities embody a 'life-centred economy' that prioritises environmental health, citizen well-being and social equity alongside economic resilience. By planning urban systems around these principles, cities can strengthen resilience, improve quality of life and unlock new economic opportunities without depleting the natural systems that sustain them. Achieving true urban circularity will require a paradigm shift: bold forward-thinking policies, innovative urban designs, strong governance and cross-sector partnerships. When cities embed these principles, circularity becomes a powerful mechanism to balance environmental imperatives with economic opportunity – positioning cities as engines of investment, job creation and improved quality of life.

The transformation toward circularity is not merely a response to environmental challenges but a proactive strategy to create thriving, future-proof urban ecosystems that deliver tangible benefits for all citizens, economies and the planet. Cities around the world are already rethinking how they operate by moving from linear consumption to circular systems that regenerate resources, strengthen economies and support inclusive, liveable communities. This transition directly supports the UN Sustainable Development Goals, demonstrating how sustainability and economic aims can reinforce each other. Circular approaches can cut emissions, reduce waste and unlock significant economic value by keeping materials, products and services circulating in local markets.

A circular city is built on four connected systems

Urban space

Shapes how people live and move.

Material and energy flows

Govern how resources are designed, reused and recovered.

Economic flows

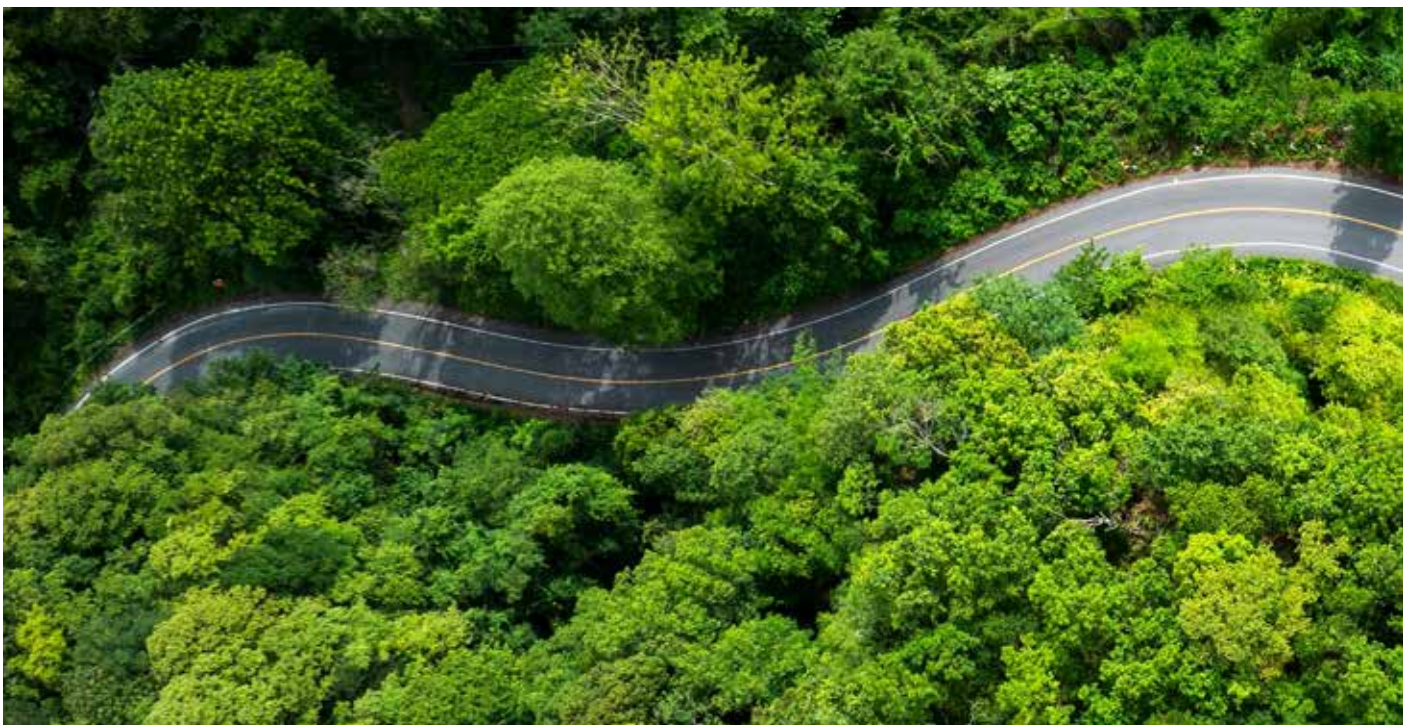
Determine business activity and investment.

Societal flows

Influence behaviour, inclusion and community outcomes.

When these systems work together, they create a regenerative urban model supported by policy, finance, design and technology. The economic case of circular cities is also substantial.

A global shift to circularity could generate US\$4.5trn in economic gains by 2030, while helping cities reduce global emissions by 39% by 2050¹, showing how environmental, social and economic gains can reinforce one another.

