Zero Waste Hierarchy of Highest and Best Use 7.0

Purpose

The Zero Waste Hierarchy describes a progression of policies and strategies to support the Zero Waste system, from highest and best to lowest use of materials. It is designed to be applicable to all audiences, from policy-makers to industry and the individual. It aims to provide more depth to the internationally recognized 3Rs (Reduce, Reuse, Recycle); to encourage policy, activity and investment at the top of the hierarchy; and to provide a guide for those who wish to develop systems or products that move us closer to Zero Waste. It enhances the Zero Waste definition by providing guidance for planning and a way to evaluate proposed solutions.

Zero Waste Definition

"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."[1]

Guiding Questions

Rethink/Redesign	What has led us to our present linear use of materials and thus, what needs to evolve to move towards a closed loop model? How do we re-design systems to avoid needless and/or wasteful consumption?
Reduce	What supports the use of less material and less toxic material?
Reuse	What supports the better use of those products we already have in ways that retain the value, usefulness and function?
Recycle/Compost	How do we ensure materials are put back in the materials cycle?
Material Recovery	What was salvaged from mixed waste?
Residuals Management	What is still left and why?
	What do we need to take out of the system that should not have been circulated in the first place? How do we manage what is left in a flexible manner that continues to encourage movement towards Zero Waste?
Unacceptable	What systems and policies encourage wasting and should not occur?

[1] Source: www.zwia.org/standards

*Guiding Principles

Closed Loop Systems	Design systems to be closed loop rather than linear in their use of resources
Close to Source	Processes to occur as close to the source as practical
Conservation of Energy	More energy can be saved, and global warming impacts decreased, by reducing waste, reusing products, recycling and composting than can be produced from burning discards or recovering landfill gases.[2]
Do Not Export Harm	Avoid the export of toxic or potentially toxic waste or materials to poorer less developed nations and avoid the export of materials with limited, undefined recycling markets that will be either landfilled or incinerated in another region.
Engage the Community	Promote changes and systems that work with communities to facilitate meaningful and sustained participation, increase understanding, and influence behaviour change and perceptions
Highest and Best Use	Creating and keeping materials and products for a use as high on the hierarchy as possible and in the useful loop as long as possible. Keeping materials from being downcycled where the number of future uses or options are limited. Source separate items and materials to the extent necessary to ensure clean and marketable products and materials for reuse, recycling and composting streams.
Information & Improvement	Collect information on systems and use as feedback for continuous improvement
Local Economies	Support the growth and expansion of local economies (production, repair, and processing) in order to reduce greenhouse gases from transportation, improve accountability, and increase repair and parts opportunities
Materials Are Resources	Preserve materials for continued use and use existing materials before harvesting virgin natural resources
Minimize Discharges	Minimize all discharges to land, water or air that may be a threat to planetary, human, animal or plant health, including climate changing gases
Opportunity Costs	Consider opportunity costs of investments and ensure investments occur as high as possible on the Hierarchy
Precautionary Principle	Ensure that a substance or activity which poses a threat to the environment is prevented from adversely affecting the environment, even if there is no conclusive scientific proof linking that particular substance or activity to environmental damage
Polluter Pays	Whoever causes environmental degradation or resource depletion should bear the “full cost” to encourage industries to internalize environmental cost and reflect them in the prices of the products
Sustainable Systems	Develop systems to be adaptable, flexible, scalable, resilient, and appropriate to local ecosystem limits

[2] Source: http://zwia.org/standards/zw-community-principles/, page 2.

Zero Waste Hierarchy

1	**Rethink/Redesign**	Design and purchase products from reused, recycled or sustainably-harvested renewable, non-toxic materials to be durable, repairable, reusable, fully recyclable or compostable, and easily disassembled
2		Shift funds and financial incentives to support a Circular Economy** over the harvesting and use of virgin natural resources
3		Enact new incentives for cyclical use of materials, and disincentives for wasting
4		Facilitate change in how end users' needs are met from "ownership" of goods to "shared" goods and provision of services
5		Support and expand systems where product manufacturing considers the full life-cycle of their product in a way that follows the Zero Waste Hierarchy and moves towards more sustainable products and processes. Producers take back their products and packaging in a system that follows the Zero Waste Hierarchy.
6		Identify and phase out materials that cause problems for Closed Loop Systems*
7		Facilitate and implement policies and systems to encourage and support Local Economies*
8		Re-consider purchasing needs and look for alternatives to product ownership
9		Provide information to allow for informed decision-making
10		Be aware of and discourage systems that drive needless consumption
11	**Reduce**	Plan consumption and purchase of perishables to minimize discards due to spoilage and non-consumption
12		Implement Sustainable Purchasing** that supports social and environmental objectives as well as local markets where possible
13		Minimize quantity and toxicity of materials used
14		Minimize ecological footprint required for product, product use, and service provision
15		Choose products that maximize the usable lifespan and opportunities for continuous reuse
16		Choose products that are made from materials that can be easily and continuously recycled
17		Prioritize the use of edible food for people
18		Prioritize the use of edible food for animals
19	**Reuse**	Maximize reuse of materials and products
20		Maintain, repair or refurbish to retain Value**, usefulness and function
21		Remanufacture with disassembled parts; dismantle and conserve "spare" parts for repairing and maintaining products still in use
22		Repurpose products for alternative uses
23	**Recycle/Compost**	Support and expand systems to keep materials in their original product loop and to protect the full usefulness of the materials
24		Maintain diversion systems that allow for the highest and best use of materials, including organics
25		Recycle and use materials for as high a purpose as possible
26		Develop resilient local markets and uses for collected materials wherever possible

