

Role of triangular cooperation (government- scientific & research organization-private sector) in advancing 3R and circular economy in Asia-Pacific



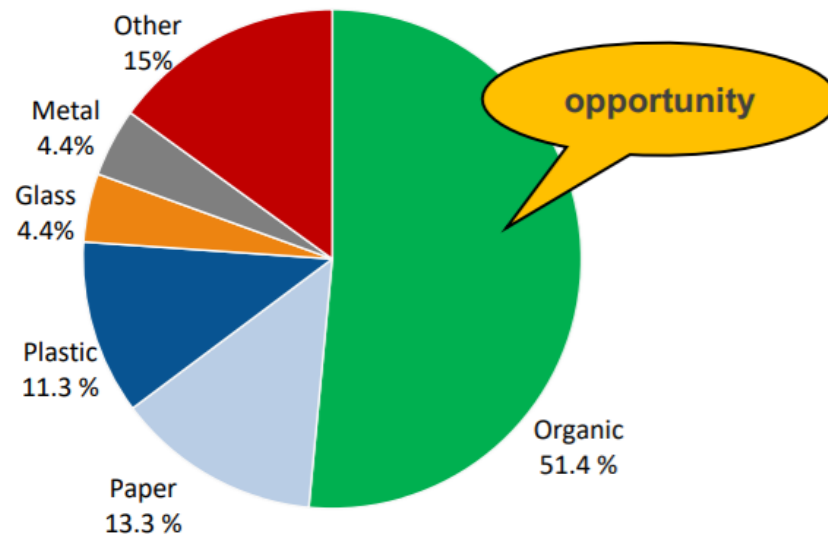
**Engagement and participation of
local government and community
services towards circular economy**

Dr. Kulwant Singh
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Former Regional Advisor, UN-Habitat

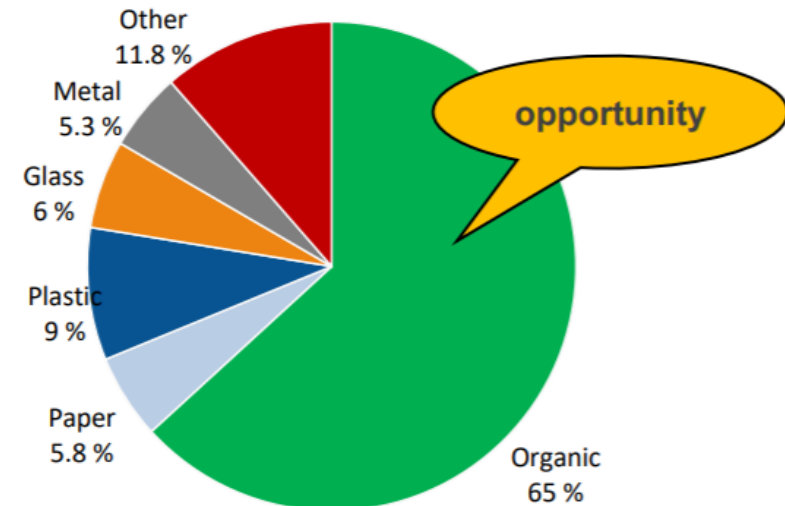
Turning Challenges of Local Governments to Opportunities

- ▶ The current system of waste management by many Local Governments is **not sustainable** and overlooks the enormous potential of turning waste into resource.
- ▶ The informal sector recovers some valuable materials downstream, but the bulk of organic waste does not have a chance to be recovered without leveraging appropriate technology and systems.