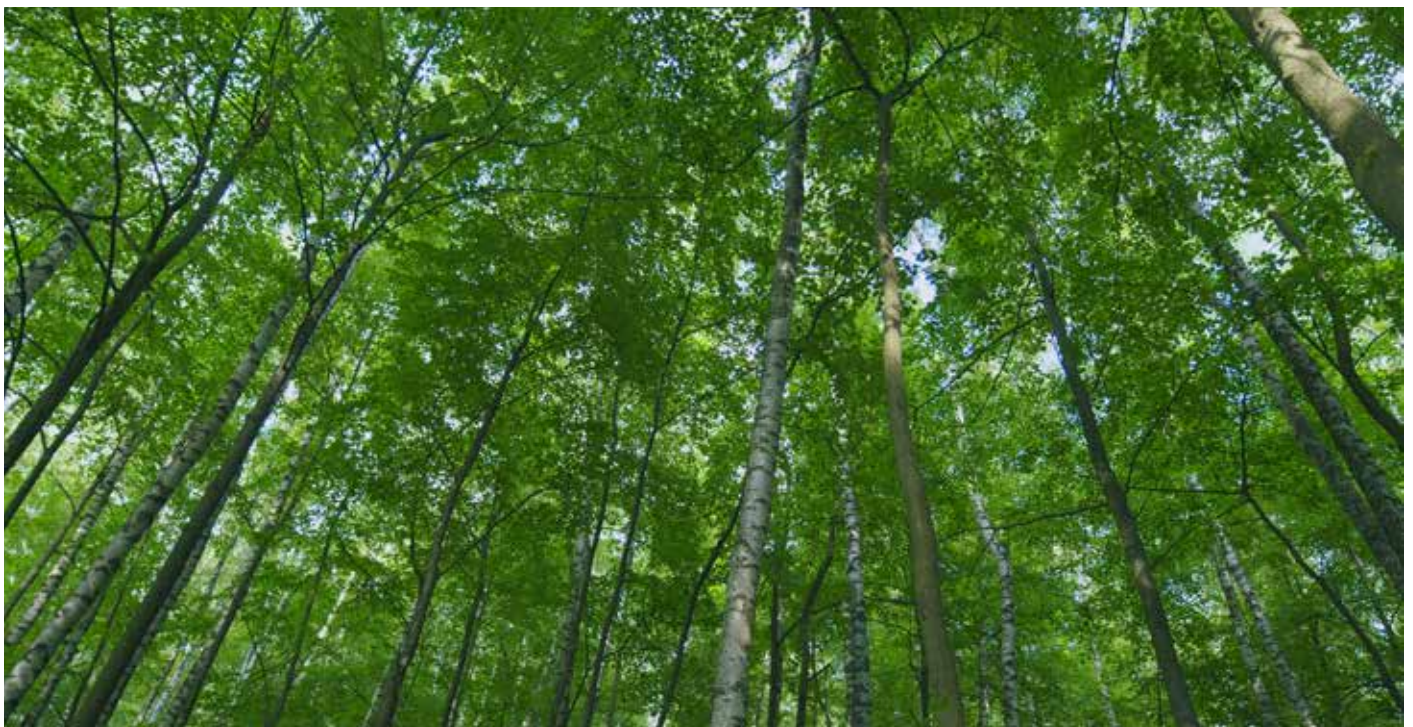


Opportunities for circular cities in the Middle East

In the Middle East, cities are expanding at speed, driving higher demand for energy, water and materials. The GCC countries have some of the highest electricity consumptions and carbon dioxide emissions per capita in the world,² as well as being among the most water-scarce globally.³ Construction waste meanwhile represents up to 35-40% of urban waste in GCC cities.⁴ These pressures sit alongside intensifying climate risks and rising expectations for environmental stewardship. Circular cities matter because they offer a way to sustain prosperity without increasing strain on natural systems.

This report explores how cities in the region can move towards life-centred circularity, particularly – as governments explore circular economy frameworks that optimise resource use, extend product lifecycles and reduce waste across the built environment, mobility and utilities. It also outlines actions that will help cities thrive in a world of rising environmental and economic pressures and calls policymakers, urban planners, private-sector leaders and citizens to adopt forward-looking circular strategies that align with a life-centred vision for urban ecosystems. By making strategic investments and regulatory shifts, cities can lead the global transition to a life-centred economy, setting new standards for sustainability and competitiveness.

The following sections explore what constitutes the framework of circularity in cities.



A life-centred economy: The intersection of profitability and sustainability

Traditional urban models built on resource extraction and disposal are becoming increasingly unsustainable – economically, environmentally and socially. With the global demand for raw materials projected to nearly double by 2050⁵, cities and businesses face mounting risks to cost stability, supply security and long-term growth. Circular strategies offer a practical response by repurposing resources and reducing dependence on finite materials, strengthening economic resilience and unlocking new value streams.

A life-centred economy offers a new paradigm – one where economic growth, business opportunity and societal well-being are not competing forces but mutually reinforcing drivers of urban resilience. This is not about replacing profit-driven models, it's about evolving them.

In this model:

Economic growth

Decoupled from resource depletion, enabling businesses to scale profitably while reducing environmental impact.

Urban design

Prioritises resilience, ensuring infrastructure, housing and mobility systems are built for longevity and adaptability.

Technology

Becomes a backbone for efficiency, using data-driven insights to optimise resource flows, energy use and business operations.

Society

Thrives through equitable access to resources, fostering inclusive, liveable and opportunity-rich urban environments.

This shift is already underway. Leading cities are embedding circular principles into governance, infrastructure, and finance – not only to strengthen sustainability outcomes but to future-proof their economies and improve quality of life.

