

# Keep It Clean Plan



# Foreword

Let's Do It is an international movement with a vision of a clean, healthy and waste-free world. Since 2008, millions of people in more than 150 countries have joined the campaign, participated in cleanups, picking up trash and making our world cleaner. World Cleanup Day on the 15th of September 2018 is one of the most significant civic actions in the world to stand against the waste problem. It's like a rebellion against trash, showing people's desire for change.

However, what's next? Cleanups are a key to raise awareness of the global waste problem, fight trash blindness and mobilise people, media and institutions, getting them together for united efforts around the global issue of trash. Is it enough? No, unfortunately. Cleanups are just the beginning to solve the global waste problem. To keep our planet clean and waste-free, we need a fundamental change and cooperation between different sectors of societies.

With the Keep It Clean Plan we aim to provide people, communities, organisations and governments with an action plan, how we can keep our planet waste-free after World Cleanup Day, complementing each other's efforts and actions.

We need to turn linear models into circular ones, hence maximising reuse, repair, refurbishment, recycling, composting, and whatever keeps the value of materials. We not only have to minimise the need for disposal but also reduce the demand for new primary raw materials, making production and consumption patterns and lifestyles sustainable. The Keep It Clean Plan, therefore, aims that one day the word "waste" is something from the embarrassing time when we couldn't sustainably use our resources.

In the Keep It Clean Plan, you'll find a global vision, and operational examples to act locally. There are short-term actions and long-term ones, and activities to be considered and taken at various levels of responsibility.

Read through the Plan to find what you may start doing personally, what you may discuss with your community, what you may consider and propose to your governments to consolidate a general strategy which reinforces and supplements the importance of individual actions in daily life. You'll also find references to great sites and local initiatives, that may inspire you, or supplement info and details.

The Keep It Clean Plan helps you stay ambitious, and improve local and global management of waste step by step, in a great shared effort to help build and consolidate the sense of community around one fundamental problem of today.

We hope that you enjoy reading and putting this material into practice. Together we will make our world clean again!

Have fun!



**Eva Truuverk**  
CEO of Let's Do It Foundation

A handwritten signature in black ink, appearing to read 'Eva'.



**Anneli Ohvril**  
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**We gratefully acknowledge all partner NGOs and individuals who contributed with inputs and comments, to help us refine and optimise this document. In particular, we'd like to thank the following partners for their valuable support:**

Piotr Barczak, European Environmental Bureau  
Zoe Lenkiewicz, WasteAid UK  
Joan Marc Simon, Esra Tat, Zero Waste Europe  
Richard Anthony, Zero Waste International Alliance  
Charles Moore, Albatross Coalition  
Pål Mårtensson, mentor, Let's Do It! World  
Meadhbh Bolger, Friends of the Earth Europe  
Roman Peter, Trash Hero  
Jean-Benoît Bel, Maëva Voltz, Association of Cities and Regions for Recycling  
Olly Jamieson, EUNOMIA  
Antonis Mavropoulos, D-Waste

**Special thanks to Peg Oetjen** who helped with editing and made the document more pleasant to read!

This document, related parts or excerpts may be used as such or quoting the source:  
Knowledge Team, Let's Do It! Foundation: Keep It Clean Plan, 2018



**Disclaimer:**

*The information in this document is provided in good faith and written as an indicative guide to the processes and activities referred to, based on knowledge of general and shared understandings and supplied by active practitioners. It should be taken as general guidelines which need to be adopted in every country taking into consideration the current and specific situation in each country regarding waste handling, awareness, legislation, infrastructure etc. Let's Do It Foundation cannot be held liable for the use of and reliance on the suggestions and findings in these documents. Let's Do It Foundation does not accept any legal responsibility for any errors, omissions or misleading statements, or for any injury or loss resulting from the use of or reliance upon the processes outlined in this document.*

# Table of Contents

▶ Glossary	4
▶ Keep It Clean Roadmap	5
▶ I. Putting our Goals in Context: Managing Waste Sustainably to Preserve Resources	7
• Global trends and the elements of the resource scarcity crisis	7
• What is a Circular Economy?	8
• Why keep resources in the loop? Key benefits	10
▶ II. From Vision to Practice – the Operating Principles	12
• Planning the steps to preserve resources	12
• The “Zero Waste” approach	13
• The importance of the top-down approach: embedding ZW principles in waste policy	15
▶ III. From Vision to Practice – Implementing Local ZW Schemes	16
• Waste prevention/reduction initiatives	16
• The pivotal role of kerb/curbside collection and the “Priority Materials”	17
• Make your plan to tackle organics	18
• Financial incentives	19
• Reuse and repair centres as a way to grade stuff up	19
• The last step to create the loop: residual waste audits and generating feedbacks	20
▶ Annex I: A Strategy to Tackle the Plastics Tide	21
• Facts & figures: the size of the global issue	21
• How to address the issue? Tools to minimise the plastic flood and to maximise circularity in the plastic sector	22
• Tackling single use plastics to avoid avoidable plastics	23
▶ Annex II: Starting from Scratch - Building up Waste Management	25
• Dumps, landfills and sanitary landfills	26
▶ In Brief: the Do’s and Don’ts	30
▶ Endnotes	30
▶ Hyperlinks	32



# Glossary

Key terms used in the document (unless described in dedicated sections):

- ▶ **Kerbside (UK)/curbside (US) schemes**, door-to-door collection of waste - a waste collection service provided to households, typically in urban and suburban areas where waste is left right outside each property (“at the kerb/curb”) in a container and picked up by a passing vehicle.
- ▶ **Extended Producer Responsibility (EPR)** - an environmental protection strategy to decrease the total environmental impact from a product, by making the manufacturer responsible for the entire life-cycle of the product and especially for funding the take-back, recycling and final disposal. E.g. producer of mobile phones has to fund the system of collecting and recycling of old telephones.
- ▶ **Deposit-Refunding Scheme (DRS)** - a scheme where an item is sold at a price which includes a deposit, whose amount gets returned to the customer once it’s taken back to the same shop, or another aligned shop. A typical DRS example covers packaging (e.g. bottles, cans) and helps to achieve very high take-back rates, thus maximising reuse and recycling, and minimising littering the environment.
- ▶ **Residuals / residual waste** - waste which has not been reused, or separately collected for recycling and composting, thus requires final disposal.
- ▶ **Waste audit** - an inventory of the amount and type of solid waste that is produced at a specific location (e.g. home, office, company) or an assessment of the composition of the municipal waste produced by a community. Waste audits provide valuable info to help understand what materials are worth taking action on.
- ▶ **Hard-to-recycle plastics** - usually low-value, mixed plastic materials (crisp packets, sachets), which are usually not worth the cost of separation from the larger plastic mass. Some processes, e.g. extrusion, may help recycle them into new mixed aggregates which can be used for various purposes.
- ▶ **Plastic extrusion** – a remanufacturing process in which raw plastics, also made of various polymers, are melted and formed into flakes (which can be processed into floorings, pots, benches, etc.) or directly into final objects, like pipes and tubes.



# Keep It Clean Roadmap

Our ecosystems are being ravaged by waste and pollution. We must keep our beaches, woods, seas, rivers, countrysides and city streets clean – only then can our environment once again regain its health and beauty.

To do this, we need a systemic shift in our approach to resources – drastically reducing the amount of waste created, and preserving all resources at their highest quality by reusing what we can, and recycling or composting everything else.

We also need a collective consensus on creating a healthy waste-free environment for all. We must shift our perspectives, and treat all waste as a precious resource - just like nature does. It's only waste when it's wasted.

## But how to create a world without waste?

This will require a collective effort from all levels of society – revising our policies, planning, decision-making, supply and packaging of goods, and business models, while simultaneously transforming public attitudes and behaviours across all generations.

### GOVERNMENTS (local & national)

#### Immediate actions

**PLAN AND MEASURE.** Make or renew your waste management (WM) strategy, and set goals, priorities, and deadlines. For example a National WM Act, National WM Plan, or local WM programme.

Prioritise waste reduction. Set targets for the amount of waste produced, ban unnecessary items like many single-use plastics, and redesign products to be durable, repairable, and re-usable.

Outline how to better manage any waste produced. E.g. by making separate collections of different waste types compulsory, and ensuring recycling takes place as close as possible to where the waste is produced.

**RESPONSIBILITIES.** Define roles and responsibilities of local governments and companies. E.g., introduce Extended Producer Responsibility (EPR) schemes for industry and businesses to fund separate collections and recycling, and define whether recycling targets must be met at regional or municipal level.

#### Long-term actions

**BRING IN RULES.** Once you have a strategy, support this with regulations defining permitting powers and procedures, waste accounting procedures, monitoring programmes, etc.

**MONEY.** Make sure goals set in the plan have funding, e.g. for prevention measures, awareness raising, reuse activities, waste collection infrastructure, incentives for local businesses to become less wasteful or for people to implement local recycling and composting activities. The economic benefits of better management of resources, reduced collection and disposal costs, jobs created in the new system will pay off!

**CONSEQUENCES.** Plan in enforcement and policing - what will you do if local authorities do not meet the targets? What will the penalties be for littering?

**SUPPORT THE FLOW.** Support the development of markets for recycled

materials, e.g. promote Green Public Procurement, and give priority to recycled products.

**NURTURE.** Trust the creativity of businesses, and create a favourable environment that nurtures waste-savvy innovations.

**RETHINKING THE CYCLE.** Promote Extended Producer Responsibility (EPR) as a way to finance better management of waste items like packaging and electricals, and to support redesign of products by industries, in order to minimise the use of hard to-recycle materials. Promote Deposit-Refund Systems (DRS) as the best way to ensure materials are preserved!

**KNOWLEDGE.** Support lifelong learning and research to build knowledge and skills for resource use and waste management.

## BUSINESSES

### Immediate actions

**RETHINK.** Recognise waste as a resource, and an opportunity to increase profitability – recycling and composting reduces disposal costs, and triggers new business opportunities.

**EDUCATE.** Teach the customer – is your product recyclable? How and where should it be disposed of?

**BE A PIONEER.** Deposit schemes (e.g. putting a small deposit on drinks containers to ensure take-back) can be launched even if no national scheme is in place.

**WRAP IT SMART.** Always opt for less packaging, smarter packaging, and

reusable packaging. The same goes for products!

**STAY SAFE.** Compost can only be used in agriculture if not polluted by other waste. Recycling may require specific safeguards for workers. Some plastics include harmful substances, making them unsuitable e.g. for food packaging or toys.

**THE AFTERLIFE.** What will happen to your product after use? Recyclable packaging in an area with no recycling collections may end up as litter. If compostable plastics end up in landfill they emit methane as they biodegrade.