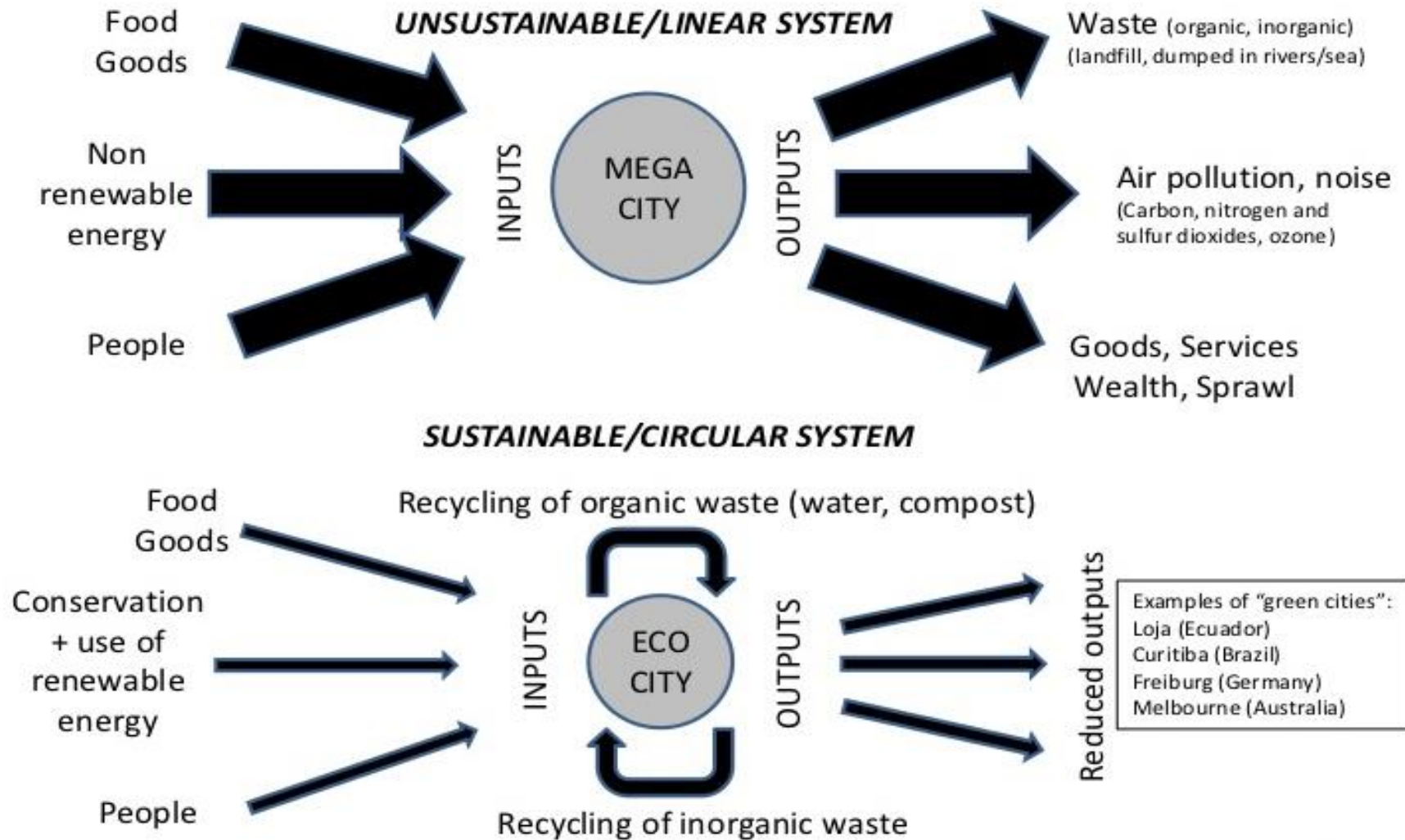
Middle Income countries



Low Income countries



Moving from Unsustainable/Linear to Sustainable/Circular City Systems



Local Governments as a driver for the Circular Economy

- ▶ Local Governments committed to play a leadership role in the achievement of the 2030 Agenda, and reinforce the synergies with the Addis Ababa Action Agenda, and the Paris Agreement, to transform our world.
- ▶ Local Governments play an important role in the transition towards sustainable & circular societies.
- ▶ Local and State Governments in India promote recycling of building materials and reuse,
- ▶ Prepare district plans and set up environmental requirements to integrate circularity into a sustainable city development.
- ▶ Local Governments are facilitating urban mining from e-waste, plastic recycling, steel recovery from end-of-life vehicles