The circular cities framework



1.1

The four pillars of circular cities

Together, these pillars act as the foundation for circular cities, ensuring that environmental, economic and social systems function in harmony to create regenerative urban ecosystems.

Circular cities rest on four foundational pillars that form the building blocks for sustainability, resilience and regeneration. These pillars ensure that circularity is deeply embedded across urban systems and guide the flow of resources, energy and value (Figure 1). They include:

Urban space: Rethinking spatial design and land use to promote efficiency, adaptability and accessibility through multifunctional spaces that reduce resource use and strengthen community connections.

Materials and energy flows: Reusing, repairing and recycling materials and ensuring energy is sourced sustainably. This ensures that cities reduce waste and minimise reliance on virgin resources.

Economic flow: Building resilient, local economies through circular business models, industrial symbiosis and green finance. This creates economic opportunities while decoupling growth from environmental harm.

Societal flow: Strengthening wellbeing and equity by creating inclusive systems that empower communities and ensure that the benefits of circularity are widely shared.

1.2

Levers of circular cities

While the pillars form the framework of circular cities, their success depends on the levers and enablers that activate these systems. These levers provide the mechanisms through which circularity can be implemented, scaled and sustained:



Policy and regulation: Establishing governance frameworks that encourage circular practices, such as green zoning, waste reduction policies and renewable energy mandates.



Design principles: Embedding circularity into planning and construction using cradle-to-cradle (C2C) methods, modular designs and symbiotic industrial systems.



Finance: Mobilising funding for circular infrastructure and businesses through green bonds, impact investing and public-private partnerships (PPPs).

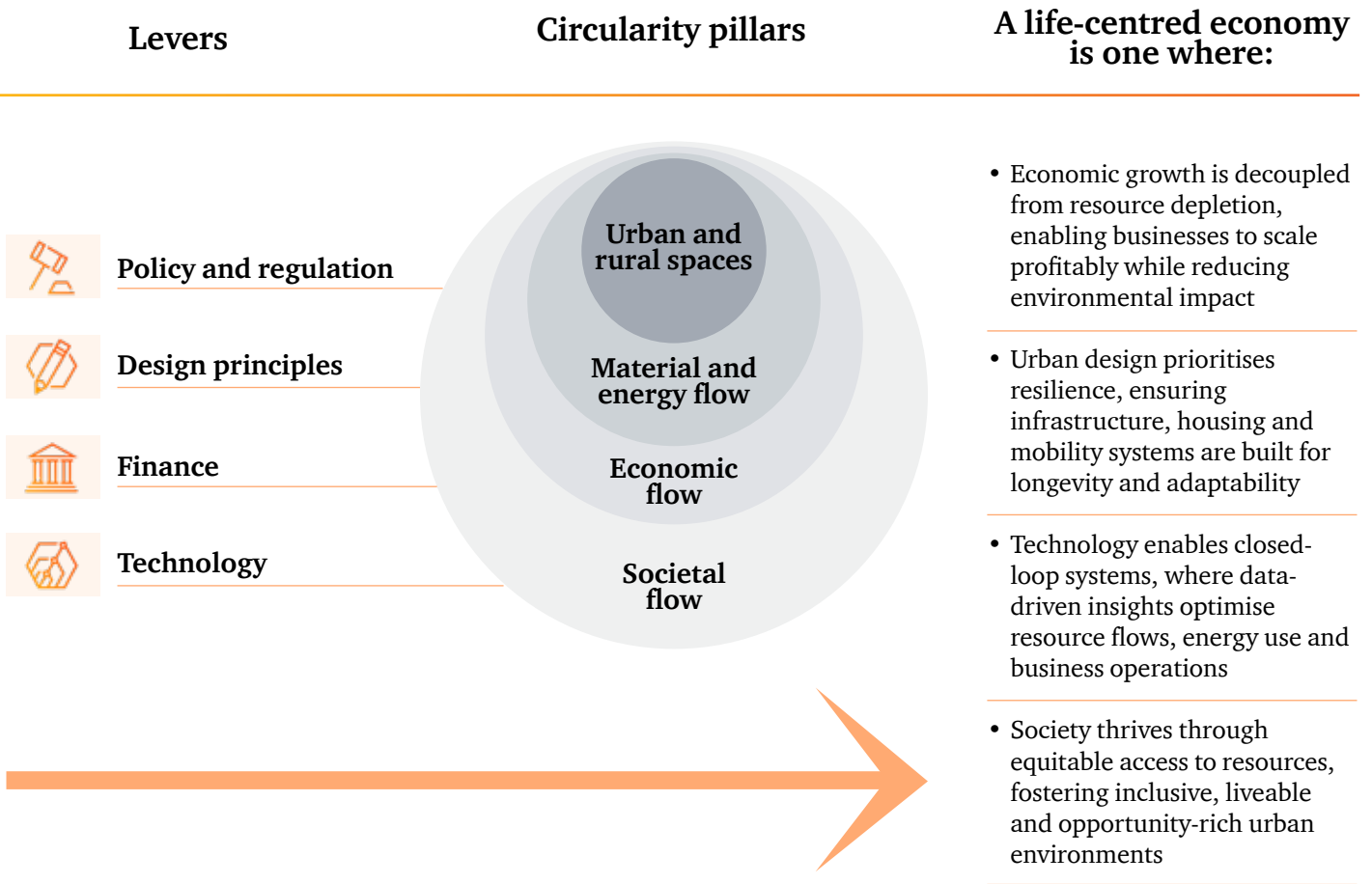


Technology: Using digital tools such as AI, IoT and blockchain to track resource flows, optimise efficiency and ensure transparency.

