

# WASTE MANAGEMENT WHITEPAPER

## A FOUR STEP GUIDE TO ZERO WASTE

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# INTRODUCTION

In its landmark 1987 Report – Our Common Future – the Brundtland Commission created the first formal definition of sustainability: *“development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”* Future refinement of this concept emphasized that, in order to be successful, sustainability must be understood as a three-legged stool that places equal emphasis on people, planet, and profit.



Practitioners interested in developing and executing sustainability strategies, however, quickly encountered a challenge: how does an individual or organization measure their sustainability impacts or gauge the efficacy of their improvement efforts? Without a measurement methodology, management of a topic as broadly defined as sustainability appeared elusive.

To help remedy this challenge, a new accounting framework was pioneered known as triple bottom line (TBL) accounting. TBL accounting expanded upon traditional financial accounting methodologies and extended those same principles of value determination to include environmental and social dimensions of business operations.

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With the philosophical and measurement directions set by the concepts of Sustainability and TBL accounting, organizational managers began rolling up their sleeves to operationalize these still broad concepts. To address environmental topics, focus areas quickly grew around energy, water, waste, and supply chain impacts. For waste – the goal of Zero Waste was established to create directional guidance for waste management efforts.



Given the heavy Zero Waste emphasis on product design, companies not involved in design and manufacturing have traditionally had fewer examples to learn from when attempting to develop effective Zero Waste strategies. The goal of this white paper is to help prepare your organization to define, plan for, and execute a Zero Waste strategy of your own.

## DEFINITION AND INDUSTRY STANDARDS

Zero Waste is considered achieved when no more than **10 percent** of material discards are disposed of in a landfill or incinerated at waste-to-energy facilities.

Mirroring an understanding of natural systems – in which waste does not exist - Zero Waste is a philosophy and design principle that addresses resource use by improving on how products and packaging are designed, manufactured, deployed, and “disposed” of at the end of their useful life.

Whereas traditional production systems are one-way or linear—going from the extraction of resources and the manufacturing of goods to their use and then ultimate disposal—Zero Waste systems work to redesign processes to be cyclical, “closing the loop” on materials management. From this paradigm, there is no such thing as ‘waste’; discards are either designed out completely or fed back into the production cycle as raw material with the potential to generate jobs and create financial opportunities via new products.<sup>1</sup>

Let us be clear on one critical point: currently, the technology does not exist to recycle or otherwise divert from the landfill 100% of materials flowing through your organization. Zero Waste as a definition is directional, not literal.

To help put some boundaries on how organizations use the term, in April 2005 the Zero Waste International Alliance (ZWIA) adopted a series of principles to guide and evaluate current and future Zero Waste policies and business programs. These guiding principles create the only peer-reviewed, internationally accepted definition of Zero Waste.

Zero Waste is considered achieved when no more than 10 percent of material discards are disposed of in a landfill or incinerated at waste-to-energy (WTE) facilities.<sup>2</sup>

For many, a definition of Zero Waste that allows up to 10% of materials to end up in a landfill or incinerator may be difficult to accept. Working with the constraints of our current technological limitations, however, this definition defines best-in-class waste management. The allowable percentage of landfill and incineration management for Zero Waste companies will undoubtedly shrink as technologies and management practices improve, eventually aligning the definition with its lofty and absolute target of zero.

## 4 STEPS TO ZERO WASTE

Setting an organizational goal for Zero Waste attainment can be overwhelming, but as with any audacious goal, breaking the effort into smaller steps can make the overwhelming actionable.

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<sup>1</sup> [www.ecocycle.org](http://www.ecocycle.org)

<sup>2</sup> [www.zwia.org](http://www.zwia.org)

The following are 4 steps to help you achieve Zero Waste at your organization:



1. **Conduct material flow and waste audits** – to gain a thorough understanding of waste generation and composition dynamics
2. **Develop prevention strategies** – to limit the amount of unnecessary waste that makes its way to your organization to begin with
3. **Explore alternative utilization plans** - to redesign processes that fundamentally change resource input requirements
4. **Change end-of-life materials management** - to return materials back to technical or biological nutrient cycles

When following these steps, keep in mind that all management options are not created equal. The graphic below depicts the generally accepted prioritization of waste management options, from most desirable to least.

It is interesting to note that while much of the focus in popular culture revolves around increasing the rates of recycling, far better is to prevent the generation of waste to begin with.

## Step 1: Conducting Material Flow and Waste Audits

The first step on the journey towards Zero Waste involves developing a thorough understanding of your organization's material flows and waste composition. It is on this intimate and data-based understanding of your organization's use of materials and creation of waste that all future management actions will be developed.