Cities are Centres for Change: Circular Economy Principles



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

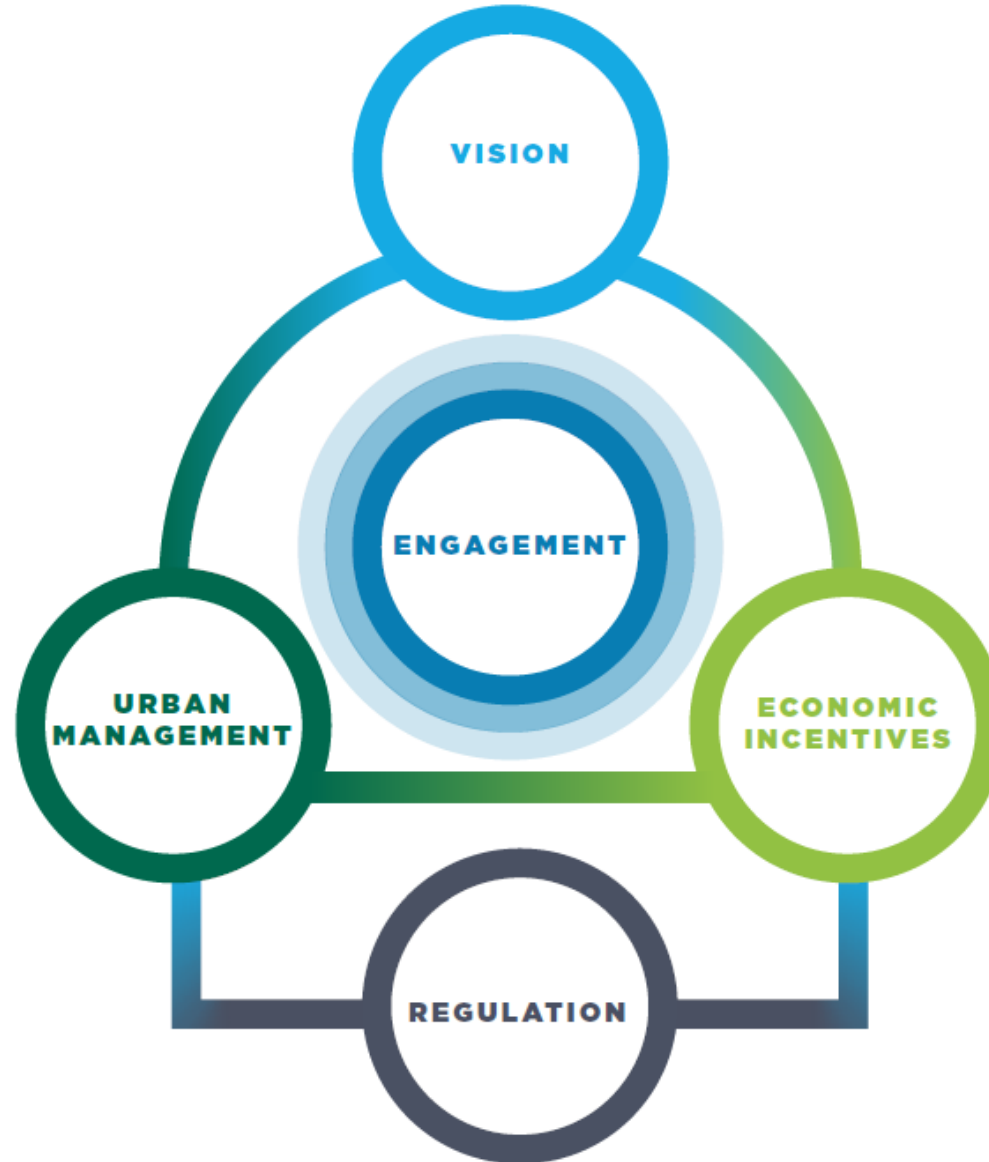


**Materials to be kept
in use and maintain
their value**



**Natural systems in
and around cities to
regenerate**

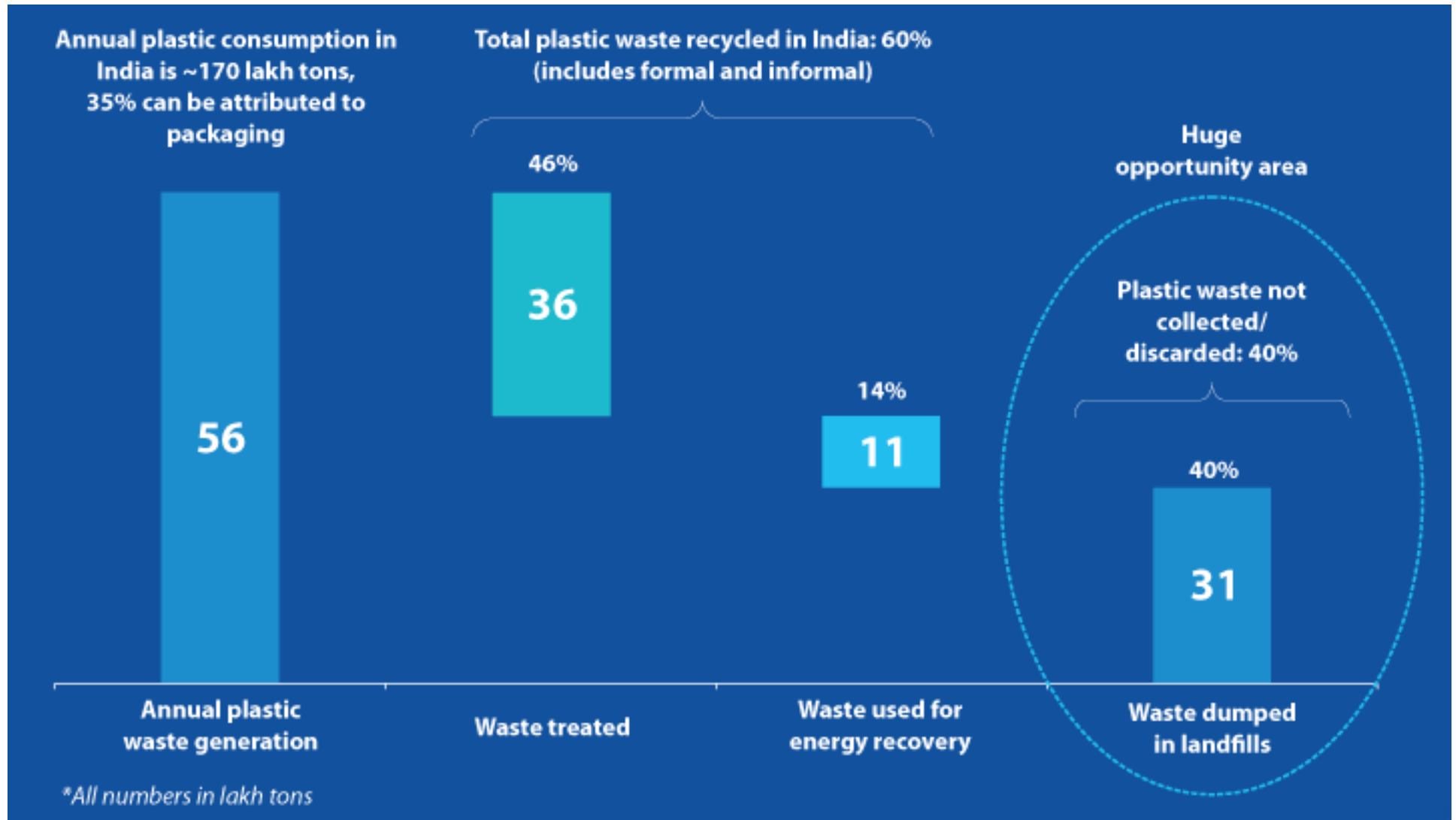
Urban Policy Levers for Circular Economy Transitions