These levers are essential for translating the pillars of circularity into actionable frameworks, enabling cities to transition from linear to regenerative systems.



Figure 1: Building a life-centred economy: Circularity pillars and levers in cities



1.3

Case study: Amsterdam's city-wide circular economy strategy

Amsterdam has positioned itself as a global leader in the circular city movement, embedding circularity into its urban fabric with a goal of full circularity by 2050 and a 50% reduction in virgin raw material use by 2030.⁶ The city's strategy is structured around three key sectors: food and organic waste, consumer goods and the built environment, and leverages data-driven governance, regulatory frameworks and public-private collaboration to scale circularity.

By integrating localised food networks, urban agriculture and organic waste-to-energy systems, Amsterdam is actively reducing food waste and enhancing resource recovery. Its consumer goods strategy emphasises extending product lifecycles, promoting repair economies and implementing digital material registries to improve circular procurement. In the built environment, circular construction standards mandate 20% bio-based materials in new buildings by 2025⁷, while the Material Passport system ensures that building components can be disassembled, reused, or repurposed, reducing construction waste.

What sets Amsterdam apart is its data-driven approach to circular governance. The Amsterdam Circular Monitor provides real-time tracking of material flows, carbon footprints and waste diversion rates, enabling policymakers to make evidence-based decisions.⁸ This open-access methodology allows other municipalities in the Netherlands to adopt and scale similar strategies, accelerating circular economy transitions nationwide. To drive innovation, Amsterdam has mandated that contractors report material use and environmental impacts, ensuring greater accountability in the built environment.

Additionally, Amsterdam launched CircuLaw, a legal framework developed with universities and policymakers to simplify regulatory processes and facilitate the adoption of circular economy principles across industries.⁹ The city also prioritises public-private partnerships, connecting startups, corporations and research institutions to co-develop circular solutions.¹⁰ By making its methodologies open-source, Amsterdam is not only transforming its own economy but also serving as a blueprint for global circular transitions - demonstrating that circularity is not just an environmental necessity, but an economic imperative that reduces costs, fosters innovation and enhances resilience in an increasingly uncertain world.

The following section explores the key enablers of circularity, policy, design, finance and technology and how they transform these pillars from concept into scalable, regenerative systems.



02

**Building circular
cities: Policies,
design, finance
and technology
for a sustainable
future**





Building circular cities: Policies, design, finance and technology for a sustainable future

Circular cities become real when policy, design, finance and technology work together to embed circular practices across urban systems, turning principles into action through governance, adaptable design, capital mobilisation and digital transparency.

This section explores how these enablers function as drivers of circular transformation, ensuring that circular cities are scalable, resilient and aligned with economic imperatives. To provide a structured perspective, we introduce a Circularity Matrix, which illustrates how these levers interact across urban spaces, economic models, material flows and social systems. The framework (Figure 2) serves as a practical guide for integrating circularity into city planning, governance and industry.



Figure 2: How to shape circular cities: Policy, design, finance and technology in action

Levers	Urban and rural space	Material and energy flow	Economic flow	Societal flow
 <p>Policy and regulation</p>	<ul style="list-style-type: none"> • Zoning policies and mixed-use development • Impacts: Housing, education, healthcare, transportation • Example: London’s Smart City project incorporates circular planning 	<ul style="list-style-type: none"> • Circular policies for energy and transport • Impacts: energy, transportation, waste management • Example: Electric vehicle subsidies, Waste-to-energy systems 	<ul style="list-style-type: none"> • Government incentives and grants • Impacts: Transportation, energy, waste • Example: Electric vehicle tax incentives 	<ul style="list-style-type: none"> • Subsidise transport, co-working spaces • Impacts: Housing, education, healthcare, transportation • Example: Electric vehicle adoption subsidies
 <p>Design principles</p>	<ul style="list-style-type: none"> • 15-minute cities, decentralised services • Impacts: Healthcare, education and public transport • Example: Melbourne’s 20-minute neighborhood concept 	<ul style="list-style-type: none"> • Cradle-to-cradle design for reuse and efficiency • Impacts: Construction healthcare • Example: Green hospital design with sustainable materials 	<ul style="list-style-type: none"> • Sharing economy models • Impacts: Transportation, waste • Example: Car-sharing and bike-sharing services 	<ul style="list-style-type: none"> • Social cohesion through circular practices • Impacts: Waste, food production, Healthcare • Example: Community-based recycling programs
 <p>Finance</p>	<ul style="list-style-type: none"> • Financing sustainable urban development • Impacts: Waste management, green spaces, energy-efficient buildings • Example: New York’s Green Infrastructure Initiative 	<ul style="list-style-type: none"> • Grants for renewable energy and innovations • Impacts: Transportation, energy • Example: Solar panels powering Electric buses in Los Angeles 	<ul style="list-style-type: none"> • Investment for local economies and SMEs • Impacts: Green jobs, renewable energy • Example: Investment in local green energy companies 	<ul style="list-style-type: none"> • Subsidies for food, vertical farming • Impacts: Food systems, Agriculture, Health • Example: local organic food production and vertical farming
 <p>Technology</p>	<ul style="list-style-type: none"> • IoT and AI tech for efficient space use, transportation planning, • Impacts: Transportation, education and Healthcare • Example: Smart traffic management systems in cities 	<ul style="list-style-type: none"> • Tech for waste and energy systems • Impacts: Waste management, energy • Example: Tokyo’s waste sorting and recycling system 	<ul style="list-style-type: none"> • Technology and money for circular economy • Impacts: Construction and transportation • Example: Blockchain for material tracking in construction 	<ul style="list-style-type: none"> • Tech for public health, sustainability • Impacts: Health, education, well-being • Example: Health apps for monitoring air quality

2.1

Policy and regulation

Policy and regulation shape the operating framework for circular cities. They influence land use, product design, waste management and everyday behaviours.

