2022 State Envirothon Current Issue Scenario

Waste to Resources

Your team works for Green Events LLC, an event planning company specializing in sustainable events. Your team has been assigned a new project – to reinvent a small outdoor musical festival. The festival has happened on the same weekend for about 10 years but hasn't focused much on sustainability in the past. Feedback from event attendees and sponsors included concerns that too much garbage was created, and recycling wasn't available during the event. In past years, about 30,000 lbs. of garbage was generated during the weekend of the event, all of it going to a landfill nearby for disposal. A waste audit of the garbage from the event showed that a large portion of the waste could have been used in better ways. Your goal is to minimize waste at the event through various means and not send any waste to a landfill at all, what we will call 'zero-landfilling'. The outdoor venue is a small park in a rural area, and a site map has been provided to you for planning purposes. The event will host approximately 5,000 attendees over a 4-day weekend, with a portion of the attendees camping in a natural area next to the festival site. It is an important part of your job to make sure that the event is a sustainable success, and that you show both event sponsors and attendees that waste is preventable, and that their waste is a resource!

Figure 1: Festival Waste Audit Results (image source: Zero Waste Paulo Alto)

To accomplish your task, you will need to learn about solid waste management and how to reduce, reuse, recycle, compost, and use waste-to-energy to keep waste out of landfills and how we can all use waste as a resource.

Solid Waste Overview

We tend to think of waste as something that doesn't have value, or that 'goes away' when we throw it away. When you put something into the garbage can, it enters a $7 billion system that collects, transports, sorts, and disposes of the things that you no longer want. But… it's not really waste. Waste is just resources (like timber made into paper or cardboard, metal extracted from ore, oil used to make plastic, sand used to manufacture glass, or soil and water used to grow food) that we can use to make new products, or perfectly good things that could be used by someone else, or even things that could be redesigned to prevent waste in the first place. Solid waste refers to the industry and infrastructure that handles your garbage (sometimes referred to as 'refuse' or MSW – municipal solid waste). Often connected to solid waste are other programs that reduce waste, such as recycling and composting programs. Waste is separated into types or 'streams' that go to specific disposal destinations. Different disposal methods are prioritized based on environmental impact, with methods that are the least environmentally preferred being at the bottom. This order of preference is called the Solid Waste Hierarchy and is often used to inform decision making about solid waste planning and programs. In order of preference, the Solid Waste Hierarchy includes:

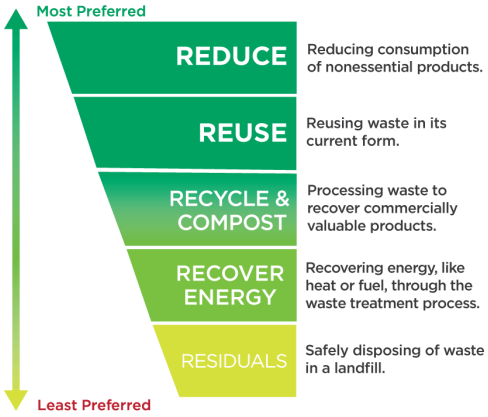

Figure 2: Solid Waste Hierarchy

Waste Reduction – prevent waste from happening.

Waste reduction, including rethinking product design to reduce packaging, only buying what you need, or even repairing items instead of disposing of them, is the most preferred way to manage waste, because it prevents waste from happening in the first place.

Reuse – the greenest product is the one that already exists.

Reuse is a very important waste reduction strategy, as it uses and reuses and makes the most of products that already exist. Items like refillable water bottles and coffee mugs, reusable food containers, or even clothing should be used and reused many times to maximize environmental benefit. Reuse benefits people who can save by buying used and reusing what they have and minimizes environmental impacts that can worsen public health. Reuse benefits the planet, because no additional resources are extracted when an existing item is reused or repurposed, and materials don't need to be re-manufactured as they do with recycling.

Recycling – making products out of waste materials

Recycling is the process of collecting specific waste materials that can be used as a raw material for manufacturing new products. The materials collected often fall into the following categories: Paper products, glass, plastic containers, aluminum and steel cans, and corrugated cardboard. Recyclable materials must stay relatively clean and must be separated into these categories before they can be pre-processed into materials ready for manufacturing new products. While many people think of recycling first, we need to focus more on reusing and prevent waste before it happens because not everything is or should be recyclable, and although recycling is a great way to keep waste out of landfills, recycling itself has a negative

environmental impact. Recycling takes energy, infrastructure, and lots of labor to get materials in a usable form to a manufacturer, in addition to the environmental impacts of the manufacturing process. This is why reuse (which doesn't require these inputs) is a better waste reduction strategy.

Composting – Nature's Way of Recycling

When we waste food, we waste all the resources that went into producing it, such as scarce freshwater resources, soil fertility, fertilizers and pesticides, fuel and machinery, and human labor. We can recover and use those resources again if we divert food waste and other compostable products through composting programs. Composting, sometimes referred to as organics recycling – is just decomposition occurring in a controlled manner. Nature recycles all the time, there is no waste in nature. In solid waste systems, food waste and other organic materials (including certified compostable cups made from plant resin, plates from plant fibers, utensils, napkins) can be separated out for specific organics recycling programs or commercial composting programs. Organics recycling programs are becoming more common in Minnesota and around the country as people realize that food waste and other organic matter should get recycled back into soil, not wasted in a landfill. Food waste can be composted in your backyard, but bigger amounts of organic waste can be collected in bins and hauled to a special commercial compost facility for organics recycling.

