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5Rs Concept Explained

5Rs Definitions	Explanations
<p>1. REFUSE</p> <p>'Refuse' stands for behaviours which prevent waste from being generated. Waste prevention is the most important, top level of the 'waste hierarchy'.</p> <p>'Refuse' is closely related to the 'zero waste' approach which aims at minimising the use of resources by responsible production and consumption, by going without a product or packaging when they are not absolutely necessary, by avoiding products and materials which cannot be reused or recycled, and which eventually generate residual waste.</p>	<p>The best way to solve the problem of waste is not to create it in the first place. Prevention is the best option, although not always available. No product, no waste, no problem!</p> <p>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. When refusal is not possible, reduction is a good option. Reuse, recycling, recovery, etc., are accepted solutions but always inferior to refusal because even repeated use or recycling have limitations (some items can be reused only a limited number of times, only certain materials can be recycled, reusing and recycling require additional resources).</p> <p>Waste hierarchy: https://ec.europa.eu/environment/green-growth/waste-prevention-and-management/index_en.htm Zero waste: https://ec.europa.eu/environment/ecoap/about-eco-innovation/good-practices/eu/20131204-zero-waste_en Circular economy: https://ec.europa.eu/environment/strategy/circular-economy-action-plan_en</p>
<p>2. REUSE</p> <p>'Reuse' means any operation by which products or components are used again for the same purpose for which they have been conceived or for another useful purpose.</p> <p>Reusing is the act of taking used items and finding extended or new uses for them. Reuse covers such behaviours as repairing, refurbishment, repurposing, remodelling, upcycling, etc.</p>	<p>When products or components are already made their original use should be extended or new uses found without intensive reprocessing, whenever environmentally and economically feasible. One person's trash is another person's treasure!</p> <p>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. Reusable packaging which is manufactured from durable materials and designed for multiple uses is an example of reuse. Many products have been traditionally repaired or refurbished, providing jobs and incomes, and making things last longer. Repurposing means changing the intended use of a product or materials to a different one, for example making furniture from used wooden pallets. Upcycling is also considered a form of repurposing by increasing value of products, e.g. by making designer bags from used car canvas or advertising banners.</p> <p>Reuse: https://www.interregeurope.eu/policylearning/news/9842/reuse-and-repair-centres-moving-out-from-the-shadow-of-recycling/</p>
<p>3. RECYCLE</p> <p>Recycling is the most environmentally friendly waste disposal method by which products and materials which cannot be used any longer are processed to create new products and materials.</p>	<p>Recycling is one of the key components of rational and environmentally sustainable waste management. It allows the conversion of 'high quality' waste, normally after sorting and reprocessing, to become useful new materials and products. Recycling means little effort and a big difference to our world!</p> <p>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</p>

<p>Recycling, by keeping resources 'in the cycle of use' reduces the consumption of new raw materials and usually allows saving energy and money by remanufacturing.</p>	<p>content. Common household items which can be recycled are paper, plastic, glass, metal - products and packaging. 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 when compost (or digestate) is used afterwards. Anaerobic digestion (producing biogas for energy purposes) is also a form of energy recovery.</p> <p>Recycling: https://ec.europa.eu/environment/topics/waste-and-recycling_en Composting: https://ec.europa.eu/environment/topics/waste-and-recycling/biodegradable-waste_en</p>
<p>4. RECOVER Recovery means any waste management operations which divert waste materials from the waste stream and which result in certain products or materials with a potential economic or ecological benefit. Waste recovery (in the strict sense) covers material, chemical and energy recovery when recycling is not viable. It is a transformation of waste elements into new (recovered) elements.</p>	<p>Resource recovery, by using mixed waste and discards from sorting processes (intended for disposal) to create building elements for new uses, takes place when recycling is impossible. What is considered waste can be a useful resource!</p> <p>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).</p> <p>Note: Incineration is unacceptable under the zero waste approach as it does not allow recovery of valuable material resources.</p> <p>Recovery of waste of electrical and electronic equipment (WEEE): https://cordis.europa.eu/article/id/123696-how-to-improve-recovery-of-electrical-and-electronic-equipment-waste</p>
<p>5. RESIDUAL WASTE MANAGEMENT Residual waste management means taking care of waste which cannot be recovered any further. Residual waste should be safely deposited. Landfills should be restored after their closure.</p>	<p>Residual waste must be safely landfilled under appropriate sanitary conditions, stabilised and prevented from contaminating the surrounding environment. When the capacity of a landfill is reached, restoration and renaturalisation activities are undertaken to 'return' waste to the nature. All these activities are very costly. Do not let the landfills grow!</p> <p>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.</p> <p>Examples and studies of restoration of landfills: the Netherlands https://www.interregeurope.eu/policylearning/good-practices/item/2292/landfill-mining-to-develop-the-area-in-housing-area-in-veenendaal/; Italy https://journals.sagepub.com/doi/10.1177/0734242X14545372, Canada https://digital.detritusjournal.com/articles/frederic-back-park-montreal-canada-how-40-million-tonnes-of-solid-waste-support-a-public-park/331</p>
<p>UNACCEPTABLE SOLUTIONS <i>Options that don't allow full material recovery, have high environmental impact or create effects which threaten the transition to zero waste, should not be accepted.</i></p>	<p>Examples of unacceptable solutions: littering and illegal dumping, landfilling of non-stabilised waste, open burning, waste to energy incineration, co-incineration, plastic to fuel conversion, gasification, pyrolysis.</p> <p><i>Gasification is a process that transforms a carbon-based material, such as municipal solid waste or biomass, into other forms of energy without burning it. Gasification converts the solid and liquid waste into a gas through a chemical reaction. Pyrolysis is the heating of organic materials, such as biomass, in the absence of oxygen. Because no oxygen is present the material does not combust but the chemical compounds (i.e. cellulose, hemicellulose and lignin) decompose thermally into combustible gases and charcoal.</i></p>

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