



World Habitat Day 7 October 2019

***Frontier Technologies as an innovative tool
to transform waste to wealth***



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Challenges

- **The world's cities produce 7 – 10 billion tonnes of waste every year**
 - **2 billion tonnes of this is municipal solid waste**
- **Municipalities in low-income countries spend a fifth of budgets on solid waste management and < 3 % on sanitation**
 - **solid waste collection reaches less than half of cities dwellers in low-income countries**
 - **16 % of urban dwellers lack access to basic sanitation services**
- **Globally,**
 - **1/3 of generated solid waste is still openly dumped,**
 - **1/5 goes to material recovery, i.e. recycling and composting,**
 - **80 % of wastewater is discharged untreated into waterways**
- **Lack of adequate waste management leads to air, soil and water pollution**
 - **plastics entering the sea kill 100,000 marine animals every year**
 - **economic effects on tourism, fisheries and healthcare: \$375 per tonne of solid waste**
 - **every 30 seconds a person dies due to diseases caused by mismanaged waste**

Challenges



2 billion t
MSW/year

7 – 10 billion tonnes
of urban waste/year

100,000
dead marine animals/year

MSW collection
in low-income
countries

< 50 %



80 %
of wastewater
discharged
untreated

16 %



no access to
basic sanitation

Only **1/5**
material
recovery

1/3
openly dumped

every



30 seconds
a person dies due to
mismanaged waste


Economic loss



375 \$/t

Share GHG-emissions

5 %



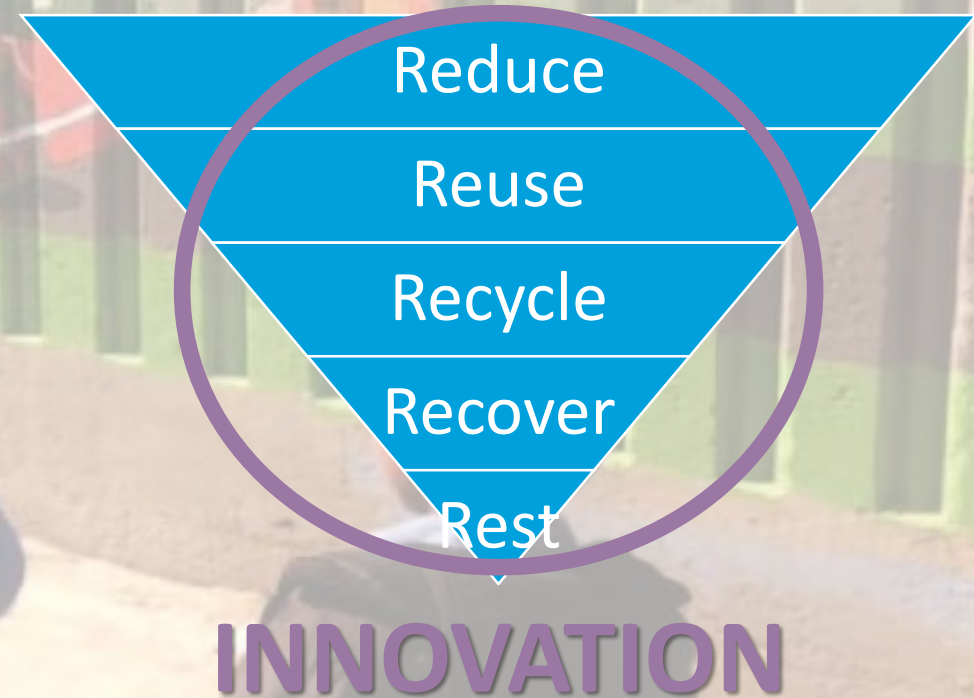
Opportunities

- **By Rethinking, Refusing, Reducing, Reusing and Recycling** waste (the “5Rs”), cities can create employment, promote economic growth, improve health and environment leading to happier, greener and healthier cities and saving money
- **Water**
 - wastewater is an affordable, sustainable source of water, energy, nutrients and other recoverable materials
 - wastewater reuse for food production can off-set costs of synthetic fertilizer
- **Cities can be pioneers in combating climate change**
 - energy savings through recycling are up to 95 % compared to new materials
 - 5 % of greenhouse gas emissions from humans are due to waste management
 - mitigation potential by using sustainable waste management including **5Rs** is 15-20 % of worldwide anthropogenic greenhouse gas emissions

Opportunities – frontier technologies

have the potential to improve how people see, work and live with waste

- drastically change the way waste is produced and disposed
- new materials can significantly reduce adverse environmental impact
- gather accurate data on the waste flows in cities
- significantly improve efficiency in manufacturing and reduce waste



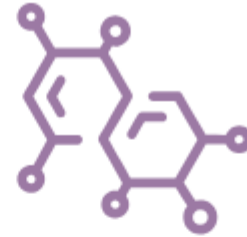
Frontier technologies



Big data analysis:
provides real-time streams of information through analyzing sets of huge amounts of data, while facilitating segmentation and targeting within that dataset.



The Internet of Things:
the extension of Internet connectivity to physical devices and everyday objects, thus enabling enhanced monitoring and management.



Sustainable polymers:
plastic materials that address the needs of consumers without damaging the environment, health and economy.



Artificial Intelligence:
includes machine learning, automation, problem solving and logical reasoning that could transform production processes and business.



3D printing:
produces objects through a simple process of layering and allows faster and cheaper low-volume production and prototyping of complex products and components.



Nanotechnology:
manufacture and use of materials at an infinitesimal scale, which behave differently than their larger counterparts.



Renewable energy technologies:
including wind, bio and solar energy technologies that have the potential to substantially reduce carbon emissions in energy production.



Drones & small customized satellites:
Other innovative approaches, such as new business models, product-service-systems.

Opportunities - Sustainable Development Goals



- **Improved sustainable waste management contributes to**
 - **by improving access to basic services (SDG 1)**
 - **by reducing food waste (SDG 2)**
 - **by enhancing public health and well-being (SDG 3)**
 - **by eliminating dumping (SDG 6)**
 - **by generating locally available renewable energy (SDG 7)**
 - **by providing green jobs (SDG 8)**
 - **by contributing to resource-efficiency and sustainable infrastructure (SDG 9)**
 - **by decreasing the adverse environmental impact of cities (SDG 11)**
 - **by increasing sustainable consumption (SDG 12)**
 - **by mitigating greenhouse gas emissions (SDG 13)**
 - **by decreasing marine litter pollution (SDG 14)**
 - **by protecting terrestrial and inland freshwater ecosystems (SDG 15)**
 - **by building partnerships (SDG 17)**



Key Messages, especially to local governments



- **Support the collection of data on sources and sinks of waste in your city.**
- **Commit to integrated sustainable waste management and join the Waste Wise Cities Campaign.**
- **Apply inclusive frontier technologies and innovative approaches to turn waste into wealth while reducing environmental and health problems.**
- **Engage with and support bottom-up approaches that enable communities, youth, women and disabled people to become innovators in the circular economy and the use of technologies in waste management.**



Key Messages, to everyone



- **Rethink waste** - change your mindset and acknowledge waste as a valuable resource.
- **Create and implement a legislative environment that envisions a circular economy.**
- **Research new frontier technologies that have the potential to substantially improve existing waste management.**
- **Invest in alternative solutions to reach a circular economy through innovative partnerships**



Thank You



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