### Long-term actions

**INSPIRE OTHERS.** Create new markets based around innovative, reusable or resource-savvy products.

**RETHINK BUSINESS MODELS.** 'Do more with less' – e.g. create lending services, selling the use of an item, not the item itself.

**RETHINK RESOURCES.** Use recycled materials rather than virgin resources – the possibilities for recycled glass, plastics, paper and metals are huge. Composted organics are a great replacement for peat or mineral fertilisers.

**"If it can't be reused, recycled, composted or redesigned, then industry shouldn't be producing it."**  
Paul Connett, one of the founders of the zero waste movement

## CIVIL SOCIETY

### Immediate actions

**TEACH NEW HABITS.** Raise awareness and change attitudes, especially among young people – "reuse is cool"! Find one great example at: [www.bit.ly/2MSxu3Z](http://www.bit.ly/2MSxu3Z).

**HIGHLIGHT.** Point out wasteful design flaws in goods, and run waste audits

to encourage re-design and green purchasing.

**ACT LOCAL.** Create, support and connect with local solutions in your community. See an inspiring example at: [www.bit.ly/2wp4ars](http://www.bit.ly/2wp4ars).

### Long-term actions

**EDUCATE.** Promote permanent education and research with resource management at the core.

**PRAISE.** Highlight best practice – either your own or others', e.g. national awards for areas recycling the most, or wasting the least. Acknowledge governments' and businesses' efforts.

**GUARD.** Make sure governments and businesses hold their promises.

**COOPERATION.** Work with local municipalities to achieve goals.

## INDIVIDUALS

### Immediate actions

**REFUSE.** Avoid single use items.

**REDUCE.** Only buy things if strictly needed, and choose less packaging.

**REUSE.** Buy second-hand items, or if new – choose products built to last.

**RECYCLE.** Recycle what you can, and choose products made from recycled materials.

**KNOW YOUR HOOD.** Find out what recycling and reuse options are near you.

**COMPOST.** Find a way to compost your organic waste.

**LET YOUR MONEY TALK.** Vote with your wallet – buy less wasteful products, and demand more of them from producers!

**ASSESS.** Do a personal waste audit, to see where to improve.

**SPREAD IT!** Spread good ideas, and involve family and friends.

### Long-term actions

**BORROW.** Create informal networks to lend out items.

**BE A LEADER.** No way to recycle? Consider starting a small recycling business yourself.

**STAY SMART.** Educate yourself about the issues and solutions.



# I. Putting our Goals into Context: Managing Waste Sustainably to Preserve Resources

## Global trends and the elements of the resource scarcity crisis

**Our vision is a clean and healthy world, and our main aim is to preserve resources.** Saving post-use materials from littering, landfilling and incineration not only means sustainable management of waste, but also saves resources, makes them available for reuse and recycling, and decreases the need for new primary raw materials to be extracted.

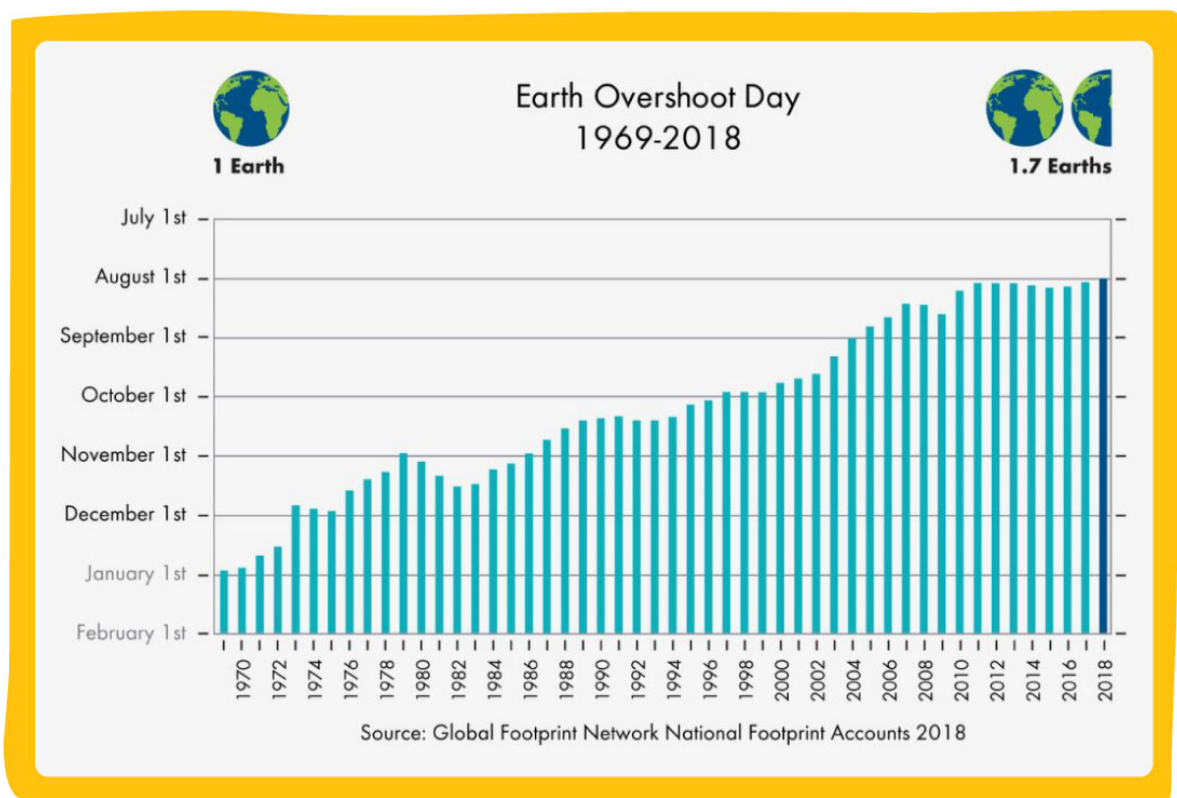
In the global picture, this is becoming a fundamental need. Mankind is currently consuming more resources than what the planet creates, which is destroying the ecosystems that support us, putting the needs of our future generations at risk.

The “ecological debt” of our consumption patterns is expressed through the “**Earth Overshoot Day**”<sup>1</sup>. It is a date calculated every year, on which humanity as a whole has consumed more from nature than our planet can renew, and exceeds the so-called ecological budget for the year.

Until 1970 this day was after Dec 31st, meaning that humanity didn’t consume more than Earth could regenerate, but in the last few decades the day has arrived sooner and sooner. In 2018 it was on Aug 1st – for the rest of the year we will be consuming more than we can repay; we’d need approximately 1,7 planets to meet our needs.

### Our words matter

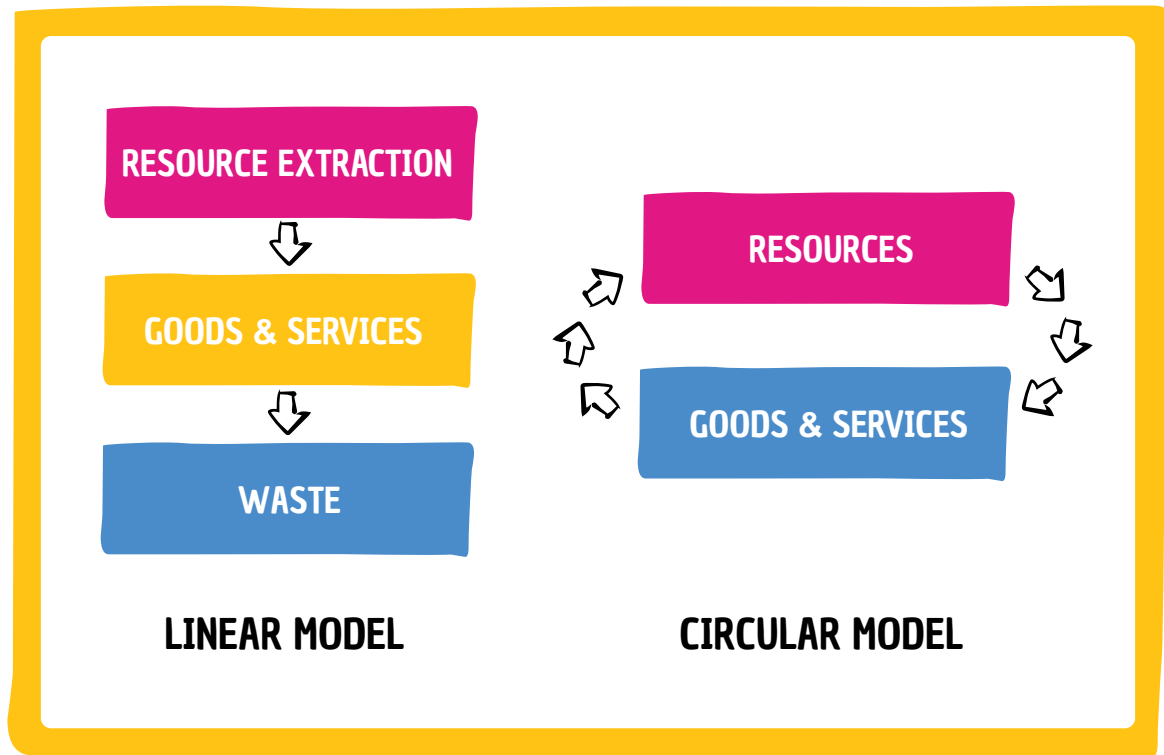
It’s only waste when it’s wasted. We want to stress the value of materials we throw away and call waste. That’s why instead of “waste” we also use words like “post-use materials”, “discards” and “resources”.





One of the reasons for overconsumption is our *linear economy* model: it is the “take, make, waste” approach. It’s not just the waste problem (littering, impacts related to landfilling and incineration) - we keep needing more new primary raw materials (oil, wood, metals, rare earth elements, etc).

The less waste we produce and the more we reuse and recycle, the fewer new resources we need to extract from nature. Good waste management becomes, first and foremost, a way to keep our production and consumption patterns “*sustainable*”, i.e. *able to meet the needs of the present, without compromising the needs of future generations*<sup>2</sup>.