Enabling Policy Landscape: Circular Economy related regulations in India

Regulation	Key highlights
Plastic Waste Management Rules, 2016 ¹⁰² and Plastic Waste Management (Amendment) Rules, 2018 ¹⁰³	• The rules mandate producers and brand owners to introduce collect back systems as per extended producer responsibility • Minimum thickness of plastic bags increased to reduce free distribution by retailers and facilitate collection and recycling • The rules also ban the manufacture of multi-layer plastic (non-recyclable or non-energy recoverable or with no alternate use) packaging and lay down penalties on their manufacture or use by retailers • Introduction of plastic waste management fee through pre-registration of the producers, importers and vendors
E-Waste Management Rules, 2016 ¹⁰⁴	• The rules lay the responsibility of collection and recycling of e-waste generated during manufacture of any electrical/electronic equipment on the manufacturer • The responsibility of producers is extended through an EPR to collect end-of life E-waste and properly store, transport and treat it before recycling or disposal • Consumers need to properly segregate and dispose the e-waste generated by them
Construction & Demolition Waste Management Rules 2016 ¹⁰⁵	• Require local bodies to utilize 10-20% material from construction and demolition waste in municipal and government contracts
Upcoming Metals Recycling Policy	• The government has proposed setting up of 5 scrap-based steel plants with an investment of 500 crores in the coming year¹⁰⁶

Recycling of discarded plastic – a huge Circular Economy opportunity in India



Waste Management Challenges of Local Governments in India

- ▶ India the second largest nation in the world, with a population of 1.3 billion, accounting for nearly 18% of world's human population.
- ▶ 31.80% of total population residing in urban areas in 2011 likely to reach 40% by 2030.
- ▶ India facing a sharp contrast between its increasing urban population and available services and resources. Solid waste management (SWM) is one such service where India has an enormous gap to fill.

Waste Generation:

- ▶ Urban India generates about 1.5 Lakhs Tonnes per day.
- ▶ The per capita waste generation rate in India has increased from 0.44 kg/day in 2001 to 0.5 kg/day in 2011.
- ▶ Waste generation rate in Indian cities ranges between 200 - 870 grams/day, depending upon the region's lifestyle and the size of the city. The per capita waste generation is increasing by about 1.3% per year in India



Local Government & Community Challenges of Faecal Sludge Management in Urban India

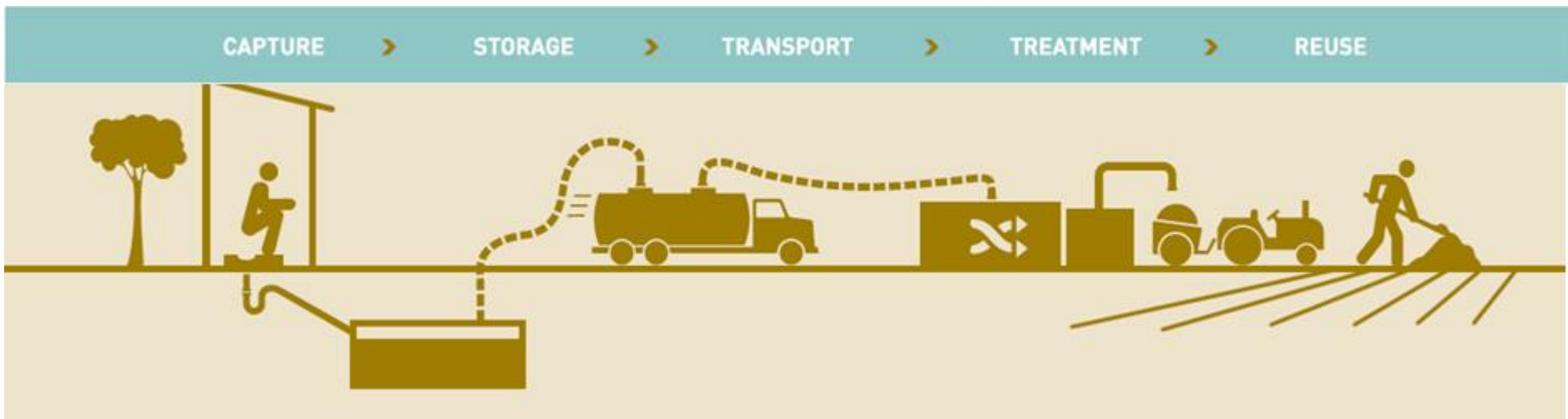
40 billion litres of human waste is produced every day

93% is untreated, causing severe water pollution and disease

4 Lakh Crores, the World Bank estimates as the cost of poor sanitation



By 2030, Urban India is expected to grow by 50% to 600 Million people



Trichy Local Government's Approach to Manage Solid Waste

Amount generated: 450 TPD

Amount collected/serviced: 95% primary collection (360 TPD)

Collection system: Door-to-Door collection of Segregated waste by SHG Members. Segregated Wet Waste sent to Micro Compost Centers.

Processing centers: 28 Micro composting centres across the city. MCC wholly covers 42 wards, partially covers 7 wards and the waste from wards uncovered is directly sent to the processing site.

Treatment facilities:

- ▶ Micro Composting Centre (28 Locations): 90 TPD.
- ▶ Bio-methanization Plant (2 Locations) : 6 TPD

Final disposal: The principal garbage dumping ground is at Ariyamangalam.



Septage Management System in Trichy (India)

Amount of sewage generated: 21 MLD

Collection system:

- ▶ 40% of the total area covered by underground sewerage system

Transfer stations:

- ▶ 9 Pumping stations and 25 lifting stations.
- ▶ From the pumping stations, the sewage water is sent to the treatment plant via main pumping station at Uthakadai.