Policy and regulation for circular urban and rural systems

Urban planning is central to embedding circular principles. Compact and mixed-use urban planning, which blends residential, commercial and recreational spaces, helps to reduce resource consumption, minimises the need for long commutes and fosters a more efficient use of urban space. By integrating circular zoning regulations, cities can promote densification, mixed-use spaces and decentralised services, ensuring that sustainability is built into urban development strategies. Research by the Ellen MacArthur Foundation estimates that cities transitioning to compact, mixed-use urban models can save up to CAD\$4bn (around US\$2.85bn) a year, improve mobility and cut pollution.¹¹

By institutionalising these planning approaches, governments can lower infrastructure costs and support more resilient urban systems.

Policy and regulation for circular energy and material systems

Regulation for materials and energy is equally important. Extended producer responsibility (EPR) requires manufacturers to design products for durability, reuse and recyclability. According to the OECD, ERP shifts the cost and responsibility of waste management from municipalities to producers, driving sustainable material use, eco-design and circularity.

EPR is typically implemented through two models:

- **Financial EPR:** Municipalities handle waste collection and recycling, while producers pay fees to cover system costs.
- **Operational EPR:** Producers are fully responsible for collecting, recovering and financing the waste management process.¹²



Incentives for the circular economy

Governments can support circular practices by offering tax breaks, grants and subsidies for sustainable manufacturing, recycling technologies or product redesigns.

Landfill taxes, for example, discourage waste disposal by raising the cost of sending waste to landfill and encourage waste reduction and recycling.

Other incentives include:

- **Tax breaks** for circular businesses investing in sustainable supply chains, product redesigns and low-waste manufacturing
- **Subsidies** for recycling, remanufacturing and waste-to-energy technologies
- **Carbon pricing** that rewards industries for reducing emissions through circular practice

Policy and regulation for social cohesion and behaviour

Policies that influence social behaviour are vital to embed circularity into daily lives. Behaviour-led policy can encourage repair, reuse and conscious consumption.¹³

Sweden's Value Added Tax (VAT) reduction on repair services is a prime example - by lowering the cost of repairing bicycles, clothing and shoes, the policy makes repairs a more attractive alternative to replacement, encouraging consumers to rethink waste.

This approach, known as “nudging,” subtly encourages sustainable behaviour without imposing mandates. By making circular options more accessible and affordable, these policies reduce waste, support local repair industries and increase consumer participation in circular systems. As more cities transition toward circularity, embedding behavioural incentives into policy will be key to shifting social norms and reinforcing a culture of sustainability.



2.2

Design principles

Design for circular urban and rural systems

Circular urban and rural planning relies on design principles rooted in symbiosis, ensuring that cities and surrounding regions function as interconnected ecosystems rather than isolated units. It optimises land use, reduces waste and improves accessibility through multifunctional spaces, decentralised infrastructure and adaptive layouts. Models such as the 15-minute city show how clustering services strengthens local self-sufficiency, reduces travel and supports active mobility. Dubai's 2040 Plan commits to doubling green and leisure areas and creating an integrated parks and green-corridor system linking residential, service, and employment hubs.¹⁴

In the GCC, the construction sector is already moving towards circular design, with reports suggesting that adopting circular construction approaches in the region could unlock over US\$23bn in benefits between 2020-2030.¹⁵

Designing for systemic interdependencies enables efficient exchange of materials, energy and services. Green corridors, bio-based construction and regenerative landscapes link built and natural systems. Rural areas support circularity by providing sustainable food and transforming urban organic waste into compost or bioenergy. Integrated urban-rural planning enables cities to move from extractive to regenerative development models.¹⁶

Design for circular energy and material systems

Circular design keeps materials and energy in closed-loop cycles. Instead of linear, extractive development, circular cities use regenerative and adaptable design, such as Cradle-to-Cradle (C2C) principles, which keep materials circulating as biological or technical nutrients. Tools like Circular Building Adaptability (CBA) and material passports enable modular construction, easy disassembly and high-value material recovery.



Design for the circular economy

A circular economy is driven by intentional design, ensuring that products, materials and industrial processes remain in continuous circulation, maximising resource efficiency, economic value and sustainability. Instead of a linear, extractive model, circular design prioritises durability, adaptability and regenerative resource flows, aligning business profitability with sustainability goals.

PwC's Value in Motion research redefines value creation as a continuous, regenerative economic activity. This requires a systems-thinking approach, where industries, businesses and governments collaborate in closed-loop networks, ensuring that resources cycle indefinitely rather than being lost as waste. Circular design transforms how businesses operate, embedding circularity into business models, supply chains and product lifecycles to drive efficiency and long-term resilience.