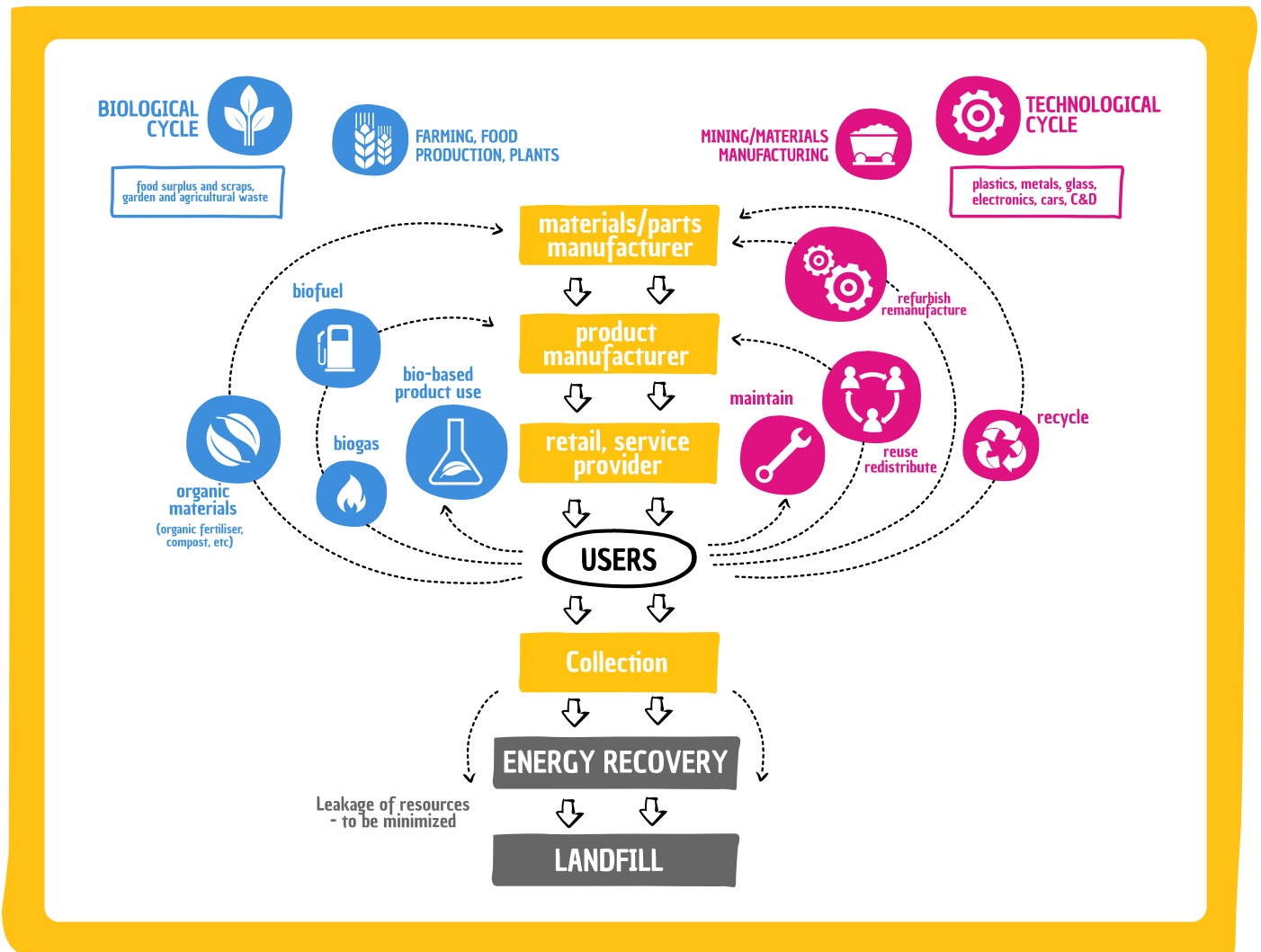
## What is a Circular Economy?

The quest for sustainability in the management of post-use materials is becoming a strategic priority, influencing the political agenda in many areas of the world. Europe has issued its “Circular Economy Package” which aims at maximising recovery of resources from discarded materials, and minimising disposal<sup>3</sup>. The term “Circular Economy” (equivalent definitions have been adopted, e.g. “Sustainable Material Management” in the US<sup>4</sup> ) captures the goal of using materials again and again in further loops of production/consumption/recovery, minimising reliance on new primary raw materials and on the need to build and run disposal sites.

Circular Economy includes many actions and levels at which we can act to preserve resources: we can reduce the amount of materials that are used to produce and distribute goods, we can reuse materials, repair, separate materials suitable for composting and recycling, refurbish/repurpose some materials and items to bring them to new life.

In a circular economy, the value of products and materials is maintained for as long as possible. Waste generation and resource use are minimised, and when a product reaches the end of its life, it is used again to create further value<sup>5</sup>.

The essence of circular economy is captured by the “butterfly diagram”, here combined from the Ellen McArthur Foundation and the European Compost Network:



We have many ways to preserve resources, from the individual scale to low-tech solutions (sharing and reusing, repurposing) to more complex systems requiring organisational and technological infrastructures (separate collection aimed at industrial composting or industrial recycling, biorefineries to extract valuable compounds from bio-based materials, etc.). While thinking globally, always be ready to act locally, even before larger strategies are promoted or mandated by local or national governments.

At whichever level you can implement or promote actions, saving resources means reducing the pressure on the global need for new primary raw materials. This is a precious contribution to decrease the global crisis on the scarcity of resources, which otherwise triggers international tensions and fights for ownership and use of resources. Hence, be proud: any item you save, any kilogram of material you keep in the loop, is **part of a peace-making global strategy**.

## Why keep resources in the loop? Key benefits

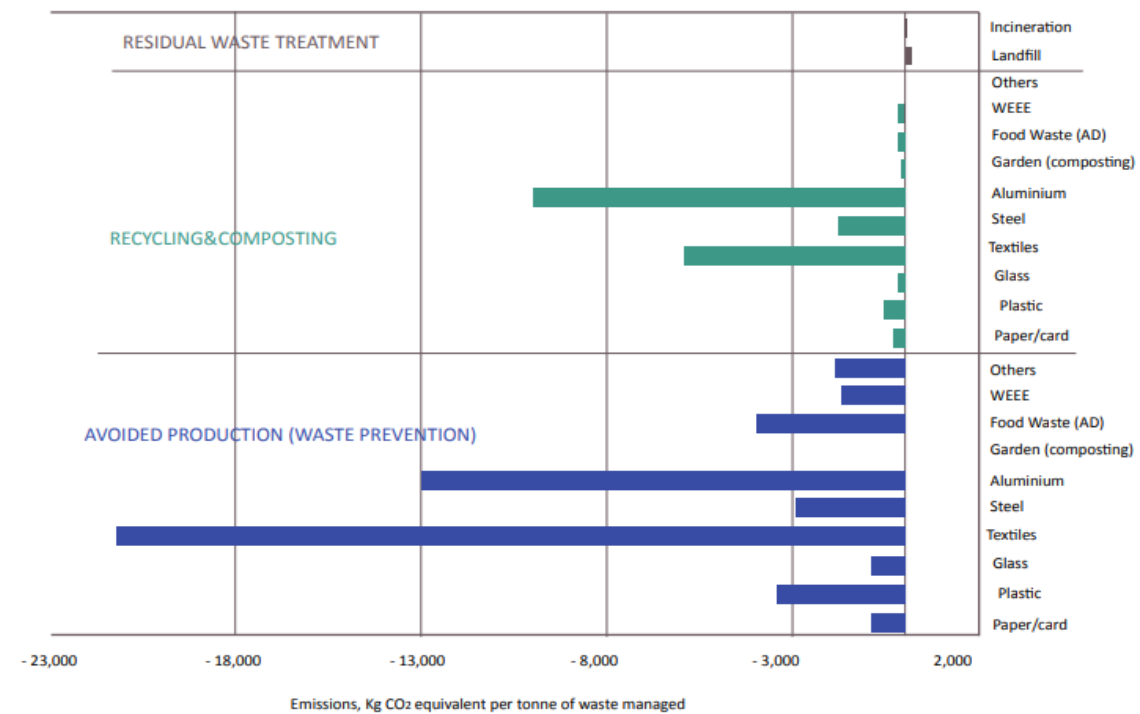
There is a direct environmental benefit of keeping materials in the loop. First and foremost, taking care of and valuing our resources reduces dumping and littering. This is the important link to our cleanup efforts. We took actions for removing litter from the environment; we'd like everybody to commit, at each level of responsibility, to prevent the problem from showing up again. If we want to value materials, minimise littering, and reduce the loss of materials, we can:

- ▶ promote and adopt less wasteful habits and products,
- ▶ establish formal collection schemes,
- ▶ promote local recycling and reuse activities,
- ▶ establish markets for recycled materials and compost.

It is important to sharply cut the amount of waste scattered in cities, countrysides, waterways, and oceans. This is how we tackle the problem of plastic marine pollution, which has grown at a pace of 8 million tonnes each year. Garbage patches in the oceans, plastic entering the food webs and our drinking water, these are the main signs of a dramatic problem now at the top of the public agenda. Sustainable management of waste doesn't only reduce litter, minimise the need for landfills and incinerators and lower the environmental impacts and concerns. It also brings wider social benefits – job opportunities, increased income and living standards.

### Some key facts and figures to engage and convince others:

- ▶ As a plan that maximises efficiency in the management of resources, going circular would mean a higher efficiency in the economic system: fewer resources used and lower expenditures for disposal of discards. Some estimates show impressive economic advantages of this “efficiency plan”: e.g. 1,8 trillion Euros of economic benefits by 2030 for the EU switching from current practice to circular economy<sup>6</sup>.
- ▶ Separate collection, recycling, composting, reuse and repair are labour-intensive activities. Managing resources through such activities, instead of disposal at landfill and incineration sites, would increase the occupational levels. For example, 1,1 million jobs could be created if the US aimed for recycling 75% of waste and composting through a Zero Waste approach<sup>7</sup>. A report by RREUSE<sup>8</sup> shows occupational figures for using different options to manage 10.000 tonnes of waste/materials:
  - 1 job at incinerators
  - 6 jobs at landfills
  - 36 jobs at recycling/composting sites
  - 296 jobs at reuse centres
- ▶ Reducing waste, reusing and sending it to recycling and composting is also a great climate-mitigation measure. Preserving resources also preserves the “embodied energy” of materials, i.e. the energy which has been used to extract, transport, transform, distribute them<sup>9</sup>. As a consequence, reducing landfilling and incineration of waste also minimises greenhouse gases from the waste sector (which, according to various estimates should be between 4 and 12% of the total generation of greenhouse gases), as can be seen from this graph:



Savings (negative values) of greenhouse gases or contribution to greenhouse gases (positive values) through waste prevention, recycling/composting or disposal of mixed waste (Source: EUNOMIA)

- ▶ Circular management of resources contributes to many of the Sustainable Development Goals (SDGs) defined by the United Nations<sup>10</sup>, with particular reference to the following goals:



