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***It is simple. Less hazardous waste means safer and healthier people, and a cleaner environment.***

# Capital Cities Collaborating on Common Challenges in Hazardous Waste Management Yerevan, Warsaw, Tirana



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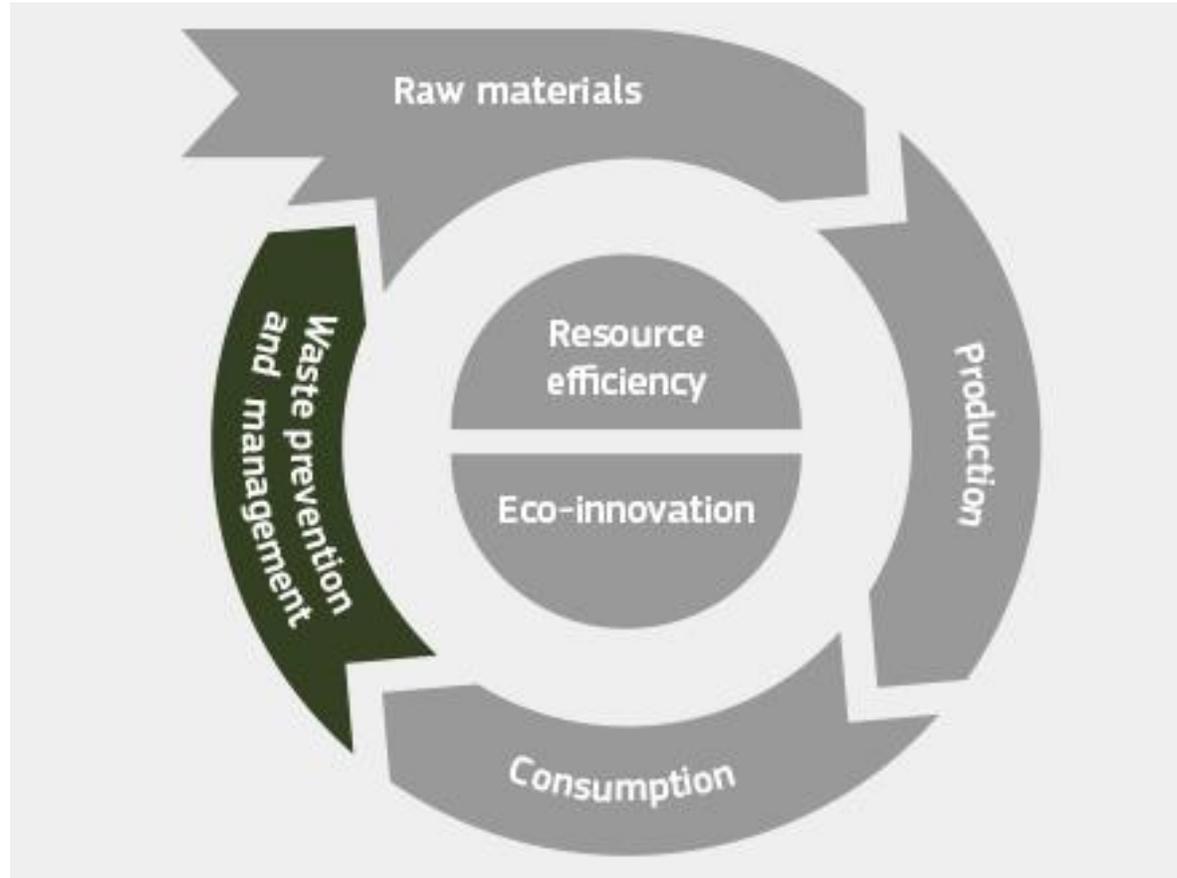


## Establishing common paradigm for waste prevention and management - 5Rs concept explained

Yerevan - 17.11.2021, Tirana – 01.12.2021, Warsaw – 08.12.2021  
International Conference “Towards cleaner and greener cities’

Robert Girejko, Team Leader

# New paradigm on waste – prevention first



[https://ec.europa.eu/environment/green-growth/waste-prevention-and-management/index\\_en.htm](https://ec.europa.eu/environment/green-growth/waste-prevention-and-management/index_en.htm)