To map material flows, move with the stream. This activity is accomplished by literally following the flow of materials throughout your organization. Information to gather includes:

- Frequency and methods by which raw materials are received from suppliers
- Generation points and types of by-products being generated during production and distribution operations
- Location, type, and size of bins used to collect by-products, including space constraints for modifications

After the above information is captured, conduct a thorough audit of all waste, recycling and compost containers. Audits provide a comprehensive breakdown of the type and quantities (by weight and volume) of by-products currently being generated, as well as a baseline to compare future progress against.

If your company manages a multi-site portfolio, then the audit process should be repeated in multiple locations to account for product variations between stores as well as geographical variations in

recycling/composting infrastructure. Pick a representative portion of your portfolio and extrapolate results across like categories.

The results of your material flow and waste audits gives you the data needed to identify opportunities within the next three steps to a complete Zero Waste strategy: prevention, utilization, and diversion. These are presented in order of importance and adhere closely to the standardized waste management hierarchy depicted above.

## Step 2: Develop Prevention Strategies

The second and arguably most important step towards achieving zero waste involves finding and

Aquafina removed the cardboard base from its 24-pack packaging. This saved approximately 20 million pounds of corrugated cardboard annually.

implementing waste prevention opportunities. This starts with a thorough assessment of how products and packaging are designed. Innovations in packaging design that incorporate multiple materials may improve the function of packaging, but create issues with recycling. In designing products, eliminating unnecessary parts and/or minimizing the materials used, also known as dematerialization, can significantly reduce the amount of materials needed. New and improved

designs can eliminate or reduce the following costs:

- Raw material purchases
- Labor used to handle/manage both the raw materials and any by-products created during production
- Disposal and/or recycling costs

An example of how these costs are reduced can be found in PepsiCo's Aquafina bottled water. In 2009, a new bottle called Eco-Fina debuted that used 50 percent less plastic than its predecessor <sup>(see Figure 2)</sup>. In addition, Aquafina removed the cardboard base from its 24-pack packaging. This saved approximately 20 million pounds of corrugated cardboard annually. Not only did PepsiCo save money in raw material purchases, but the lighter bottles and 24-packs provided the additional benefit of improved fuel efficiency during transportation.



FIGURE 2

Another area where small, incremental changes can have significant impacts is in the packaging and shipping of raw materials and final products. Excessive packaging costs businesses significant amounts of economic capital, decreased transportation efficiencies, and increased amounts of labor to handle these materials. Walmart, perhaps the most important driver in improving packaging efficiency in recent years, has worked with their vast supplier network to achieve huge savings.

The example that kick-started these efforts came from the observations of an outside consultant that a popular toy's display box was several inches larger than was necessary to hold the product. The change suggested did not impact functionality and was imperceptible, yet the savings and collective impact from this simple reduction was dramatic. In addition to using less cardboard to make the displays, 497 fewer shipping containers were needed to ship the same number of toys. All in all, these changes led to \$2.4 million in annual savings.<sup>3</sup>

By proactively engaging vendors in your Zero Waste efforts, companies can work to strip unnecessary materials out of the entire product lifecycle, creating production, in-store, and consumer waste reductions.

While the Aquafina example is illustrative of significant design savings for companies in charge of manufacturing, the Walmart example demonstrates the power that retail companies can exert on their supply chain. By proactively engaging vendors in your Zero Waste efforts, companies can work to strip unnecessary materials out of the entire product lifecycle, creating production, in-store, and consumer waste reductions – a win-win-win scenario.

### Step 3: Develop Alternative Utilization Plans

Over the past several decades society has adopted a disposable mentality in regards to products and packaging. Some examples include bottled water, coffee cups, Styrofoam plates, and plastic bags. The third step towards achieving Zero Waste involves reversing this trend by improving the utilization of resources. Taking useful products and reusing or repurposing them helps save time, money, energy, and resources. Reuse includes conventional reuse where the item is used again for the same function and new-life reuse where it is used for a different function.



FIGURE 5

Some examples of conventional reuse include printer cartridges and toners, milk crates and returnable milk bottles, reusable coffee mugs (Figure 5), and use of durable reusable/returnable packaging systems. In the automotive industry, Toyota utilizes collapsible packaging modules made from durable plastic for many of their car parts (Figure 6)<sup>4</sup>, and Subaru reuses Styrofoam packaging used to protect motor parts up to seven times before recycling.<sup>5</sup> Finally, many items such as used furniture, electronics, unused office supplies, and edible food products can be donated to non-profit organizations like Goodwill or local food banks rather than land-filled.

<sup>3</sup> Force of Nature, The Unlikely Story of WalMart's Green Revolution, Edward Humes, 2011.

<sup>4</sup> Establishing Metrics for a Zero Waste Business, Ryan McMullan – Toyota Motor Sales

<sup>5</sup> <http://www.subaru.com/company/environment-sustainability.html>

Some examples of new-life reuse include forward-thinking menu planning at full-service restaurants to reuse vegetable and meat trimmings in soups and sauces; collecting once-used cardboard boxes originally used to transport raw materials, parts, etc. and reselling them for any number of new uses; and reusing plastic supermarket bags as garbage can liners.