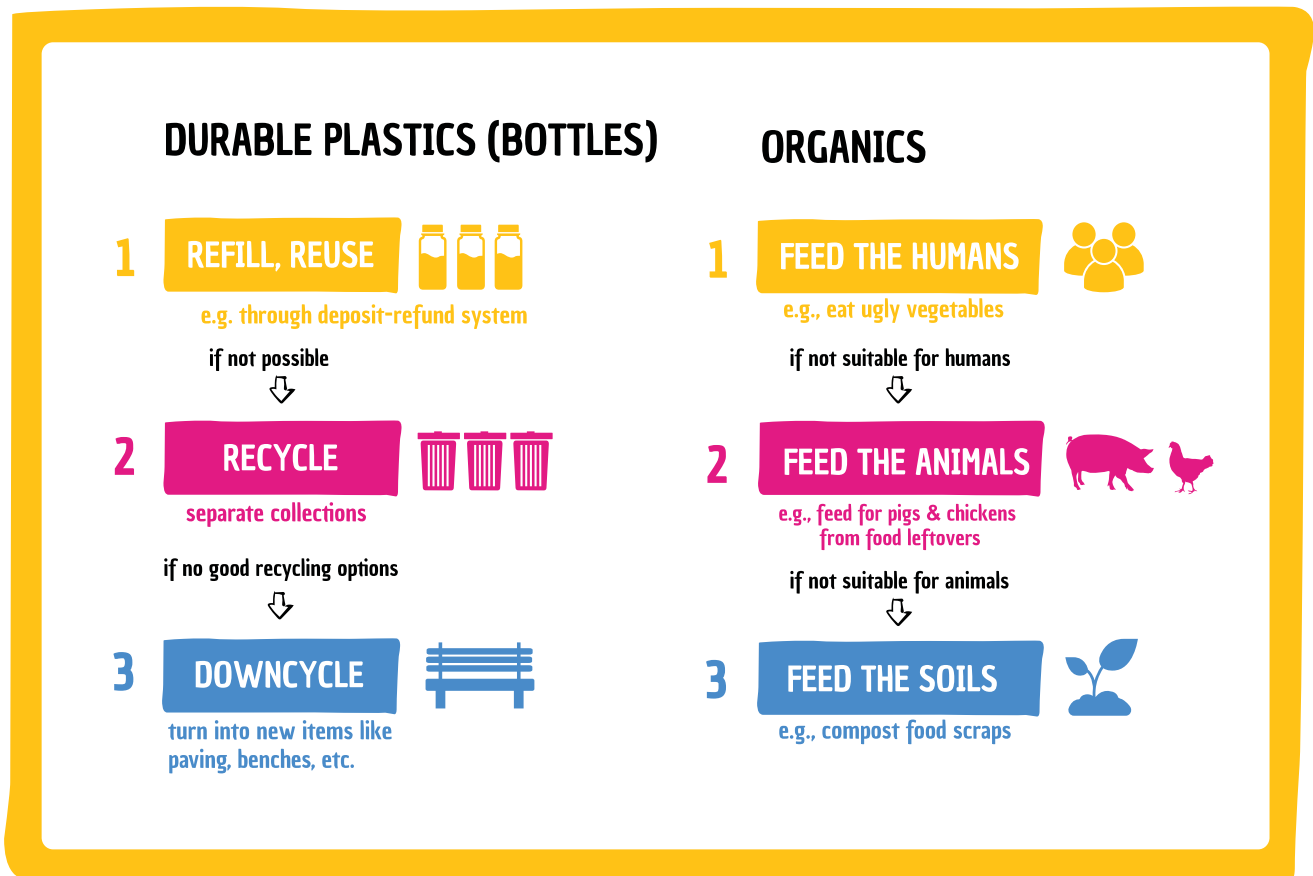
Preserving resources included in materials and goods is always a win-win situation. Whatever we do around this key principle, from individual choices (less wasteful lifestyles) to larger organisational complexity (separate collection schemes, recycling infrastructure, industrial policy to promote redesigning for durability and reparability) is always worthwhile.



## II. From Vision to Practice – the Operating Principles

### Planning the steps to preserve resources

The principle to best embody the effort to preserve the value of materials is the “**cascading use of materials**”. This can be defined as retaining resources in the highest status for as long as possible, in practical terms the search for the use of waste that – in the given operational context - maximises its value. Here are two examples of how this principle works in practice:



The approach to move from linear to circular use of resources, can be described with the “4R’s” strategy, i.e. the combination of the following actions:

- ▶ **Reduce (and refuse):** choose goods and services that create less waste, refuse single use items (straws, bags, etc.) when not strictly needed.
- ▶ **Reuse:** choose durable products and use them again and again; give second life to stuff which is not useful anymore for you, but may still meet the needs of somebody else.
- ▶ **Recycle:** separate your waste by type, as this advances recycling (and composting) initiatives.
- ▶ **Rethink-Redesign:** materials and items which can’t be reduced, reused, recycled or composted should be industrially redesigned and made durable, reusable, recyclable.

**Note:** Attention should be paid to the importance of “**waste audits**” - analysing what kind of waste you create the most. It is a great way to get information for the next steps and connect the last “R” back to first one, creating an endless loop of implementation/testing/assessing/redesigning.

## The “Zero Waste” approach

“Zero Waste” is increasingly being adopted as a “toolkit” to turn the Circular Economy vision into practice. Even the first Circular Economy Package proposed by the EU in July 2014, was sub-titled “A Zero Waste Programme for Europe”.

### The guiding principle of Zero Waste (ZW) is the commitment to constantly:

- ▶ improve the management of resources,
- ▶ reduce progressively the amount of waste,
- ▶ increase the percentage which is reused/recycled/composted,
- ▶ assess what is not recovered in order to have it redesigned.

This approach connects with the 4 R’s strategy, and has already proved to be a powerful driver to minimise leakages of resources from their circular use.

### Sometimes the term “Zero Waste” is misused, either:

i) in a simplified way (“no production of waste”, and “no need to have waste processing sites, whatever their nature”, which doesn’t show the need to manage reusable materials and reprocess recyclable and compostable waste), or

ii) including technologies and processes (e.g. incineration, pyrolysis or other types of thermal treatments) that do not belong in the ZW path. They destroy resources and require a long-term fixed amount of materials to burn (in other words - more waste is constantly needed) and this is in contradiction with the principle of improving recycling rates and minimising residual waste.

Actually, ZW has been defined at the international level, and a growing number of municipalities and communities have formally adopted it as the guiding strategy for the management of waste.

The Zero Waste International Alliance (ZWIA) adopted an “operational roadmap” - the “Zero Waste Hierarchy of Highest and Best Use” (meaning the cascading approach) listing and describing all options to retain resources in their highest status, what to do with residual waste (mixed garbage) and what is not acceptable in the ZW approach<sup>11</sup>.

### Typically, ZW schemes include the following key points (but sometimes in different order and combination)<sup>13</sup>:

1. Avoid waste by reuse, repair and de-construction
2. Encourage waste reduction initiatives
3. Sort at source wherever waste is produced
4. Collect sorted waste separately
5. Compost organic waste
6. Recycle all materials
7. Study residual waste to find better options for material separation and redesign.
8. See landfilling as a temporary solution, with decreasing amounts. Minimise impacts through pre-treatment.
9. Apply industrial design and help to change consumer behaviour.
10. Use economic incentives to encourage all of it!

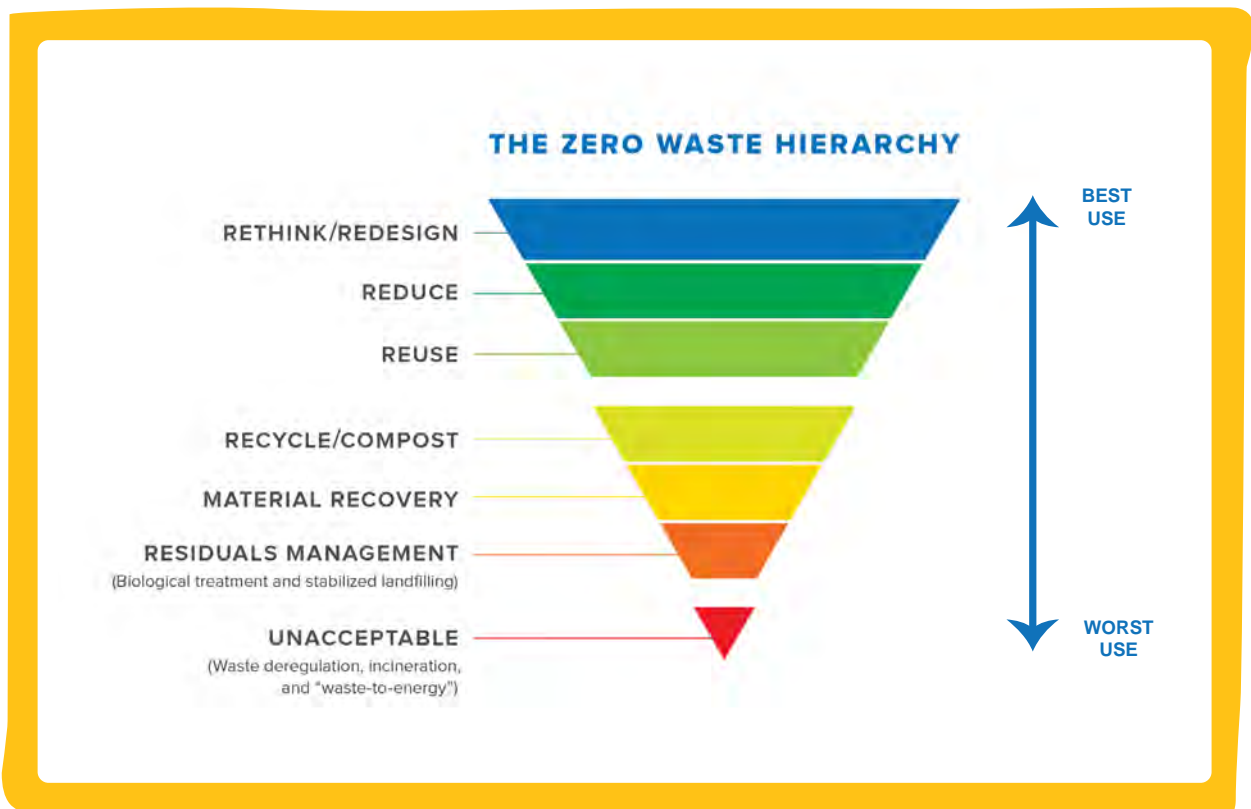
**The official Zero Waste definition, adopted by Zero Waste International Alliance:**

Zero Waste is a **goal** that is ethical, economical, efficient and visionary, to guide people in changing their lifestyles and practices to emulate sustainable **natural cycles**, where all discarded materials are designed to become resources for others to use.

Zero Waste means **designing and managing products and processes** to systematically avoid and eliminate the volume and toxicity of waste and materials, conserve and recover all resources, and not burn or bury them.

Implementing Zero Waste will eliminate all discharges to land, water or air that are a threat to planetary, human, animal or plant health.

The following chart<sup>12</sup> visualises the hierarchy as a “funnel”, progressively minimising what is left for disposal (“residuals management”) and leaves out what is deemed “unacceptable”.