Treatment facilities:

- ▶ STP at Panjappur with a total treatment capacity of 90 MLD (Facultative and waste stabilization pond).
- ▶ Two new STPs at Kelakalkandar Kottai-32 MLD, and at Kulumani-24 MLD are expected to augment treatment capacities for the newly covered areas.

Final disposal:

- ▶ Septage disposal in STPs either through pumping stations or directly.
- ▶ Final disposal in Koraiyaru river channel of the Cauvery river



Approach to Manage Solid Waste in Dungarpur (Rajasthan) India

Amount generated: 16 TPD

- ▶ Wet Waste : 7 TPD
- ▶ Dry Waste : 9 TPD

Amount collected/serviced: 100%

Collection system: Government-owned collection vehicles.

Treatment facilities: Compost production plant (Medium scale) and Large-scale anaerobic digestion (bio-gas) plant and compost production plant.

- ▶ Septage and wet waste both are emptied in the digester of the bio-gas plant.
- ▶ Anaerobic digestion plant and vermicompost production plant (Small scale).
- ▶ 4-5 TPD of dry waste is sold to the scarp dealers.

Final disposal: Sanitary landfill for inert waste: Treated leachate.



Septage Management System in Dungarpur

Dungarpur is the first city in Rajasthan to declare itself free from open defecation. Dungarpur is relatively more progressive in terms of their approaches in solid waste management and faecal sludge management in comparison to other Indian cities.

Amount of sewage generated: 666 LPD

Amount collected: 100% sanitation coverage

Collection system: 70% of septic tank and 30% of pit latrines (single and twin)

Transfer stations: Septage is collected and transferred and now being handed over to the bio-gas plant.

Treatment facilities: Anaerobic digestion plant and compost production plant (Large scale).

Technologies: Biogas, slurry and co-compost (mix of faecal sludge and organic solid waste).

Final disposal: Bio-gas plant

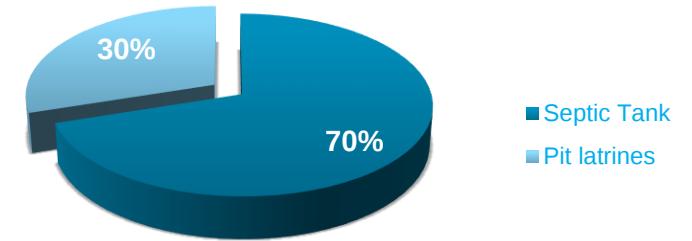


Figure: Collection system in Dungarpur.



Local Government of Pune - Approach to Manage Solid Waste

Amount generated: 2100 MTD

Amount collected/serviced: 1678 MTD

Collection system: There is a network of around 3000 waste pickers who work with an NGO SWaCH Coop, and works in close relation with PMC offering door-to-door collection services.

43% door to door collection, 12% gate collection, 40% community bin collection, 5% collected from chronic spots.

Treatment facilities: Bio-conversion of wet waste and recycling of dry waste. 815 MTD is processed (both dry and wet waste) and 611 MTD is unprocessed and ends up in landfill sites.

100 MTD is recovered from landfill.

Final disposal: PMC plans to convert the dumping ground into a scientific landfill site and start bio mining.



Pune Local Government - Septage Management System

Pune city has more than 92% households connected with sewerage that goes to the 10 functional and existing STPs in the city.

However, sewage generated (calculated on per capita basis) is 744 mld while treatment capacity of all STPs combined is only 567 mld. 1 STP at Naidu is not in working condition and hence lowering down the capacity of treatment to 477 MLD

Amount of sewage generated: 744 MLD

Amount of sewage treated: 477 MLD

Collection system: 92% connected to sewerage system, 8% onsite sanitation.

Treatment: 10 available outsourced STPs.

Disposal: Water bodies and land disposal.



Warangal City Corporation - Approach to Manage Solid Waste

Amount generated: 300 TPD

Amount collected/serviced: 100%

Collection system: Door-to-door collection separately for wet waste and dry waste by GWMC Staff

Transfer stations: Wet waste is transferred to bio methanation plants and dumping site. Dry waste is transferred and handed over to Dry Resource Collection Centres (DRCC)

Treatment facilities: There are 2 biomethanation plant and the rest is dumped in open. For dry waste, it is well segregated by DRCCs sent to recycling units in different parts of the country. Infrastructure has been created for composting /vermicomposting but not put to use.

Final disposal: Dumping site in Amavaripetta by GWMC.



Warangal City Corporation: Septage Management System

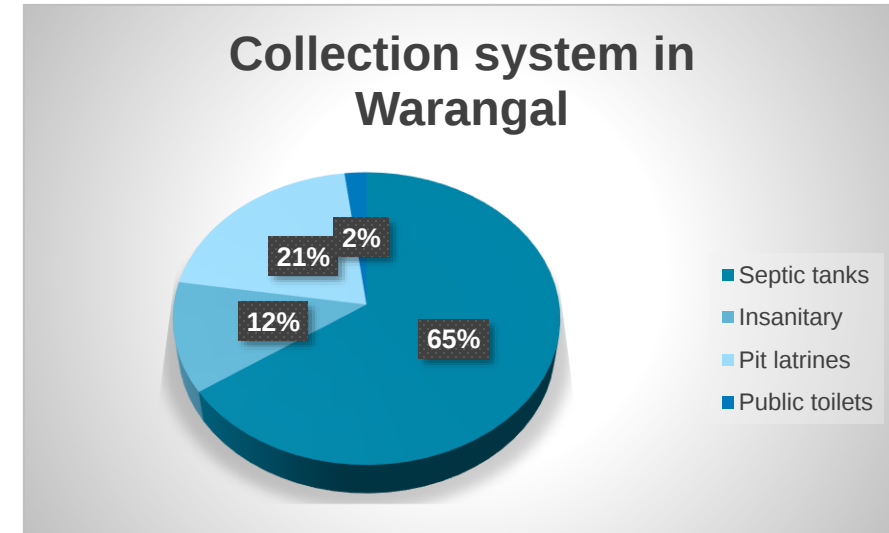
Warangal has been declared Open-Defecation Free (ODF) even though the city doesn't have sewerage facility. The city is in the list of 100 smart cities and Hridaya Program of Government of India.