Industrial symbiosis is a powerful example of this approach. Kalundborg Symbiosis in Denmark is a leading example, where excess steam from power plants is repurposed to heat nearby facilities and industrial by-products become raw materials for other sectors. Such resource-sharing models minimise waste, lower costs and enhance resilience against supply chain disruptions - an imperative in today's volatile economic landscape.

Circular design also supports the transition to product-as-a-service (PaaS) models, where businesses retain ownership of products, shifting revenue from sales to long-term leasing and maintenance. Philips' Lighting-as-a-Service model, where customers pay for lighting output rather than the fixtures themselves, exemplifies this shift. By embedding circularity into business models, companies can optimise performance, extend product lifecycles and reduce waste while maintaining a steady revenue stream.

Through these applications, circular design strengthens business performance, extends product use and supports economic resilience.



Design for social cohesion and inclusivity

Circular design also enhances social outcomes by shaping urban spaces that are accessible, adaptable and community oriented. Mixed-use developments, walkable neighbourhoods and shared infrastructure foster social interaction and broaden access to essential services and amenities.

Beyond physical infrastructure, circular design promotes shared resource models that enable participatory engagement and collective ownership. Repair cafes, tool libraries and community-led sustainability initiatives empower citizens to contribute to and benefit from circular systems, fostering a sense of belonging and shared responsibility. By embedding inclusivity into design principles, cities ensure that circularity is not just an environmental or economic transition, but a social transformation that strengthens communities and enhances urban resilience.

2.3

Finance

Finance circular urban and rural systems

Finance is central to advancing circular transformation across both urban and rural areas. Tools such as strategic co-financing, PPPs, green bonds and impact investment enable public and private sectors to share risk and direct capital toward circular infrastructure, efficient land use and nature-based solutions. In the GCC, the UAE's Sustainable Finance Framework demonstrates how green financial instruments can support circular projects and strengthen environmental performance across multiple sectors.¹⁷



Finance circular energy and material systems

Investment in circular energy and material flows is critical to scaling closed-loop systems. Public funding for research in sustainable technologies and materials accelerates innovation, while multilateral initiatives, such as the Global Commission on Urban SDG Finance, help align capital with circular-economy objectives. In Saudi Arabia, the National Waste Management Centre is creating financing models for recycling and waste-to-value infrastructure as part of its national mandate.¹⁸

Financing the circular economy

Circular business models, including leasing, repair and remanufacturing, benefit from financial structures that prioritise long-term value rather than single-use transactions. Green bonds, sustainability-linked loans and blended finance reduce risk for circular assets by linking capital costs to environmental outcomes.

The European Green Bond Standard enhances market confidence through clearer reporting requirements. Performance-based mechanisms such as Social Impact Bonds tie funding to measurable sustainability outcomes, ensuring capital is deployed where it delivers the highest impact. Embedding circularity into financial systems unlocks new investment opportunities and supports a shift away from resource-intensive practices.

Financing for social cohesion and inclusivity

Financial incentives can help mainstream circular behaviours by making sustainable choices more affordable and accessible. Rebates, cashback schemes and deposit-return systems increase public participation in recycling and support more inclusive consumption patterns.

Programmes such as the U.S. Energy Star and California's Clean Vehicle Rebate¹⁹ accelerate adoption of energy-efficient appliances and electric vehicles. Deposit-return systems in Germany²⁰ and Norway²¹, as well as retail take-back programmes from companies like H&M and Patagonia, reduce barriers to participation and reinforce circular consumption habits.



2.4

Technology

Technological innovations for circular urban and rural systems

Technology is reshaping urban and rural planning by embedding real-time intelligence, predictive analytics and decentralised systems. AI modelling and digital twins optimise land use, energy and material flows while allowing planners to test circular interventions before implementation. In rural areas, geospatial AI, IoT sensors and blockchain improve sustainable agriculture, resource management and transparent land-use agreements. Geospatial tools and IoT sensors enhance precision in water, land and waste management, strengthening circular food systems and enabling better coordination across local and regional systems.²² GCC cities are beginning to use these tools, including Abu Dhabi's new City Management project, which uses a digital twin and AI to visualise liveability in real time and help planners improve residents' quality of life. The platform integrates data with existing infrastructure to support holistic planning, predictive analytics and scenario simulations for future decisions.²³

Technology for circular energy and material systems

Advanced digital technologies are accelerating circular energy and material systems by improving resource flows. Real-time analytics and automation provide transparency and help keep materials in circulation.

IoT-enabled asset tagging tracks condition, usage and lifecycle, supporting timely repair and repurposing. Similarly, predictive analytics in mobility and industry helps avoid inefficiencies and keeps materials and products in use. AI-powered automation is transforming waste management by improving sorting and separation. At a Tokyo industrial waste facility, Telexistence's AI-driven robotic waste sorting system is demonstrating how machine learning can automate material classification, increasing efficiency while reducing reliance on manual labour. Blockchain-based tracking strengthens supply chain transparency and helps verify material provenance and recyclability.



Technology for circular business models

The circular economy requires a redesign of how businesses manage resources, supported by technologies like AI, blockchain, IoT and digital twins. These tools provide real-time monitoring, predictive analytics and transparent supply chains that keep materials in continuous use.

Companies such as Michelin use IoT to extend product lifecycles through leasing models, while AI-enabled reverse logistics improves product recovery and remanufacturing.