## The importance of the top-down approach: embedding ZW principles in waste policy

By its nature, ZW is a process that can also be implemented at local level, by communities (villages, municipalities, neighbourhoods, etc.). Local implementation is what “makes it happen”, and shows the way to other communities to follow. However, local initiatives can benefit from a coherent and supportive regulatory framework and ZW-oriented “top-down” policy. This can set the frame for steps towards ZW, provide for economic incentives, define clear conditions for markets for recycled materials, and/or provide the legal background for bans and restrictions to be adopted locally.

**While community-based ZW initiatives “make it happen”, ZW-oriented policies “make it possible”**; good interaction between the two levels is the best way to have fast and successful implementation of the ZW approach. For more info on the topic, read the “[Communication on the role of Waste-to-energy in the Circular Economy](#)” by the European Commission.

### Some examples of ZW-oriented policy:

- ▶ The previously mentioned **EU Circular Economy Package**, originally sub-titled “a Zero Waste Programme for Europe”. Although it is not fully embedding the ZW roadmap, it borrows many of its guiding principles: emphasis on ecodesign and redesigning for durability, maximisation of targets for recycling and composting (65% of actually recovered materials, net of the recycling/composting rejects, by 2035), the need to avoid any “lock-in” effect potentially caused by investments in technologies requiring a secured tonnage of mixed waste to be financially viable.
- ▶ **Bans and restrictions** may play a major role in moving towards Circular Economy and ZW programmes, and promote innovation and new business models. An increasing number of countries (or jurisdictional sub-divisions, e.g. states in the US, cities in Germany, etc.) have banned (or taxed) or want to ban (or tax) one or more of the following:
  - plastic bags (e.g. Italy, France, California, Kenya),
  - cotton buds (e.g. United Kingdom, Italy),
  - single-use plastic cutlery and coffee pods (e.g. France, Hamburg),
  - all single-use plastics (e.g. India, Costa Rica).More similar examples can be found [here](#).
- ▶ Ancillary economic tools may be a great way to move progressively away from wasteful behaviours and purchasing habits, and drive innovation:
  - **Extended Producer Responsibility** (EPR) can be adopted to have separate collection and recycling schemes funded by packaging producers (EPR schemes collect unit fees from producers, then the budget is allocated to compensate municipalities for the cost of separate collection, and/or to support/reward recycling activities). EPR has long been adopted in Europe for packaging waste, electric/electronic waste, and other types of goods and materials. Also important: EPR schemes should not be designed to kill local recycling initiatives, but to support them - EPR schemes must simply fund the system, not run the business.
  - **Deposit-Refunding Schemes** (DRS) have proved to be the most effective way to have a high return rate of specific items: customers return the item (e.g. beverage bottles and cans) to the shop where purchased or (more commonly) any cooperating shop, to get the deposit back. This maximises capture rates of items within the DRS, boosts their reuse or recycling, and minimises littering of those items. Well-working DRS systems have been adopted for various containers by Denmark, Estonia, Germany, single states in the US, parts of Australia, etc. A good overview can be found [here](#).



### III. From Vision to Practice – Implementing Local ZW Schemes

A Zero Waste (ZW) approach may be based on an existing good operational strategy, which includes short- and long-term actions. Some actions can be carried out regardless of contextual conditions (e.g. promotion of simple waste prevention initiatives like home composting); others may need more consideration to fit into an existing framework (e.g. some financial incentives and pay-as-you-throw systems).

A great guidance for communities willing to implement a ZW strategy is the [“Masterplan” by Zero Waste Europe](#). Much as it refers primarily to the EU context, it has good hints and examples for implementing a ZW scheme.

Whatever the situation, always think of the ZW mindset: “Always happy, and never satisfied”. There are possibilities for modular implementation of ZW schemes, doing what is currently possible/viable, celebrating related achievements, while still planning for next steps to further improve the situation. Because ZW-minded people love being ambitious.

#### Waste prevention/reduction initiatives

This is the highest ranking step in the hierarchy and should come first. Always keep in mind that the best waste is the one which is not produced.

Some examples of the first steps in waste prevention are:

- ▶ **Promoting tap water** whenever suitable for human consumption: a free water supply must be a fundamental human right - surely it is a priority in many cooperative and infrastructural programmes; also in the Global North many municipalities are building “water houses” to remind people that tap water is perfectly good for drinking (which many don’t know). Large cities in Europe are starting to promote the use of water from their fountains, sometimes with additional incentives: for example, presenting tourists with durable, reusable bottles/canteens with a specific logo (suitable as souvenirs).



*A water house (or “water kiosk”) installed in Rome to deliver still and sparkling waters for free. Similar initiatives to promote tap water - offering filling points for bottles to reduce need for buying bottled water - are booming in other large cities and small villages.*

- ▶ **Packaging-free shops** - can simply be keeping the traditional shopping systems alive. In the Global North it may mean promoting new business models at markets (and supermarkets), to attract conscious consumers (and often, also economic incentives by local authorities for those businesses generating less waste). Some examples of working package free shops are [Original Unverpackt](#) in Germany and [Negozio Leggero](#) in Italy. And [this page](#) allows you to find shops that sell goods in your own container all over the world.

- ▶ **Home and neighbourhood composting** is always a great action, which connects commitment to ZW and the importance of organic matter for soils, gardens and agriculture. For details, you can read our paper on [handling biowaste](#).
- ▶ **Cloth (washable) nappies/diapers**: typically a baby uses around 2000 nappies until the age of two. This accounts for about 1 tonne of not recyclable waste. Whenever running water is available, and young parents have time, switching to washable nappies would make a big impact. In some advanced economies, there are even collection services for dirty nappies, with centralised washing/drying outlets. It is a good idea for the environment, and also turns a disposal cost into jobs and wages.

There are many more examples of waste prevention/reduction, e.g. local mug circulation systems like [MyCup](#) at the University of Brighton or cutlery/cups/dishes-renting service [Ecocup](#) for festivals.

## The pivotal role of kerb/curbside collection and the “Priority Materials”

Curbside (N.America)/kerbside (Europe) is collection at the doorstep, i.e. a scheme where each household or housing unit (e.g. a block of flats in the same building) or business are provided with containers for different materials, and are held responsible for their management and the quality of collected materials.

It's a great way to ensure the highest collection rates and best quality of recyclable and compostable materials. With adaptation, kerb/curbside collection can be implemented in densely populated areas (e.g. San Francisco, Milan, pilots in many other cities) to pave the way for others to follow.

In low-income countries, if formal collection is not fully implemented through a public service, consider that the value of materials may pay off the cost of collection, hence you may consider promoting informal schemes. And that can help capture most of the materials the waste is made of.



### Some operational principles:

- ▶ **Organics are always worth including** in the scheme: they are the largest contributor to total amounts of municipal waste (i.e. household waste + small businesses), from 30% in large cities in N America and the EU, up to 80% and more in rural areas and the Global South. But even more importantly, a good separation of organics means reducing the collection rounds of residual waste (which is much less fermentable). This in turn is a further driver for better separation of plastics, paper, glass, etc. (as it will make collection of unsorted waste less comfortable, people will be more eager to sort their waste as much as possible).

- ▶ Typically **kerbside/curbside schemes also include packaging waste** (usually plastics, metals, glass, paper) and other similar materials (e.g. newsprint with packaging paper). Often this is connected to, or funded by, EPR schemes.
  - Some communities tend to simplify collection of such materials, with a **common container** to include all packaging waste (e.g. the “3 streams” approach in the US: organics, packaging waste, residuals). This may require further costs as the different materials need to be separated at recycling facilities, and typically implies **lower quality** (some people tend to get confused by the wide variety of materials fitting into one bin).
  - Other communities have adopted **“bespoke” collection** of different materials: one scheme for paper, one for glass, one for plastics and metals (metals and plastics may be collected together, since they are lightweight, compactable and easy to separate by means of magnetic and eddy current separators). This tends to give **higher quality**, which is becoming of fundamental importance given the current restrictions on imports of low-quality materials adopted by many countries in the international market for commodities. Also, usually the economics are more favourable, since the collected materials may typically get revenues right after collection instead of paying the costs for selection. For more details you can watch [this clip](#).
- ▶ In our daily life we handle literally dozens of different materials. You cannot plan for everything to be collected at the kerb/curbside. Apart from the “priority streams” (organics, packaging waste, residual waste) you can **establish a Municipal Recycling Centre** (or whatever may act as that), i.e. a controlled area where other materials - smaller amounts randomly scattered across the different households at any given time - may be collected separately in dedicated containers (“bring systems”). This can still capture a relevant percentage of total waste generated in the community: e.g. appliances, garden waste (if not collected mixed with food scraps – we recommend a dedicated scheme for food scraps only), textiles/ clothes, and also some hazardous waste from households and small businesses.

## Make your plan to tackle organics

### Organics can be managed at different levels:

- ▶ promote home composting (in the backyard),
- ▶ promote community-composting initiatives (even in large cities, e.g. Zurich, [Besançon](#)),
- ▶ roll out collection schemes to capture organics and send them to professional composting (or anaerobic digestion) sites, which may be large- or small-scale sites (e.g. “Rural Composting” sites run by farmers in Austria).



As already specified, organics are key from both the quantitative (largest contribution to diversion from disposal) and operational standpoint (better management of other streams, too). See [our paper](#) on the management of organics for more info.

## Financial incentives

Financial incentives are also a great tool to get taxpayers and businesses on board, and shorten transition time to better practices. Some incentives are typically in the power of national or regional governments (e.g. establishing EPR schemes, promoting and regulating DRS) while others can be adopted locally.

One such local incentive is a **“Pay As You Throw”** (PAYT) scheme, where the cost of waste management is not paid for through general taxation (or through a property tax on houses), but, at least partly, is correlated to the amount of unsorted collected waste, which can only go to disposal. This keeps households and businesses mindful of the possible management of goods and related packaging after use, and tends to encourage less wasteful purchasing habits and lifestyles.

PAYT schemes have been implemented in different ways around the world, sometimes with pre-paid bags (mixed waste can only be delivered in a specific bag whose cost mirrors the cost of disposal of materials included), other times with a registration fee for a specific service, in which case the fee varies based on frequency of collection and volume of containers; sometimes, with more technological tools using tagged bags and bins, where the ID gets recorded whenever mixed waste is delivered.

## Reuse and repair centres as a way to grade stuff up

Reuse is one of the priorities. It keeps resources at highest levels in the waste hierarchy and is a great way to promote sharing of resources in the community, and create jobs.



It's been calculated that the value of materials handled at a Reuse Centre can be around 2000 USD/t - it's impressive, considering that the cost of waste disposal can range from a few USD/t to 100 USD/t, and the same basically applies to the value of recyclable materials.