Amount of sewage generated: 30 KLD

Collection system: 65.35% Septic tanks, 12.16% Insanitary, 20.49% Pit latrines and 2% Public toilets.

Treatment facilities: 100% collection and approximately 85% treatment of FS in Warangal. 15 KLD is treated in the Tide Technocrats FSM plant and 10 KLD is treated in the new FSM plant (Banka Bio Loo Limited).

Final disposal: Two functional FSM plants in the city.



City State of Singapore's Waste Management Policies

► **Environmental Public Health Act 1968**

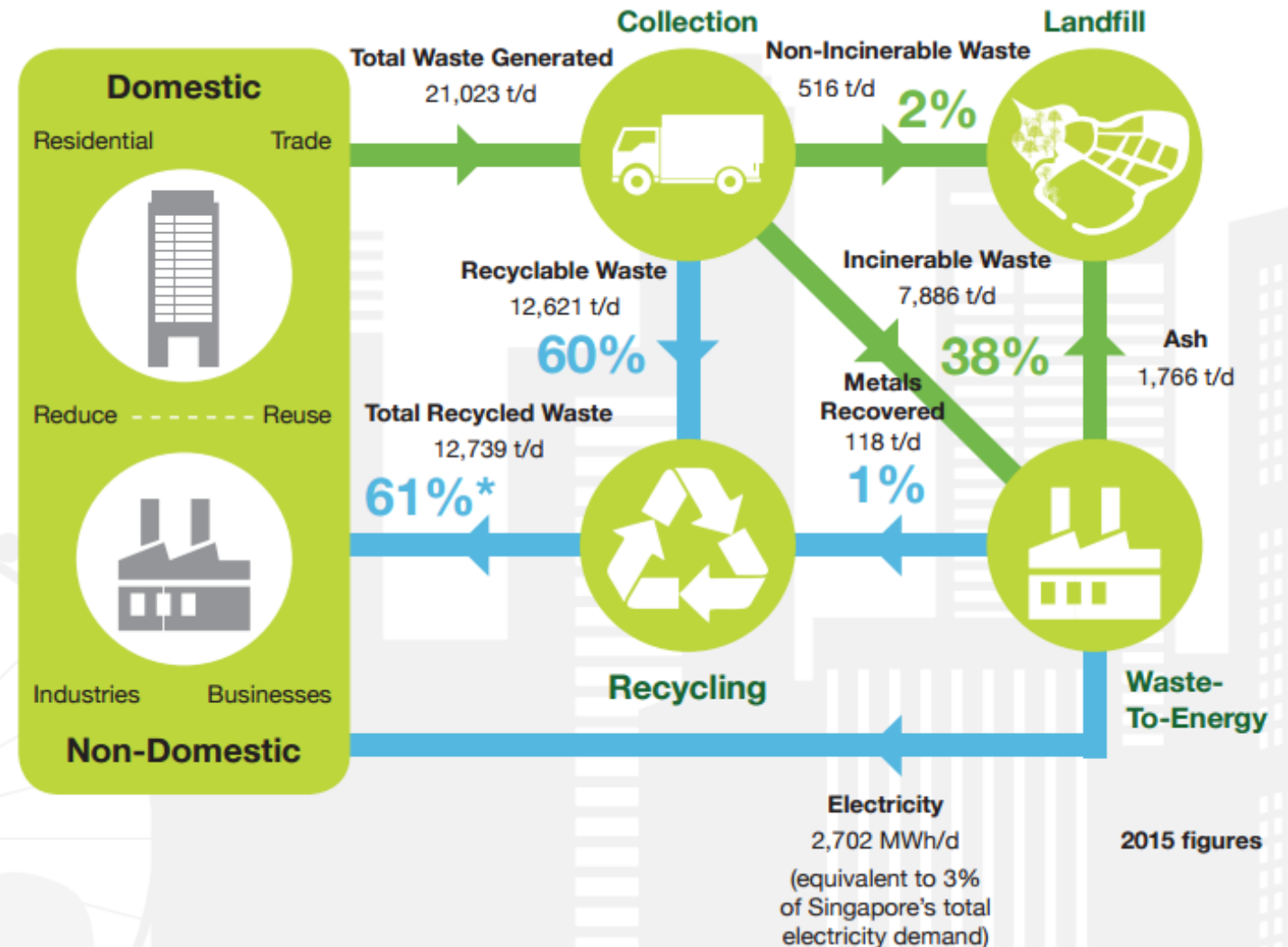
- Act provides police powers and the authority to **arrest and prosecute**
- Enforced by the National Environment Authority **very strictly**.