By integrating smart technologies, businesses reduce resource dependency, extend value and create new revenue streams - making circularity both a sustainability imperative and a competitive advantage.

Technology for social cohesion and inclusion

Technology strengthens social cohesion in circular cities by enabling inclusive, participatory and data-driven engagement.

AI-, IoT- and blockchain-enabled platforms support real-time resource tracking, shared infrastructure and community-led initiatives, making sustainability a collective effort. Digital incentives-such as smart waste tracking, sustainability dashboards and token-based rewards-encourage recycling, upcycling and resource sharing. Decentralised decision-making tools further empower citizens to co-create policies and co-own circular assets. As cities adopt circular models, these technologies help distribute ownership, governance and benefits, reinforcing shared responsibility and stronger community ties.



03

**Circularity for
resilient,
life-centred cities**

Circularity for resilient, life-centred cities

A life-centred vision views cities as resilient, adaptable ecosystems that support wellbeing for people and the planet. Resilient cities are not only sustainable but also prepared to mitigate, absorb and regenerate in response to shocks—whether economic, environmental, or social. Circularity strengthens resilience by optimising resources, localising systems and fostering collaboration.

Circular principles can foster resiliency by enabling cities to:

- Mitigate risks by reducing dependence on external inputs
- Absorb shocks through localised, adaptive systems
- Regenerate value by turning waste into resources and promoting collaborative, inclusive economies. These dynamics are increasingly visible in the Middle East as cities respond to climate risk, diversification pressure and social change

3.1

Climate shocks: Mitigating and adapting to environmental disruptions

Climate shocks such as extreme weather, floods, heatwaves and rising sea levels threaten urban systems. Circularity helps cities manage these risks by integrating regenerative systems and nature-based solutions into infrastructure.

Nature-based solutions such as green roofs and urban wetlands reduce flooding and improve cooling. Circular energy sources such as renewables and waste-to-energy support city operations during outages. By relying less on resource extraction and using local supply chains, circular cities are more resilient.

In Saudi Arabia, programmes under the Saudi Green Initiative include large-scale urban greening and mangrove restoration to absorb heat, improve air quality and protect coasts, strengthening resilience in cities such as Riyadh and Jeddah.²⁴ Research from KAUST's Urban Lab also highlights how green infrastructure tailored for arid climates can reduce the urban heat island effect and support more resilient Saudi cities.²⁵

3.2

Economic disruptions: Stabilising local economies

Economic disruptions, including supply chain breakdowns, global resource shortages, or financial recessions, can destabilise cities that rely on linear systems. Circularity boosts economic resilience by supporting local economies, industrial symbiosis and resource recovery. Local manufacturing and closed-loop systems reduce exposure to global market volatility; while leasing and repair-based models provide stable revenue during downturns.

At the same time, green jobs in recycling, renewable energy and sustainable construction strengthen local employment and economic stability during crises.

This shift is already visible. In Saudi Arabia, Vision 2030 targets supply chain localisation and circular resource use as a foundation for more resilient non-oil sectors,²⁶ while Oman's waste-to-wealth programmes are turning waste into energy and materials, creating new industries and lowering exposure to unstable commodity markets.²⁷ Together, these approaches show how minimising waste and maximising resource value can help cities maintain stability amid uncertainty.

3.3

Social crises: Empowering communities and strengthening equity

Social crises such as rapid population growth, inequality-driven unrest or pandemics expose the fragility of traditional urban systems. Circularity strengthens social resilience by promoting equity, community collaboration and accessible resources - critical during crises such as pandemics, population surges, or social unrest. In Qatar, work on circular economy pathways for food and materials is tied to national resilience planning, with research highlighting local production, resource recovery and diversified value chains as tools to manage future shocks.²⁸

Localised food systems reduce reliance on global supply chains, while clean energy and waste reduction improve air quality and public health. Community initiatives like urban farming, sharing platforms and repair cafés build cohesion and support collective adaptation. Nature-based solutions also enhance mental and physical well-being.



04

**Scaling
circularity:
Partnerships
and community
collaboration**

Scaling circularity: Partnerships and community collaboration

Scaling circularity requires more than successful pilots. For circular systems to deliver long-term impact, they must be adopted across cities, industries and supply chains. This depends on strong partnerships, aligned incentives and coordinated action between government, business, finance, academia and communities.

Circularity scales fastest when stakeholders share data, align standards and co-invest in solutions. Collaboration reduces duplication, accelerates innovation and ensures that circular systems work across whole value chains rather than in isolated pockets. Across the Middle East, this coordination is becoming more prominent as governments embed circularity into national visions and long-term diversification plans.

4.1

Cross-sector partnerships

Partnerships across public and private institutions are central to scaling circularity. Global platforms such as the World Economic Forum's Platform for Accelerating the Circular Economy bring businesses, policymakers and financial institutions together to advance circular models in sectors including food, minerals and mobility. PPPs can unlock investment for circular infrastructure such as material recovery hubs, industrial zones and reverse logistics networks.

Similar collaboration is emerging in the region. Saudi Arabia's National Waste Management Centre is building partnerships with municipalities, private recyclers and industrial operators to standardise waste recovery and accelerate investment in waste-to-value projects. Oman's be'ah also works across government and industry to coordinate recycling systems and support circular business development.²⁹



4.2

Innovation hubs and market-driven adoption

Innovation hubs and research centres play an essential role by testing circular solutions before they scale. Facilities such as the Circular Innovation Lab in Denmark allow businesses to refine technologies, trial industrial symbiosis and experiment with secondary material use. Corporate-led circular R&D is also advancing closed-loop manufacturing, regenerative product design and secondary material integration, ensuring circular models become economically competitive rather than niche sustainability efforts.