The potential added value is a great opportunity to create jobs and benefit your community: by teaching local people simple repairing/refurbishing skills, you make items attractive to new potential users, while saving them from disposal, and the newly instructed workers are paid. It can be a great way to offer work to disadvantaged people. As noted, managing 10.000 tonnes/year through a reuse/repair centre can create up to 296 jobs (for incineration, only 1, managing landfill, 6, and 36 jobs for recycling/composting).



However, keep in mind that even without establishing related economic activities, repairing and reusing is fun and great for the environment! Many cities and local networks have promoted “**Repair Cafés**” whereby ordinary people get how-to-repair-it help from skilled persons. They see how their stuff may be brought to new life - and may even be swapped with others.

## **The last step to create the loop: residual waste audits and generating feedbacks**

While ZW programmes continuously strive to maximise recovery, they put analyses of residual waste at the core of a constant process for improvement and optimisation. Residual waste is a great place to investigate “systemic mistakes”, i.e. what is blocking the system from going totally disposal-free.

**Through residual waste audits, the “rethinking/redesigning” element may powerfully open the way to:**

- ▶ **producer responsibility**, to have hardly recyclable/compostable items redesigned for better recyclability, compostability and durability;
- ▶ **community responsibility**, to single out the materials that most often mistakenly end up in residual waste, while they could be collected separately for recycling/composting (or taken at a reuse centre).

One great example was the initiative in Capannori, Italy, the first municipality to have formally committed to a ZW programme in 2007. After reaching around 80% separate collection, audits by their ZW Research Centre disclosed a growing number of coffee capsules which are impossible to recycle. The information was passed on to industrial coffee-makers, who started dedicated research for reusable or compostable capsules (which can be collected together with organics). Hence, a local community-based ZW scheme was able to give info and feedback on the problematic items in the residual waste; the company took responsibility and redesigned the capsules.

**Other items which are commonly found in residual waste:**

- ▶ nappies/diapers (see the paragraph on waste reduction)
- ▶ hard-to-recycle plastics (e.g. multi-layered packaging, sachets in Asian countries).

Residual waste audits can be a powerful tool to push for redesign of flawed products and systems as well.



# Annex I: A Strategy to Tackle the Plastics Tide

## Facts & figures: the size of the global issue

Problems related to increasing flows of plastics in the environment have reached the top of the global discussion. The extensive use of plastics has helped to improve many lives, but there are also serious downsides.

Plastics are relatively lightweight and can easily be carried by wind, water, gravity. They are resistant to biodegradation, but fragment into smaller and smaller bits which attract and absorb other pollutants and enter the food web, thereby affecting living organisms. Microplastics (coming from fragmentation of larger plastic items, but also from microbeads intentionally added to toothpastes and scrubs, or from tyres and washing of oil-based textiles like fleece) are ubiquitous and have been found in drinking water, in air, in soils. Their impacts on human health are still largely unknown.

For these reasons many governments and agencies have decided to act on the plastic problem. The UN Environmental Assembly has started dedicated discussions, some countries or coastal regions have started banning various types of plastics (mainly certain single-use items) while the EU lately issued a “Plastic Strategy”<sup>14</sup>, i.e. a framing document for actions to tackle the problem. A great infographic on sources and fate of plastic marine litter may be found [here](#).

### The plastic problem in a nutshell:

- ▶ Since 1950, the production of plastics has grown from 2 million tonnes a year (1950) to 381 million tonnes a year (2015)<sup>18</sup>; the total amount of plastics ever manufactured is more than 8 billion tonnes.
- ▶ Every year around 8-9 million tonnes of plastics are estimated to get into seas and oceans – a truckload a minute; which is “turning oceans into a plastic soup”.
- ▶ With no action to cut the pace of plastics entering seas, by 2050 we’d have more plastics than fish mass in the oceans<sup>19</sup>.
- ▶ Over time, the flow of plastics into oceans has created the so-called “garbage patches” (e.g. the Great North Pacific Garbage Patch, estimated to have more than 5 trillion plastic pieces weighing over 250,000 tons<sup>20</sup>).
- ▶ Importantly, 80% of the plastic getting into oceans comes from land-based sources<sup>21</sup>, emphasising the need for targeted actions on production and consumption of plastics.





## How to address the issue? Tools to minimise the plastic flood and to maximise circularity in the plastic sector

On the global scale, the plastic tide is, first and foremost, a **problem of overproduction**. Many of our everyday plastic items, mostly single-use, are not vital, or could be replaced by durable materials (e.g. straws). For example many packaged foods don't really need the packaging. The key argument "packaging helps to reduce food waste" has been recently debunked, showing that plastic waste is growing in parallel with food waste (and to some extent, even contributes to it: e.g. packages require standard food sizes, which results in food scraps caused by trimming to fit the right size<sup>15</sup>). Also, the argument "plastic waste is preferable to food waste" is questionable: food waste can be composted, while some low-value plastics are hard to recycle and, without suitable technology to process them, end up in incinerators or landfills.

In many parts of the world, systems for waste collection have not been formally established yet, hence plastics end up in farmlands and cities, and are often thrown into waterways (rivers, channels) to finally flow into seas.

Recycling is great, and helps to tackle the problem in medium term, but the disproportion between the amount of plastics produced and the amount being recycled is huge. Even in the countries with a long tradition of recycling, with EPR schemes funding and promoting separate collection of plastics (which should ultimately maximise recycling), only about 30-40% of plastics are actually recycled. Globally, the OECD<sup>16</sup> estimates that as little as 15% of plastic is recycled. Also, some separately collected plastics are typically discarded by recycling businesses as low-value materials; that further lowers the potential of recycling to tackle the total amount of plastic.

Incineration is never a solution, and actually worsens the total environmental footprint of plastics, since it turns them into fossil-based CO<sub>2</sub> - a greenhouse gas contributing to climate change (as mentioned by EU Plastic Strategy).

**While we are striving to maximise recycling rates, the most reasonable way forward is to reduce plastic production.** Recycling is a fundamental "Plan B for sustainability" (Plan A being reduction and reuse, which minimises the environmental footprint).

We want to increase, as one key goal, the level of recycling, but we cannot wait until it achieves 100% to have the plastic problem finally sorted. Simply put, in first place, we must avoid all avoidable plastics.

For the non-avoidable ones, we must maximise reuse and recycling, and minimise disposal.

### Key actions to reverse the plastic tide:

- ▶ **Avoid avoidable plastics!** Always think before you buy: is this single-use plastic really necessary? Could it be replaced by an alternative?
- ▶ **Design plastics for durability and reuse.**
- ▶ Adopt **deposit-refunding schemes (DRS)** to maximise the take-back rate and enhance reuse and high-quality recycling.
- ▶ Implement **separate collection** for those plastics which cannot be avoided.
- ▶ Adopt **Extended Producer Responsibility (EPR)** as a way to fund collection/recycling (or reuse) schemes. EPR should primarily fund the system, not run the system (funding supports local recycling initiatives; the latter might kill them).

- ▶ If you are a policy-maker, put in place compulsory (sector-specific) **Minimum Recycled Contents** for products as a mid-term tool to maximise actual recovery rates of plastics.
- ▶ Open the doors to innovation, and promote activities to **recycle low-grade, low-value mixed plastics**, those that typically get discarded at the end of sorting lines. Such low-value materials can still be recovered through e.g. extruding systems, which blend various polymers into new compounds.

**This may be performed also on a small-scale, with simplified approaches, although this requires:**

- ▶ proper safety measures for workers (extrusion may release volatile compounds that can be harmful);
- ▶ a thoughtful assessment of the final use of the recovered materials (they may include harmful substances previously included in the blend of polymers). Typically, the most sensible end use of such materials is for low-risk applications (no indoor use, no direct contact with food) such as benches, paddle boards, floorings. Most sensitive uses such as toys and food packaging should be avoided.

There are many tools and approaches: choose the ones suitable to your local situation and capabilities, regulatory framework and marketing context.

## **Tackling single use plastics to avoid avoidable plastics**

Single-use plastics (SUPs) are a sub-set of plastics, items with the shortest lifespan, making the largest contribution to the overflow of plastics into the environment.

Many SUPs have made an important contribution to improve life (e.g. some medical equipment), but most of them are not vitally needed; we've long been able to live without them. Many countries have considered and adopted restrictions or even bans on some or many of them; or have introduced taxes/levies to discourage their use. A comprehensive list of possible actions and initiatives in various countries or cities can be found from the [Single Use Plastics Roadmap](#) by UNEP.

### **Most commonly found single-use plastics in litter<sup>17</sup>:**

- ▶ plastic shopping bags
- ▶ beverage cups and lids
- ▶ cotton buds
- ▶ beverage containers
- ▶ bottle caps
- ▶ wet wipes
- ▶ balloons and balloon sticks
- ▶ plastic tableware (dishes and cutlery)
- ▶ food wrappers and take-away containers
- ▶ straws and stirrers

Most such items are not “vital” in most situations – there is room for initiatives to reduce their use, or even phase them out.



## There are many tools for curbing and minimising the use of SUPs:

- ▶ bans (e.g. many countries have already enacted bans on plastic bags, some on cotton buds);
- ▶ reduction targets (e.g. the EU has adopted a “usage cap” on the number of plastic shopping bags per person and year; some EU member states have issued total bans);
- ▶ design requirements (e.g. the “leash the lid” initiative, to have bottle caps tethered to bottles to prevent scattering);
- ▶ EPR (producers may be required to fund collection schemes, or even cleanups, as is currently being proposed in the EU SUP draft Directive for some items).

All these tools should also be supported by proper enforcement. In a few cases, bans include exceptions for biodegradable (or compostable) plastics, which are not a solution to littering, but may be used as tools for separate collection of organics and composting (e.g. biobags to maximise captures of organics in separate collection schemes; compostable tableware for sustainable event management if reusable is not suitable to local conditions). For more info on the topic, see our paper [“What are biodegradable plastics”](#).

However, even before any relevant policy, it’s fundamentally up to each one of us to use the right to refuse, to avoid the unnecessary single use plastic items.



## Annex II: Starting from Scratch - Building up Waste Management

Managing waste poses particular challenges in many parts of the world, where fewer economic resources are available. Sufficient infrastructure may be missing, organisational and legal framework may be not (fully) established, and recycling activities and compost sites might not exist. Lack of funds can pose constraints, and hamper quick implementation of all the needed operational and organisational framework.

This may require a bottom-up approach, and some creativity, to implement and run at local level the activities - separation, recycling, disposal - not provided by central institutions and jurisdictional authorities. On the other hand, the value of recyclable/compostable materials in less wealthy economies may be an important economic driver, which can compensate the lack of dedicated budget by state or local institutions, and involve the needed workforce, even informally.