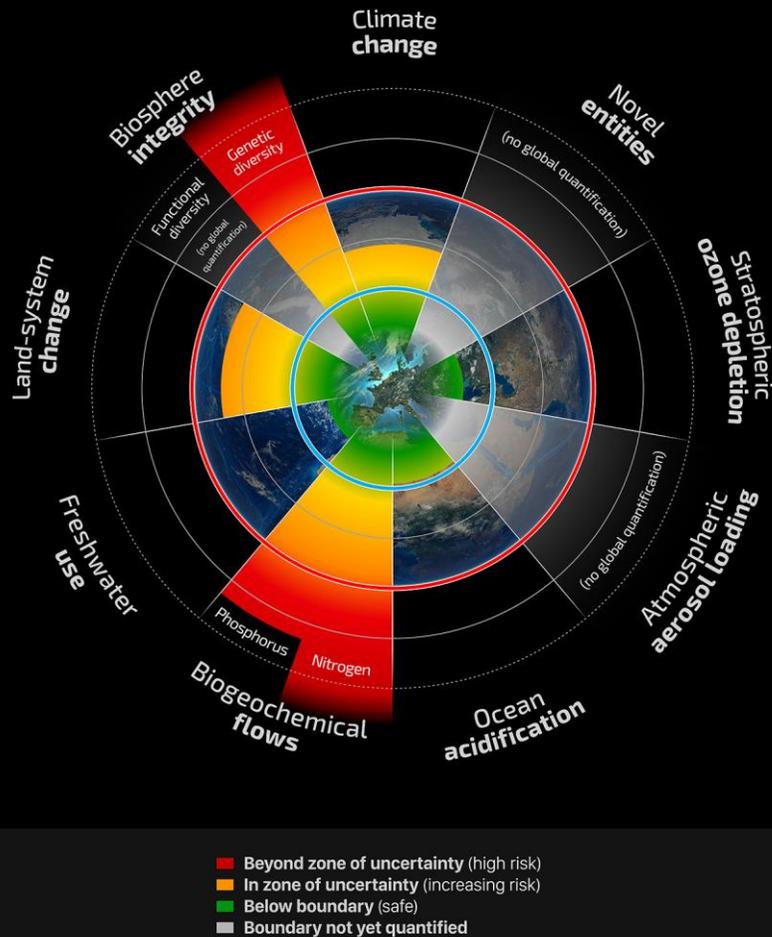
## The waste hierarchy



# Why must we change our thinking about waste?

## Planetary Boundaries

A safe operating space for humanity



- **There are limits to our planet resources**
- **New solutions generate new problems**
- **Production generates waste and waste is always a challenge or a hazard**

Climate change and air pollution → Electric cars → Lithium-ion batteries BUT ← Emissions from manufacturing these batteries are equivalent to driving a traditional car for about 7 years...

[https://www.transportenvironment.org/wp-content/uploads/2021/07/2019\\_11\\_Analysis\\_CO2\\_footprint\\_lithium-ion\\_batteries.pdf](https://www.transportenvironment.org/wp-content/uploads/2021/07/2019_11_Analysis_CO2_footprint_lithium-ion_batteries.pdf)

*Electric batteries can contain toxic chemicals, including lithium, cadmium, sulfuric acid and lead. If disposed of improperly, these toxic chemicals can leach into the soil and contaminate the groundwater.*

Electric vehicle sales have exploded in recent years. [...] By 2030, 11 million metric tons of Li-ion batteries are expected to reach the end of their service lives. Thus, Li-ion battery recycling is an issue that will take on much greater importance in coming years.

<https://www.forbes.com/sites/rrapier/2020/01/19/environmental-implications-of-lead-acid-and-lithium-ion-batteries/?sh=3fb76ec77bf5>

# 5Rs by us (Refuse, Reuse, Recycle, Recover, Residual waste management)



**Refusal** means **avoiding** unnecessary production and consumption, and minimising the use of resources when avoidance is impossible. Societies always require certain resources but the key is to arrange social and economic processes to achieve a situation of **'zero waste'** which is the core expression of the **'circular economy'**. Refusal requires rethinking and changing behaviours of producers and consumers, redesigning products, processes and packaging. This is done by finding ways to be productive and satisfied without certain products or with their minimal volumes, also by switching to products which last longer, are repairable, reusable, etc.

**No product, no waste, no problem!**

*New „refuse“ economy?*

*Degrowth aims to reshape society away from its current trends of environmental damage, alienation and inequality towards a society which promotes harmony, respect for environment and extension of local democracy. Examples of practical actions:*

- Individuals switching to a less materialistic life*
- Prohibiting planned obsolescence of products (no new mobile phone every 2 or 3 years)*
- Switching to public transport or no-emissions transport*
- Suppressing advertising in public space*
- Switching to organic food*
- Making use of empty houses, not building new*

*Questions and limitations: developing nations, changing attitudes at the core.*

<https://www.economicshelp.org/blog/164203/economics/degrowth/>

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**Reuse** is not as effective in waste prevention but actually it prevents more new products and materials being produced and consumed, at least partially. If the lifetime (original use) of a product or component is extended or a new life (new use) is invented, during this time no new products or components are needed as replacements. Reusable products (potential waste) can be exchanged, traded, repaired or upgraded, and again exchanged or traded.