27		Provide incentives to create clean flows of compost and recycling feedstock
28		Support and expand composting as close to the generator as possible (prioritizing home or on site or local composting wherever possible)
29		Whenever home/decentralized composting is not possible, consider industrial composting, or if local conditions require/allow, anaerobic digestion
30	**Material Recovery**	Maximize materials recovery from mixed discards and research purposes after extensive source separation
31		If conditions allow, recover energy using only systems that operate at Biological Temperature and Pressure**
32	**Residuals Management**	Examine materials that remain and use this information to refine the systems to rethink, reduce, reuse, and recycle in order to prevent further discards
33		Ensure minimization of impacts by means of biological stabilization of fermentable materials.
34		Encourage the preservation of resources and discourage their Destructive Disposal or dispersal
35		Plan systems and infrastructure to be adjusted as discards are reduced and its composition changes
36		Minimize Gas Production and Release** and maximize gas collection
37		Use existing landfill capacity and maximize its lifespan. Ensure it is Responsibly Managed.**
38		Contain and control toxic residuals for responsible management
39	**Unacceptable**	Don't support policies and systems that encourage the Destructive Disposal of organics and/or the destruction of recyclables
40		Don't support energy and Destructive Disposal systems that are dependent upon the continued production of discards
41		Don't allow the Incineration** of discards
42		Don't allow toxic residuals into consumer products or building materials

**Definitions:

Biological Temperature and Pressure The ambient temperature and pressure that occurs naturally without the use of added energy, or in any case not above 100 degrees Celsius to change it such as anaerobic digestion. [3]

Circular Economy An industrial economy that is, by design or intention, restorative and in which material flows are of two types, biological nutrients, designed to re-enter the biosphere safely, and technical nutrients, which are designed to circulate at high quality without entering the biosphere. Materials are consistently reused rather than discharged as waste.

Closed Loop System A system not relying on matter exchange outside of the system, as opposed to open loop where material may flow in and out of the system.

Destructive Disposal Discarded materials placed in a landfill or in an Incineration** facility

[3] Unless higher temperatures are required, not to exceed 150 degrees Celsius, as a pretreatment (e.g. to control diseases, or reduce pathogens) to be then subject to composting or AD; the pretreatment should never be used to destroy materials.

Diversion	An activity that removes a material from Destructive Disposal.
Incineration	Incineration is a form of Destructive Disposal via combustion or thermal conversion/treatment, using temperatures above 100 degrees Celsius, of discarded materials into ash/slag, syngas, flue gas, fuel, or heat. Incineration includes facilities and processes that may be stationary or mobile, may recover energy from heat or power and may use single or multiple stages. Some forms of incineration may be described as resource recovery, energy recovery trash to steam, waste to energy, energy from waste, fluidized bed, catalytic cracking, biomass, steam electric power plant (burning waste), pyrolysis, thermolysis, gasification, plasma arc, thermal depolymerization or refuse derived fuel.
Minimize Gas Production and Release	This means keeping out source-separated organics as much as possible and biologically stabilizing the materials that go into landfill. For existing landfill cells that already contain unstabilized organics, the gas production should be minimized by keeping out rainwater and not recirculating leachate. Minimize methane release by permanently capping closed cells with permanent covers and installing gas collection systems within months of closure (not years). Maintain high suction on collection wells and do not damp down wells or rotate off the wells to stimulate methane production. Filter toxins in the gas into a solid medium that is containerized and stored on site. Note that this is not considered a renewable energy.
Problematic for a Closed Loop System	Materials that make it hard to recycle or compost the materials themselves or other materials. These may be contaminants for a material (like some forms of biodegradable plastics or stickers on fruit and vegetables) or materials that clog processing systems (like plastic bags)
Responsibly Managed Landfills	Manage landfills to minimize discharges to land, water or air that are a threat to planetary, human, animal or plant health. This must include plans for closure and financial liability.
Sustainable Purchasing	The purchase of goods and services that take into account the economic value (price, quality, availability and functionality) and the related environmental and social impacts of those goods and services at local, regional, and global levels.
Value	The importance, worth, or usefulness of something that may be economic, social, environmental, or sentimental.

Waste Deregulation

The act of removing environmental health and safety regulations from waste, often treating it as if it is no longer waste. Such as the U.S. EPA's Non-Hazardous Secondary Materials rule which allows burning of waste in various applications, and as a consequence, no longer subject to stricter air pollution requirements associated with waste incineration. This also includes allowing toxic or potentially toxic waste streams to be recycled, composted, or managed in a way that is or would be a threat to planetary, human, animal, or plant health.

Further examples of waste deregulation include but are not limited to: using hazardous waste, low-level radioactive waste, sewage sludge, or composted MSW residuals as soil amendment or fertilizer, incorporating incinerator ash or coal power plant fly ash into cement, and artificial underwater reefs; incorporating radioactive metals and other toxic materials into the general material stream and consumer products without any limitation or labeling, using fly ash and sewage sludge as mine fill (filling in surface coal mines) without any liner systems to protect groundwater; using incinerator ash, sewage sludge, construction/demolition debris, auto shredder residue, and other hazardous waste streams as alternative daily cover at landfills.