For circularity to scale, standards and regulations must evolve alongside innovation. Shared procurement criteria, clear product standards and harmonised extended producer responsibility frameworks help circular products enter the market more easily and at lower cost.

Governments can also support market adoption by aligning incentives, updating procurement rules and removing barriers that make circular products more expensive than linear alternatives. Recent efforts in Saudi Arabia to standardise recycling specifications and in Oman to integrate circular materials into national procurement frameworks are examples of this trend.^{30 31}

Building systems that endure

Circularity will only scale once it is embedded in industry operations and urban planning. This demands shared data, consistent measurement frameworks and collaboration across supply chains, alongside sustained commitment from governments, businesses and communities. Ultimately, circularity is a system-wide strategy that enhances resilience, drives economic diversification and enables cities to thrive in a resource-constrained future.



05

**Roles for
sustaining
and driving
circularity**

Roles for sustaining and driving circularity

Scaling circularity depends on coordinated action across government, business, finance, academia, NGOs and communities. Each plays a distinct role in embedding circularity. It requires collaboration, innovation and shared responsibility.

Governments shape the conditions that allow circularity to take root at scale. They must set a clear direction through regulation, investment and enforcement.



Governments must:

- Establish regulations that incentivise circular practice, such as extended producer responsibility, zero waste rules and green procurement policies
- Invest in waste-to-resource facilities, decentralised renewable energy systems and circular material recovery hubs
- Align tax incentives, regulatory compliance and sustainability reporting standards

Businesses turn circular principles into practical solutions and can scale them quickly.



Businesses should:

- Integrate leasing, sharing and repair-focused models to reduce waste and extend product life
- Build industrial symbiosis networks that exchange by-products, repurpose waste and create shared resource networks
- Strengthen supply chain transparency through blockchain, AI and digital tracking
- Track and disclose their circularity progress, aligning with international standards

Universities and research centres develop the skills and innovation needed for circular transitions.



Educational institutions should:

- Embed circular economy, regenerative design and sustainable finance into curricula
- Drive innovation in materials recovery, circular business models and smart city applications
- Provide training in circular supply chains, waste-to-value systems and renewable energy technologies
- Form partnerships with businesses and policymakers to create innovation hubs and pilot programmes

Financial institutions determine which circular solutions grow from pilots to mainstream systems.



Financial institutions should:

- Provide venture capital to circular startups in waste management, reuse and sustainable production
- Offer sustainability-linked loans to incentivise circular models
- Use blended finance with governments and development banks



NGOs support circularity by building awareness and connecting sectors.



NGOs should:

- Educate citizens and businesses through targeted programmes
- Bring together governments, businesses and communities to co-develop circular initiatives
- Enable grassroots action through programmes such as urban farming, repair cafes and local reuse schemes

Citizens and communities give circularity momentum by making it part of daily practice.



Citizens should:

- Participate in recycling, reuse, reduce individual consumption & embrace sharing schemes
- Reduce individual consumption and adopt more resource-aware behaviours
- Advocate for transparency and stronger sustainability commitments from businesses and government





Communities can:

- Build shared resource platforms such as tool libraries, community gardens and repair networks
- Form cooperatives focused on recycling, composting or shared renewable energy
- Strengthen social cohesion across neighbourhoods



06

**Circular cities
as catalysts for
a life-centred
economy**

Circularity is emerging as a practical blueprint for cities facing resource stress and rapid urbanisation. By redesigning how materials, energy and economic activity flow, circular cities reduce reliance on finite resources while strengthening resilience across infrastructure, communities and local economies. For the Middle East, where urban growth and climate pressures are accelerating, circularity provides a route to building more adaptable, efficient and environmentally grounded cities.

This life-centred approach places people, ecosystems and long-term prosperity at the core of urban development. It supports localised economies, empowers communities through shared resources and enhances equity and access to essential services. Delivering this transition requires coordinated action across government, business, finance and society.

Cities that invest in circularity today will be better positioned to thrive in a climate-aligned, resource-conscious future. Circular models not only ease pressure on natural systems but also strengthen social cohesion, unlock new value and improve adaptability.

The Middle East stands at a moment when circular thinking can move from the margins to implementation. Cities are rising fast, national agendas are pushing long-term outcomes and investment in infrastructure is no longer about adding capacity but shaping the kind of places people will rely on for decades. That combination creates more than momentum. It creates room to make different choices.

As renewable energy scales up, as new districts are planned as connected systems rather than separate projects and as resource efficiency becomes a measure of progress, cities can start to show how design, finance and technology reinforce one another. Not in theory, not in pilot zones, but in the day-to-day decisions that determine how an urban economy grows.

Circular models lighten the strain on natural systems, strengthen community ties and widen the pathways for economic participation. They offer cities a practical way to stay ahead of the pressures that come with constant change.



Circularity provides cities with a practical blueprint for protecting resources while creating shared prosperity. With coordinated action across government, industry and society, urban systems can become more efficient, inclusive and economically resilient. The Middle East now has an opportunity to set a global benchmark, demonstrating how circular models can build cities that are dynamic, future-ready and built to thrive.”

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