► **Implementation of ISWM framework**

- Waste minimization
 - Recycling
- NEA set up IES fund (SG \$ 20 million) for innovations in environmental technologies.
- Volume reduction through incineration
- Incineration (90 % volume reduction)/ WTE projects due to scarcity of land

Singapore's 3R & CE Policies for Waste Management

- ▶ 3-pronged waste strategy of Singapore has seen an increase in recycling rate from 40% in 2000 to 61% now.
- ▶ As a result, the lifespan of Semakau landfill has increased from 30 years to about 40 years, while the need for additional incineration plants has been reduced from one in every 5-7 years to one in every 7-10 years.



Case Studies on Circular Economies

- ▶ City governments around the world are taking action to enable circular economy opportunities that deliver on a range of mayoral priorities, Sustainable Development Goals, and climate objectives.

Barcelona Zero Waste Strategy-Promoting Green and Circular Behaviour among citizens

- ▶ Barcelona committed to reducing the generation of municipal waste.
- ▶ Multitude of policy interventions by the municipality to support households and organisations contributing towards this goal.
- ▶ Barcelona has set strategic targets:
 - To reduce waste generation to less than 1,2 kg per inhabitant per day;
 - To reach recycling levels of 60% of municipal waste; and
 - To reduce the polluted fraction of organic waste to below 8%.
- ▶ Financial Stimuli by the municipality supporting citizens, organisations and businesses to contribute to achieving these ambitions.
- ▶ Waste taxation reformed to encourage source separation
- ▶ Developing infrastructure for community composting for biowaste from households.

Paris Circular Economy Roadmap

- ▶ In 2015, the White Paper on the Circular Economy in Paris was published, outlining 65 action proposals for the circular economy in Paris. In its Circular Economy Plan (CEP), the city stipulates it will prioritise 10 to 15 actions every year, as such annually readjusting its circular economy strategy in response to market changes within the city.
- ▶ The 2017 - 2020 CEP sets targets for the city of Paris in relation to the French national targets. They include a zero-waste path for household waste and a 2019 deadline to sort all plastic packaging. Moreover, the municipality sets itself the ambition to run building sites that produce no waste from operations and require 100% recycled paper from public purchasing.
- ▶ In its first Roadmap, the municipality has prioritised economic support in the shape of direct financial support and infrastructural provisions. The municipality subsidises a refurbishing workshop that diverts donations (clothing, books, records, appliances and furniture) from going to landfill. The municipality also aims to further develop the service economy and eco-design by incorporating lifecycle costing and circular indicators into public procurement practices.
- ▶ In order to advance the reuse of secondary building materials, the Department of Heritage and Architecture aims to develop a warehouse that internalises the production of building materials from secondary materials into their operations. Eventually, a network of warehouses within the department will coordinate the production system and stock management will be organised with new software.
- ▶ The city employs a wide range of soft instruments to support the transition to circularity, ranging from knowledge sharing to training and education programmes. Amongst other interventions, the city organises repair cafes in school, trainings on the reuse of building materials, and organises premise sharing initiatives for organisations in the circular and social and solidarity economy.

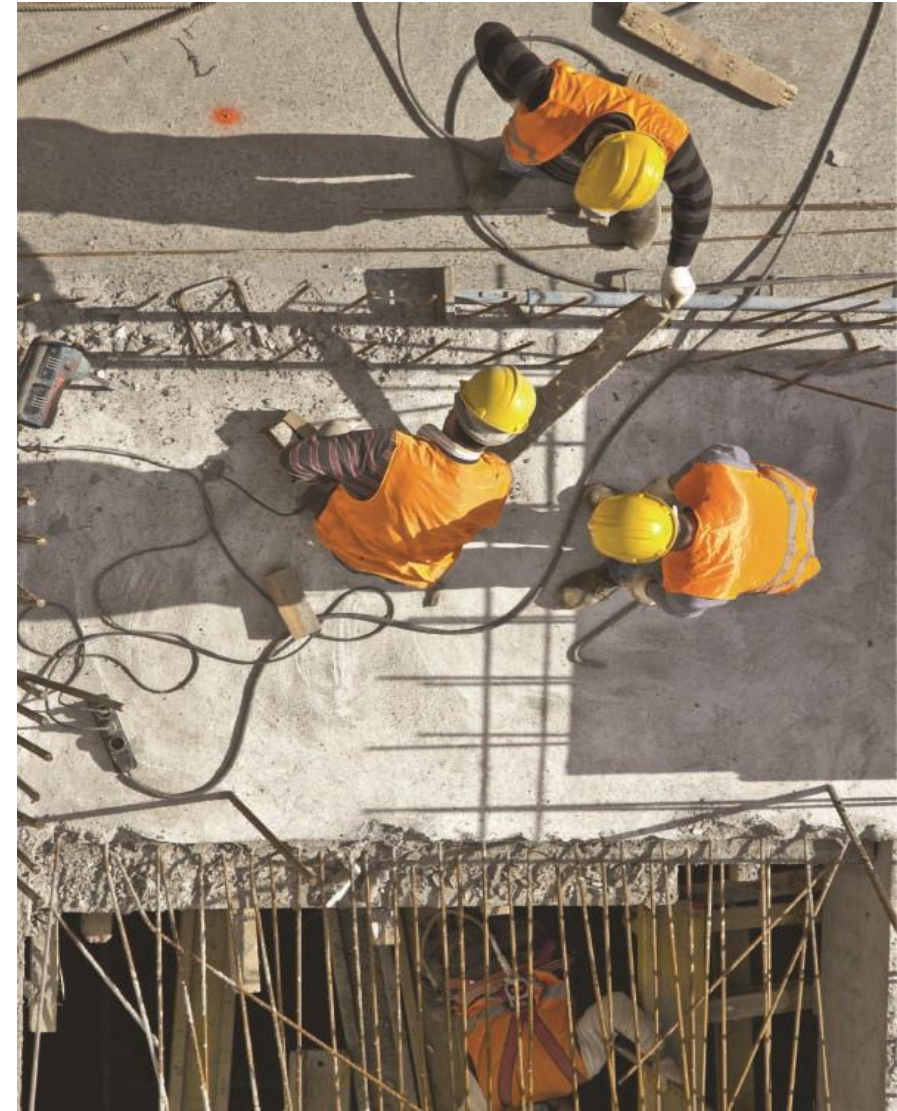
Birmingham City Council Promotes Circular Economy