In the end, utilizing conventional or new-life reuse opportunities provide many economical and environmental benefits that should be practiced by all industries.



FIGURE 6

## Step 4: Change End-of-Life Materials Management

Once prevention and utilization opportunities have been fully maximized, it is time to address how products and materials are managed at the end of their useful life. What was previously viewed as trash now needs to be viewed as a pile of valuable resources to be used in the making of something new. This shift in perspective requires new management and handling procedures to assist in closing the loop for all by-products by initiating or expanding recycling and composting programs.

The steps to develop a comprehensive recycling program include:

1. Conducting a waste audit (discussed previously)
2. Creating a green team or selecting a recycling champion at each location
3. Partnering with janitorial staff
4. Identifying local recyclers
5. Deciding on a collection system (source-separate or single-stream)
6. Setting up bins, containers, and signage for recyclables
7. Creating a recycle-friendly environment via employee training and customer involvement
8. Promotion efforts geared towards customers and the local community.

Other considerations for a recycling program include equipment solutions such as balers, and utilizing your supply chain via reverse logistics to bring products back to a distribution or production center. This later option can be used in situations where the local recycler does not take certain materials or you have a remote location where no recycling is available. When utilizing this option, it typically is necessary to source separate in order to maximize revenues.

Composting programs can be located either on-site or off-site. The primary variables to be considered in making this decision include:

- Assessing space availability for equipment on-site
- Determining the financial ability to purchase or lease equipment
- Assessing the potential impact of odor/vermin issues on operations
- Researching the proximity of external composting facility (the website [www.findacomposter.com](http://www.findacomposter.com) serves as a good starting point for locating one)

The decision should be relatively straightforward once these variables are researched and answered. The next step is to use the waste audit data to estimate what container size and collection frequency will be required to handle the capacities of food scraps and food soiled paper. Also, an inside collection system will need to be designed with bins that are typically color coded green and strategically placed throughout each facility near high-generation locations. For restaurants, this would be near food prep areas, dishwashers, and next to refuse containers. For most other locations, these typically include cafeterias, lunch rooms, and kitchenette areas.

If you are dealing with multiple locations, it is a best practice to identify and target a few pilot locations (ideally the same ones that were already audited) that will serve as testing grounds for new program rollouts.

## A ROADMAP FOR THE FUTURE

The four steps listed above will help your company develop a strategic and cost-effective approach to your Zero Waste efforts. In order to drive long-term execution success, your organization will need to commit time and resources to drive implementation and engage the organization in a process of continual improvement.

Publicizing waste prevention and waste diversion program milestones, as well as the positive environmental impacts to your employees, will help keep your organization motivated and excited about

reaching ever higher levels of waste prevention and diversion. Praise and recognition should be given to employees for a job well done.

The final point to remember is that after initial research and planning, it is important to simply get started.

Adjustments will most likely be needed at many points on this journey due to changing business models and new prevention and diversion opportunities, so don't wait for the perfect plan before getting started. Creating a bold vision and taking the first steps on what will be a long journey will go a long way in helping you succeed in achieving Zero Waste goals.

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## ABOUT ECOVA

Ecova is *the* total energy and sustainability management company whose sole purpose is to see more, save more and sustain more for our clients. Using insights based on consumption, cost and carbon footprint data spanning thousands of utilities, hundreds of thousands of business sites and millions of households, we provide fully managed, technology-optimized solutions for saving resources, which in turn increase returns, lower risks, and enhance reputations. Ecova is the largest non-regulated subsidiary of Avista Corp (NYSE: AVA and [avistacorp.com](http://avistacorp.com)). For more information, visit the company's website at [ecova.com](http://ecova.com), on LinkedIn at [linkd.in/ecovainc](https://linkd.in/ecovainc), or follow Ecova on Twitter at [@ecovainc](https://twitter.com/ecovainc).

## ABOUT WASTE MANAGEMENT SOLUTION

The Ecova Waste Management solution helps you implement a comprehensive waste stream management program. Partnering with Ecova, you can efficiently select the best, most cost-effective waste haulers for your portfolio while streamlining bill payments, service optimization, and Zero Waste programs.

As an independent third party working on your behalf, Ecova helps you negotiate the optimum terms for master service agreements with waste haulers, obtain the lowest rates available, and ensure compliance with negotiated rates. Our team's extensive experience with waste hauling and service management for thousands of sites across the country translates into savings of both time and costs for you. Improve the overall efficiency of your waste stream management program by ensuring proper pricing, appropriate service levels, and mitigating additional charges.

Additionally, our team of Zero Waste professionals is ready to support your environmental initiatives. From organizing waste audits to developing a comprehensive waste reduction plan, our experts can support your organization every step of the way.

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