### Guiding principles for starting local action:

- ▶ **Separate organics and handle them separately as much as possible:** if organic waste is properly separated from other materials then composting can be easily done with small-scale, low-tech systems. Such compost has a value for your farmlands or gardens. By composting, we reduce the amount of waste to be landfilled, and we will minimise the impact on the final disposal sites. Always remember that food and garden waste make up a large part of waste in low-income economies; once tackled properly, you solve much of the waste problem. For easy composting instructions, look into our [biowaste paper](#).
- ▶ **Harness the potential of reuse.** Low-income economies may value many materials (e.g. clothing, furniture, used appliances) whose importance can be overlooked elsewhere.
- ▶ **Look for local markets for various materials.** Are there any? Who could help you connect with them? A great example is the long established informal (but perfectly working) recycling scheme run by the [Zabbaleen community](#) at the “Garbage Village” in Mokattam, near Cairo, which recycles about 80% of waste through simple low-tech collection systems. You might consider also starting or connecting to activities such as the “[Waste Banks](#)” in Indonesia. Many other informal recycling activities are run throughout the world by people creating value out of waste, and who can help to implement and provide some local recycling schemes, turning a problem into new opportunities for people.
- ▶ For the materials with no local market, **think of some “creative recycling”**, e.g. use tyres as pots; make paper into pulp and turn pulp into sculptures. For various options for local scale, low-tech activities and creativity, see our paper “[Some recycling options for different materials](#)”.
- ▶ Always **assess the benefits, downsides and hazards of every recycling/reuse option, against the most likely alternative in the local context:** balancing pros and cons will let you take the best option to improve local conditions (which is ultimately our goal); e.g. if there are no other options, using plastic bottles as ecobricks may not be the “best” option ever (their safety is sometimes questioned, since plastics may include some harmful substances such as softeners/plasticisers), but they are still a “better” solution, if the only local alternative is burning them at dumpsites. Burning plastic is extremely harmful.
- ▶ **Keep waste that can't be reused or recycled in one place.** This is always better than letting it scatter across the land. A single location may ensure a proper siting far enough from



water sources and water bodies, a better control of fire hazards, a lower risk to spreading diseases to the community. For more info, look into our paper on [creating a resource station](#).

For a comprehensive overview of the “early steps” and actions that may be implemented at local level, you can check out WasteAid website. It’s a great resource to understand the basics, and to make your system work when there is no infrastructural support, and little money. [Their toolkit](#) and how-to guides address various possibilities for improvement in local waste management schemes.

## Dumps, landfills and sanitary landfills

Given the importance of proper siting, design and management of disposal sites, and the particular challenges of managing waste that cannot be recycled, here are some basics to help understand related issues and needs.

### Glossary

- ▶ **Dump** generally refers to a place for disposal of domestic waste, where little or no environmental and occupational safety measures are taken in account.
- ▶ In **landfills**, some engineering principles are followed, e.g. waste is confined to as small an area as possible, waste is compacted to reduce volume, and covered now and then with layers of soil.
- ▶ **Sanitary landfills** are sites where waste is isolated from the environment. Waste is compacted in thin layers, covered by soil every evening, leachate and gas are collected and treated, and a monitoring program is applied. Waste is weighed and inspected to exclude unwanted items.

For references on optimised design and management of landfill sites, look into the [EU Landfill Directive](#) and related technical information. It may serve as a guide to design, build and manage landfills in order to minimise environmental impacts. It includes provisions on engineering of landfills, but also requires pretreatment of waste prior to landfilling. This reduces impacts related to fermentation of organics (odours, methane, leachate, attraction of pests, etc.), but also causes an important economic side-effect, as it makes landfilling more expensive, and recycling cost-competitive.

At the opposite end, for simplified, low-tech approaches when resources are limited, while still addressing most of the issues around landfilling, you can look into the Waste Aid [how-to guide](#) on waste disposal sites.

### Environmental effects

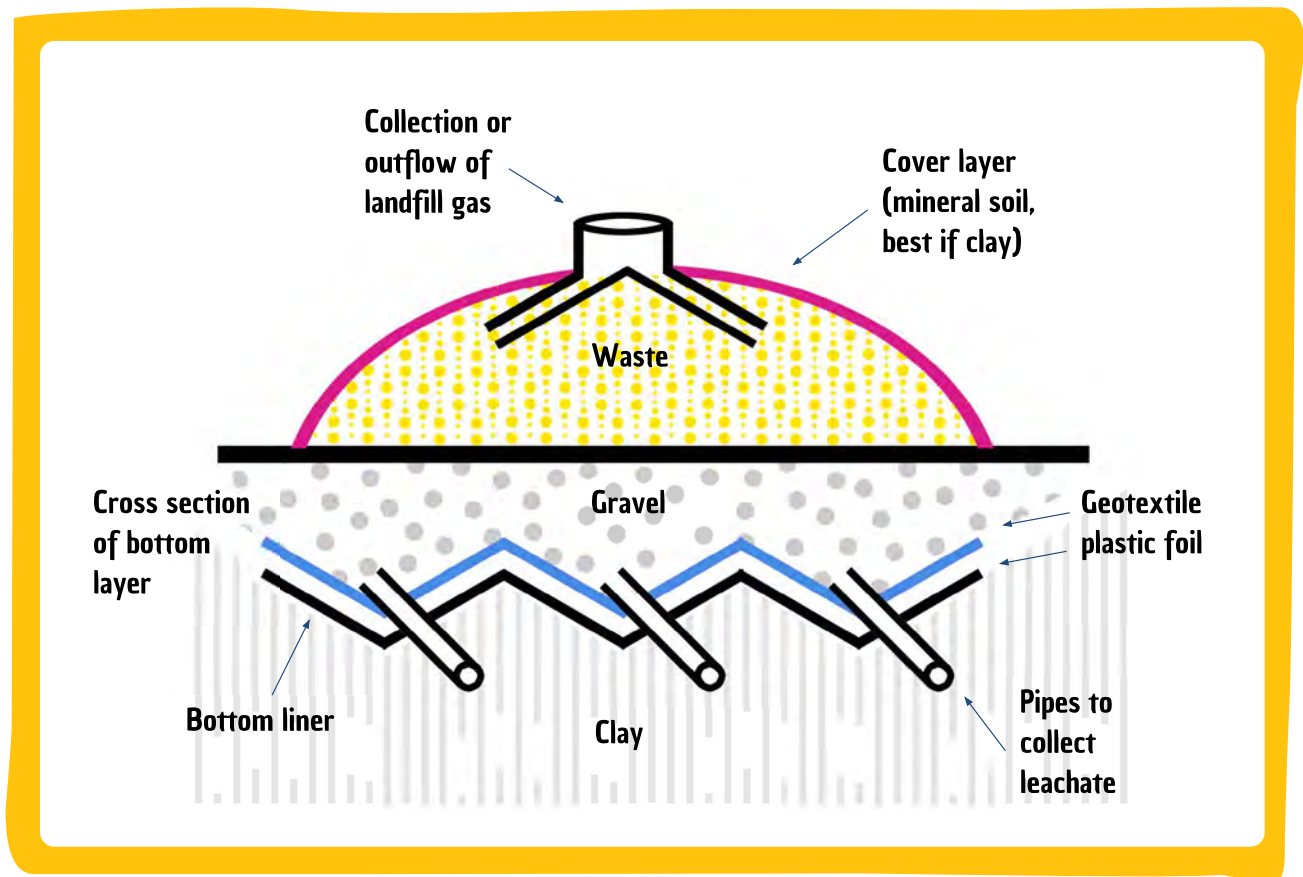
Landfilling has many negative environmental effects during its operational life (while it’s being filled) and even after its closure. In the table overleaf, we address key concerns and the way to minimise them.



<b>Risk</b>	<b>Origin/reason of risk</b>	<b>How to improve</b>
<b>Landfill gas</b>	Organic waste is decomposed biologically under anaerobic conditions. End-product of this process is landfill gas – a mixture of methane and carbon dioxide. In particular, methane is a powerful greenhouse gas. Landfill gas is flammable, and contains trace compounds that are toxic to humans.	Landfill gas has to be collected <sup>22</sup> . Preferably, gas should be used for energy production (heat, electricity). If this is not possible, gas should be destroyed by burning, to reduce risk of spontaneous fires, odours, greenhouse gas emissions and migration of gas to nearby houses. To prevent gas emissions, reduce disposal of organic wastes. Even mixed waste can be „stabilized“ (a natural, operationally enhanced degradation, similar to composting, to reduce fermentability) prior to landfilling.
<b>Odours</b>	Unpleasant odours from degradation of organic waste are most common during the early degradation phase of the wastes.	Reduce organic content of waste (by separating and composting/stabilizing it).
<b>Fires</b>	Most wastes burn easily, thus landfill fires last for a long time, are difficult to fight, and generate very toxic smoke.	Collect and burn landfill gas. Reduce organic content of waste.
<b>Leachate</b>	All water (rainwater, surface water) which has been in contact with waste is polluted! Groundwater pollution is the biggest risk.	Water contamination can be minimized by proper design of landfills, by leachate collection and treatment.
<b>Landslides</b>	Slope failures are a serious risk, caused by poorly compacted waste, degradation of organics and rainwater intrusion.	Compact waste in thin layers, reduce organic content of wastes, stabilize, collect and remove leachate by draining.
<b>Fly waste, dust, dirt</b>	Fly waste, dust and dirt are typical nuisances at a landfill site. Dust is a problem during dry periods, and wherever ash is deposited.	When waste is off-loaded from trucks, contain it in as small an area as possible, and surround it with portable fencing. Wash truck wheels if dirty. Irrigate if dusty.
<b>Vectors</b>	Insects, birds and animals seek food and can nest in waste. They may spread diseases and cause hygienic problems.	Reduce organic content of waste. Cover freshly disposed of waste with mineral soil every day. Use rat poison and similar measures. Stabilize organic-rich waste by relatively simple systems, similar to composting (e.g. some windrowing).
<b>Noise</b>	Noise is a typical nuisance at landfills, created by road traffic, waste compactors and other large heavy-duty equipment.	Build noise barriers (like lines of trees, walls) around the landfill. Most efficient option to limit noise is restricting operation hours.

## Landfill design

The most important elements of a modern landfill facility are bottom liners (the lowermost base of the landfill), collection and treatment system for leachate and gas, cover layers with various function, and monitoring system.



*An example of basic landfill construction*

## Bottom liner

The purpose of the bottom liner is to separate waste from the environment, collect leachate and drain it out of the landfill body. Bottom liners should be functional throughout the whole lifecycle of a landfill.

The best bottom mineral material for a landfill is clay. If clay is not available, plastic liners are used. Plastic membranes are made of PE, PVC or PP, and they are typically 1–3.5 mm thick. Plastic liners have to be protected against uneven settling and puncturing holes by a thick layer of geotextile. On that, the leachate collection layer with leachate collection tubes is placed. Only then, can waste disposal take place.