Resource Recovery

Resource Recovery, commonly referred to as Waste-to-Energy, is a strategy for disposing of waste that cannot be reused, recycled, or composted. There are benefits to Resource Recovery over Landfilling, which is why it is higher up on the Waste Hierarchy diagram. Resource Recovery burns waste in a controlled environment and uses the heat to produce steam. The steam can be used in manufacturing, or the steam can be used to generate electricity which is sold to help offset costs at the facility. The volume of the waste is also reduced by up to 85% during incineration, greatly reducing the volume that needs to be disposed of in a landfill. Multiple pollution control measures such as bag houses and neutralizing agents are in place to remove contaminants from air leaving the system. Continuous emissions monitoring protects the environment and ensures pollution control measures are adequate to meet all environmental standards and requirements. Resource Recovery facilities are quite expensive, but have more benefits than landfilling, and so some communities rely on them instead of building landfills.

Landfill/Residuals

The least preferred method of waste disposal is landfilling. The United States relies heavily on landfilling (approx. 52% landfilling vs 11% Resource Recovery at the national level) for waste disposal, while parts of Europe rely almost entirely on Resource Recovery for their waste disposal needs. Landfills are built to store waste, not decompose things, and a landfill essentially locks away resources (such as metal or other recyclables, food waste that could have been composted into new soil, or items that could have been reused such as clothing or housewares) and prevents them from being used further in any beneficial way. Landfills are built with thick impermeable liners and layers of soil and clay both on the bottom layer and on the top layer once they are full and need to be closed over. This protects groundwater from contamination and prevents any garbage from escaping or contaminating the environment, but it

also means that whatever is put into a landfill is locked away, for any practical purposes, forever. Landfills are extremely expensive engineered structures, and no one wants to live next to one making them extremely hard to get approved and sited.

Minnesota Solid Waste and Recycling Trends

On average, each person in the United States generates about 6 lbs. of garbage and recycling each day. While that doesn't seem like a lot when you think of just yourself, it adds up to be mountains of waste when you consider the population of the whole country, or the state. In your lifetime, you will make as much garbage as the weight of 9 large school buses! Although many try to reuse when they can and lots of people recycle, Minnesotans are generating more trash than ever, including more plastic waste and more food waste. (Fig 2) This is partly due to an overabundance of disposable convenience items, wasted food, and lots of items that are not recyclable and are recyclable but don't get into a recycling bin.

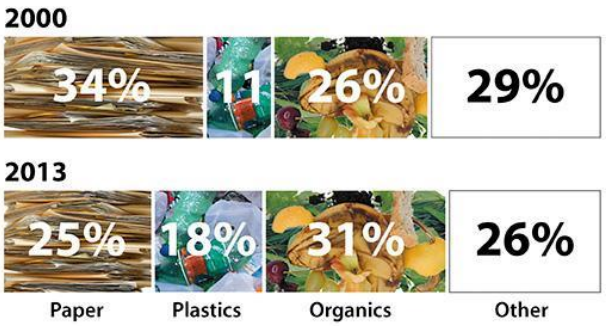

Figure 3: Minnesota waste trends after recycling. Source: Minnesota Pollution Control Agency

Let's Plan A Sustainable Event!

1. Choose a name for your event that will help communicate to event attendees, sponsors and vendors the change to a more sustainable focus.

2. Looking at waste audit results from past festival years (Figure 1), how much of your waste do you anticipate could be prevented or used as a resource instead of landfilled?

3. Think about the kinds of items attendees would bring to the festival that would need to be disposed of, or items that vendors would sell. What are the different types of waste you will collect at your music festival, and how will that waste be used as a resource that has environmental benefit?

4. What disposal containers will you need, and what kind of locations around the site (Figure 4, below) will you put them to make sure attendees dispose of things properly?

5. How will you communicate your goal of being a zero-landfill event to your event attendees – before they arrive and during the event? Your vendors? Are there items attendees should/should not bring?

6. How will you encourage and support waste reduction and reuse (preventing waste before it occurs) at your festival – the most preferred ways to manage waste on the Solid Waste Hierarchy?

7. How will you show to event attendees, sponsors and vendors that their waste is a resource that can be used in a beneficial way?

Figure 4: Festival Site Map

ADDITIONAL RESOURCES AND EXAMPLES

Moving beyond recycling op-ed https://resource-recycling.com/recycling/2021/01/25/first-person-perspective-its-time-to-upend-the-cycle-of-infinite-consumption/

Benefits of Recycling https://lbre.stanford.edu/pssistanford-recycling/frequently-asked-questions/frequently-asked-questions-benefits-recycling

Waste-to-Energy trends and emissions information https://news.climate.columbia.edu/2016/10/18/putting-garbage-to-good-use-with-waste-to-energy/

Organics Recycling benefits and the Food Waste Hierarchy https://www.epa.gov/sustainable-management-food/reducing-impact-wasted-food-feeding-soil-and-composting

Event Recycling Services example: https://www.co.washington.mn.us/3077/Event-Recycling

10 tips for throwing a large zero-waste event https://www.goingzerowaste.com/blog/10-tips-for-throwing-a-large-zero-waste-event/

Clean River Blog: Planning an eco-friendly event https://cleanriver.com/blog-plan-eco-friendly-event/

Recycle Camp at Burning Man Festival https://burningman.org/event/black-rock-city-guide/infrastructure/recycle-camp/

Sustainability Initiatives at San Francisco Outside Lands Music Festival https://www.sfoutsidelands.com/experience/sustainability/

Give Waste a New Life example https://ottertailcountymn.us/content-page/give-waste-a-new-life-recycle/

Forever Ware – reusable takeout containers https://foreverware.org/

Examples of industrial wastes used as a resource, explanation of circular vs linear system https://community.materialtrader.com/3-examples-of-using-waste-as-a-resource/

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