**One person's trash is another person's treasure!**

***Reuse activities are higher on the waste hierarchy than recycling and can also create more jobs*** compared to other waste treatment options, including jobs for disadvantaged groups.

*RREUSE, the European Network of social enterprises in reuse, repair and recycling, estimates that preparing for re-use of just 1% of municipal waste generated in Europe could help support 200,000 local green and inclusive jobs.*

<https://www.interregeurope.eu/policylearning/news/9842/reuse-and-repair-centres-moving-out-from-the-shadow-of-recycling/>



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**Recycling** is conducted by: 1/collecting (and normally sorting) recyclable waste – at the source (households), at drop-off centres, collection (public amenity) centres, also by deposit and refund programmes, followed by further sorting, cleaning and processing into materials which can be used in manufacturing; 2/manufacturing from or with recycled content; 3/use of new materials made from or with recycled content. Recycling means using the same material multiple times to produce the same (recycled) material. Biological treatment (composting and anaerobic digestion) may be classified as recycling.

**Recycling means little effort and a big difference to our world!**

*Less than 50% of waste in the EU is recycled. **The new rules will make all Member States top performers in recycling:***

- By 2030, at least 70% of all packaging waste in each EU country should be recycled.*
- By 2035, all EU countries should recycle at least 65% and landfill less than 10% of municipal waste.*

*There are also recycling targets for specific packaging materials:*

- + Paper and cardboard: 85%*
- + Ferrous metals: 80%*
- + Aluminium: 60%*
- + Glass: 75%*
- + Plastic: 55%*
- + Wood: 30%*

<https://op.europa.eu/en/publication-detail/-/publication/2d986694-736a-11e8-9483-01aa75ed71a1>

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**Extraction of materials, chemical and energy recovery** are considered the main ways of recovery. This is the last step before waste disposal, which is important to the environment and can be economically viable by reducing the needs for landfills and preventing unlimited use of natural resources. Waste recovery examples include transformation of sludges into organic fertilizers, clays and sawdust into cat litter, making valuable materials from used batteries, and energy recovery (e.g. biogas production from anaerobic digestion of biodegradable waste). Note: Incineration is unacceptable under the zero waste approach.

**What is considered waste can be a useful resource!**

*A smartphone might contain up to 50 different metals. This makes it lightweight, and its small size user-friendly. Critical raw materials (CRMs) are irreplaceable in solar panels, wind turbines, electric vehicles and energy-efficient lighting. Hence, they are also relevant for fighting climate change.*

*Material produced from battery recycling, cobalt, for example, can be used for the battery industry or steel and other industries depending on the quality of the recycled material.*

<https://cordis.europa.eu/article/id/123696-how-to-improve-recovery-of-electrical-and-electronic-equipment-waste>



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**Residual waste**, especially hazardous waste, needs to be solidified and stabilised involving specialised additives or reagents to reduce solubility or mobility of contaminants into the environment. Chemical, physical and thermal processes might be used to detoxify hazardous waste. After a landfill is closed, it should be **restored**, normally by capping the landfill with composted green waste to improve soil structure and water retention, allowing and enhancing the succession of vegetation.

**Do not let the landfills grow!**

*Landfill mining to develop the area in housing area is very suitable in regions where there is high land pressure and the land value can be potentially high. As the landfill mining project also allows reuse of materials, it also generates some revenues and reduces the costs for primary materials. It contributes to a Circular Economy and reduces CO<sub>2</sub> emissions.*

<https://www.interregeurope.eu/policylearning/good-practices/item/2292/landfill-mining-to-develop-the-area-in-housing-area-in-veenendaal/>



# 5Rs by us (Refuse, Reuse, Recycle, Recover, Residual waste management)

From the policy perspective, the 5Rs concept helps understand how to best prevent and manage waste. Given the limited resources and the environmental balances, better policies and practices have to be developed, including those at the municipal level.

From the societal perspective, understanding the complex issues behind production and consumption, and the impacts of individual and group behaviours on the environment (and consequently on humans), need to be better understood and greater damage prevented.

**Time for 5Rs is now!**

*What can I do  
to improve on  
my 5Rs?*



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***Thank you***