## Top liner

The design of the cover layer has to meet some of the following requirements: it has to reduce infiltration of rainwater and reduce the amount of leachate; enhance surface runoff and evaporation; reduce gas emissions by either sealing of wastes, or supporting biochemical degradation of gas (oxidation of methane while passing through the layer); and provide a physical barrier between the waste and the environment. The use of a fully sealed non-permeable cover will minimise the amount of leachate.



## Leachate

Leachate quality depends on waste and its degradation phase. Leachate from newly built landfills contains much more organic material and salts than municipal wastewater. The concentration changes in time, as organic material is degraded and mineralised.

The leachate can be discharged to a wastewater treatment plant or treated on-site. Fresh leachate, like wastewater, is easily treatable, old leachate is difficult to treat through biological processes such as those typically adopted in wastewater treatment, because most of the degradable material has been degraded. Physical-chemical cleaning can be used in combination with biological treatment.

Low-tech methods such as treatment in constructed wetlands offer a low-cost after-treatment option.

Recycling leachate to the landfill increases gas generation, which may be the desired option in the case of gas collection and energy use. Reduction of leachate by evaporation may be applicable in dry climates.

For economic reasons, the filling period of a landfill should be 15–30 years. It is desirable to build landfills in relatively small cells, to minimise infiltration of rainwater.

Waste hierarchy aims at minimising landfilling, which represents a “leakage of resources” from circular systems, by means of reuse, recycling, composting, and continued redesigning of materials which are hard to recover. A landfill tax is often applied in developed countries to reduce disposal and increase recycling.



# In Brief: Do's and Don'ts



## Do's

**Always be ambitious and improve your behaviour and habits.** “Always happy, never satisfied” is the best attitude to value all efforts - both your own and your community's; and keep improving.

**Make your hands the tools to build the clean world you want.** It's our hands that make the difference, by separating our discarded materials – if they sort, we've got resources; if they don't, we've got waste.

**Choose durable and reusable over recyclable,** and choose both over easily disposable items.

**Choose deposit and/or refillable bottles** over single-use ones.

**Compost organics yourself, or separate them for professional composting.** Composting sends organic carbon and nutrients back to the soil – and makes management of other discards much easier!

**See if Extended Producer Responsibility or a Deposit/Refund Scheme is working in your area.** This means that collection and treatment of a material/item is already paid for. Learn which goods it applies to and where you can return them for free (or even get a deposit back).

**Always share your knowledge with others.** Learn from those who know better, and pass it on to your loved ones, friends, colleagues and neighbours.

**Let your words show you value resources.** Remember “it's not waste until it's wasted”. Instead of “waste”, try to say “post-use materials”, “discards”, “resources”.



## Don'ts

**Never litter.** One moment of careless behaviour - a long time spoiling our landscapes and environments, and harming wildlife.

**Never burn plastics or mixed waste in open fires,** nor allow them to be burned at dumpsites. This releases harmful compounds. Always aim for reusing, recycling or landfilling plastics in a controlled way.

**Never dump waste into water.** With 8 million tonnes of plastics entering our oceans every year (most being transported there by rivers and waterways), we're turning our seas into a plastic soup.

**Never mix hazardous and non-hazardous materials.** It is important to manage different materials properly.

**Avoid single-use plastics and overpackaging.** Buying less packaged or packaging-free goods can make a big difference for the environment. Many single-use plastic items may be easily and comfortably replaced by durable, reusable alternatives (flasks, mugs, steel straws, reusable cutlery, etc.).

**Only consider landfilling only as the last resort,** as it loses resources instead of keeping them available for use in the Circular Economy.

**Refrain from investing in incineration.** Besides destroying resources, incineration works against the Zero Waste vision and strategies, as it needs huge amounts of waste daily. This weakens the incentive to reuse, recycle and compost more.

# Endnotes

- 1 <https://www.overshootday.org/>
- 2 This is the internationally adopted definition of sustainability, first coined by the UN-appointed Brundtland Commission
- 3 [http://europa.eu/rapid/press-release\\_IP-18-3846\\_en.htm](http://europa.eu/rapid/press-release_IP-18-3846_en.htm)
- 4 <https://www.epa.gov/smm>
- 5 [https://ec.europa.eu/growth/industry/sustainability/circular-economy\\_en](https://ec.europa.eu/growth/industry/sustainability/circular-economy_en)
- 6 <https://www.mckinsey.com/business-functions/sustainability-and-resource-productivity/our-insights/europes-circular-economy-opportunity>
- 7 <http://www.ecocycle.org/zerowaste/jobs>
- 8 <https://www.rreuse.org/re-use-has-higher-employment-potential-than-recycling/>
- 9 <http://www.eunomia.co.uk/reports-tools/the-potential-contribution-of-waste-management-to-a-low-carbon-economy/>
- 10 <http://www.undp.org/content/undp/en/home/sustainable-development-goals.html>
- 11 The full ZW Hierarchy can be found at <http://zwia.org/standards/zero-waste-hierarchy/>
- 12 Credits: ZWIA, Certifications Committee
- 13 Most often used list of 10 steps of Zero Waste: <http://derryair.eu/zero-waste-resources/ten-steps-to-zero-waste/>
- 14 [http://ec.europa.eu/environment/waste/plastic\\_waste.htm](http://ec.europa.eu/environment/waste/plastic_waste.htm)
- 15 <http://www.foeeurope.org/unwrapped-throwaway-plastic-food-waste>
- 16 [https://read.oecd-ilibrary.org/environment/improving-markets-for-recycled-plastics\\_9789264301016-en#page53](https://read.oecd-ilibrary.org/environment/improving-markets-for-recycled-plastics_9789264301016-en#page53)
- 17 [http://ec.europa.eu/environment/waste/pdf/single-use\\_plastics\\_factsheet.pdf](http://ec.europa.eu/environment/waste/pdf/single-use_plastics_factsheet.pdf), [https://wedocs.unep.org/bitstream/handle/20.500.11822/25496/singleUsePlastic\\_sustainability.pdf](https://wedocs.unep.org/bitstream/handle/20.500.11822/25496/singleUsePlastic_sustainability.pdf)
- 18 Geyer, R., Jambeck, J. and Lavender, K. 2017. Production, use, and fate of all plastics ever made. Science Advances 3:7
- 19 <https://www.ellenmacarthurfoundation.org/news/new-plastics-economy-report-offers-blueprint-to-design-a-circular-future-for-plastics>
- 20 <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0111913>
- 21 <http://www.eunomia.co.uk/reports-tools/plastics-in-the-marine-environment/>
- 22 For more information on landfill gas management, here are some additional resources <https://www.atsdr.cdc.gov/HAC/landfill/html/toc.html>, [https://www.globalmethane.org/documents/toolsres\\_lfg\\_IBPGcomplete.pdf](https://www.globalmethane.org/documents/toolsres_lfg_IBPGcomplete.pdf)



# Hyperlinks

The following URLs were hyperlinked in the main body of the Keep It Clean Plan, and are sorted into their relevant sections.

## Roadmap

- ▶ Snaga: Get Used to Reuse Initiative from Slovenia, 2013 <https://www.youtube.com/watch?v=Du8fYgN79z4>
- ▶ Materials Recovery Facility Toolkit, 2013 <https://www.adb.org/publications/materials-recovery-facility-tool-kit>

## From vision to practice – the operating principles

- ▶ The role of waste-to-energy in circular economy, European Commission, 2017 <http://ec.europa.eu/environment/waste/waste-to-energy.pdf>
- ▶ Beverage Container Deposit Laws Worldwide <http://www.bottlebill.org/legislation/world.htm>

## From vision to practice – implementing local ZW schemes

- ▶ The Zero Waste Masterplan, Zero Waste Europe <https://zerowastecities.eu/masterplan/>
- ▶ Zero Waste shop Original Unverpackt in Germany <https://original-unverpackt.de/>
- ▶ Zero Waste shop Negozio Leggero in Italy <http://www.negoziologgero.it/>
- ▶ Bulk Finder, Zero Waste Home <https://app.zerowastehome.com/>
- ▶ Dealing with Biowaste, Knowledge Team of Let's Do It Foundation, 2018 [https://www.letsdoitworld.org/wp-content/uploads/2018/08/WCD2018\\_Biowaste.pdf](https://www.letsdoitworld.org/wp-content/uploads/2018/08/WCD2018_Biowaste.pdf)
- ▶ MyCUp, University of Brighton, 2018 <https://eat.brighton.ac.uk/ethics/mycup/>
- ▶ Ecocup, how does it work? <https://www.ecocupshop.co.uk/en/how/>
- ▶ Why Source Separation? Zero-Waste NorthWest, 2018 <https://vimeo.com/263204415>
- ▶ French city of Besançon saves €800,000 through extensive use of decentralised composting, Zero Waste Europe, 2017 <https://zerowasteurope.eu/2017/12/france-besancon-saves-decentralised-composting/>

## Annex I: a strategy to tackle the plastics tide

- ▶ Single-use Plastics. A Roadmap for Sustainability, UNEP, 2018 [https://wedocs.unep.org/bitstream/handle/20.500.11822/25496/singleUsePlastic\\_sustainability.pdf](https://wedocs.unep.org/bitstream/handle/20.500.11822/25496/singleUsePlastic_sustainability.pdf)

## Annex II: starting from scratch – building up waste management

- ▶ City of Zabbaleen <https://en.m.wikipedia.org/wiki/Zabbaleen>
- ▶ Waste Not, Want Not: „Waste Banks“ in Indonesia, The World Bank, 2013 <http://blogs.worldbank.org/eastasiapacific/waste-not-want-not-waste-banks-indonesia>
- ▶ What to do with the collected materials – some recycling options, Knowledge Team of Let's Do It Foundation, 2018 [https://www.letsdoitworld.org/wp-content/uploads/2018/08/WCD2018\\_Recycling.pdf](https://www.letsdoitworld.org/wp-content/uploads/2018/08/WCD2018_Recycling.pdf)

- ▶ Get Organised! Setting Up a Resource Station, Knowledge Team of Let's Do It Foundation, 2018 [https://www.letsdoitworld.org/wp-content/uploads/2018/08/WCD2018\\_Resource-station.pdf](https://www.letsdoitworld.org/wp-content/uploads/2018/08/WCD2018_Resource-station.pdf)
- ▶ Making waste work, WasteAid Toolkit <https://wasteaid.org.uk/toolkit/making-waste-work/>
- ▶ Council Directive 1999/31/EC on landfilling <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31999L0031>
- ▶ How to design and operate a basic waste disposal site, WasteAid Toolkit <https://wasteaid.org.uk/toolkit/how-to-design-and-operate-a-basic-waste-disposal-site/>