- ▶ Birmingham City Council tackles its waste management that reflects the wider environmental, social and economic landscape.
- ▶ In 2016, Birmingham introduced new vision for its future waste management.
- ▶ Promote a circular economy by preventing waste generation, maximising recycling and re-use, and utilising waste as a resource in contributing to health, wellbeing and prosperity.
- ▶ The council supports businesses contributing to the diversion of waste from landfill by embedding waste prevention in its public procurement practices.
- ▶ For household waste, the city works with property developers to specify waste collection arrangements to ease separating waste for inhabitants and develops alternative collection systems for flats
- ▶ Adopts soft instruments to engage all inhabitants in a more circular economy. Awareness raising campaigns to influence purchasing habits of consumers.

Amsterdam's Initiatives of Circular Policies

- ▶ Sharing Economy Action Plan designed to enable the city, businesses and residents to reap the benefits from sharing platforms, while also identifying and mitigating unintended risks.
- ▶ The Action Plan looks into multiple activities including housing, office space and product sharing opportunities and individual and integrated sharing-mobility modes.
- ▶ With strong, refreshing designs and strategies, we strive for a future-proof living environment that runs on a circular economy.
- ▶ Amsterdam's circular policies actively support us to achieve our ambitions. We support these policies by spreading our circular impact in our field of work.

Karin Dorrepaal & Saskia Oranje, Founders, DOOR architecten



The county of Brandenburg, Germany's circular economy policy supports Bio-lutions research centre

- ▶ A strong circular economy vision makes a city highly attractive for Bio-lutions for expansion.
- ▶ It's a win-win: Municipal support facilitates company's operations.
- ▶ Bio-lutions able to contribute to the local labour market and enrich the regional market with locally produced, alternative packaging and products.

Eduardo Gordillo, CEO, Bio-lutions



Reducing Food Waste: Pagachey collaborating with local governments

- ▶ As the urgency to combat food waste is increasingly recognized in the political sphere, Pagachey, an online platform against food waste welcomes the support from local policy makers translating these intentions into concrete support.
- ▶ Local governments and Pagachey plan to collaborate effectively to reduce food waste and benefit all citizens.

Laurent Coste, Founder, Pagachey



Circular Economy in Cities



Amsterdam: the sharing economy action plan

Shaping a sharing economy that works for businesses and citizens alike



Austin: developing the materials marketplace

Creating new value and saving city and business costs



Belo Horizonte: computer reconditioning centre

Combining resource recovery, skills training, and digital inclusion

Circular Economy in Cities



**Brussels: regional programme
for circular economy**

*Collaborating to achieve
systemic change*



**Cape Town: Generating
multiple benefits for the
manufacturing industry**

*Africa's First Industrial
Symbiosis Programme*



**Glasgow: the business
community kick-starting
circular cities and regions in
Scotland**

*Adopting circular economy
practices to create thriving
cities and economies*

Circular Economy in Cities



**London: Advance London
circular economy SME
business support programme**
*Stimulating and scaling circular
breakthroughs*



**New York City: The #WearNext
campaign**
City and industry in
collaboration to save clothes
from landfill



**Peterborough: developing a
measurement framework for
the city and local businesses**
*Tracking progress on a journey
to full circularity by 2050*

Circular Economy in Cities



San Francisco: Cradle to Cradle carpets for city buildings

Laying the groundwork for circular procurement



Shenzhen: switching to an electric mobility system in the city

Developing electric mobility in the public bus system and beyond



Toronto: circular economy procurement implementation plan and framework

Creating systemic change through public purchasing power

Some Takeaways

- ▶ Cities and metropolitan areas are globally acknowledged as ‘engines of growth’.
- ▶ Local governments have a role to strengthen their local economy, invest in local economic development to foster technological innovation and support the green and circular economy,
- ▶ Circular Economy related regulations help creating an enabling policy landscape. Favorable regulatory frameworks play an important role in enabling Circular Economy across industries. Sector-specific rules can help catalyze circular business models.
- ▶ Introduction of different measures by the local and state governments help driving sustainable consumption of resources.
- ▶ Various strategic approaches by local governments of many different cities have helped mainstreaming the circular economy.
- ▶ Promotion of circular economy and a zero-emission society necessitates a global change of consumption and production patterns that go well beyond climate action alone. A full ecological transition needs to be led and owned by the communities if we want it to succeed.
- ▶ Local governments are key actors when it comes to support and incubate micro, small and medium-sized enterprises and promote green and circular economy.

Thank you for your attention!