



Draper Aden Associates

Engineering • Surveying • Environmental Services

The Future of Solid Waste and Recycling

Shifting purchasing patterns, maximizing re-use, etc.

Presented By: Ernie Hoch

The Future of Solid Waste and Recycling

Timeline:

- Until the early 20th century we reused and recycled everything possible, food scraps even in large city went to feed animals.
- 1950-By the mid century, we began to substantially increase our waste generation. Landfills began to be established in every community.
- 1965 - Solid Waste Disposal Act (SWDA)
- 1970 - Earth Day / The Environment and Recycling
- 1976 - RCRA
- 1989 - EPA said we were running out of landfill space
- 1991 - Subtitle D established for all future landfills
- 2000 - 100's of landfills in every State
- 2021 - Substantially fewer landfills with a move to larger landfills
- 2022 - And Beyond

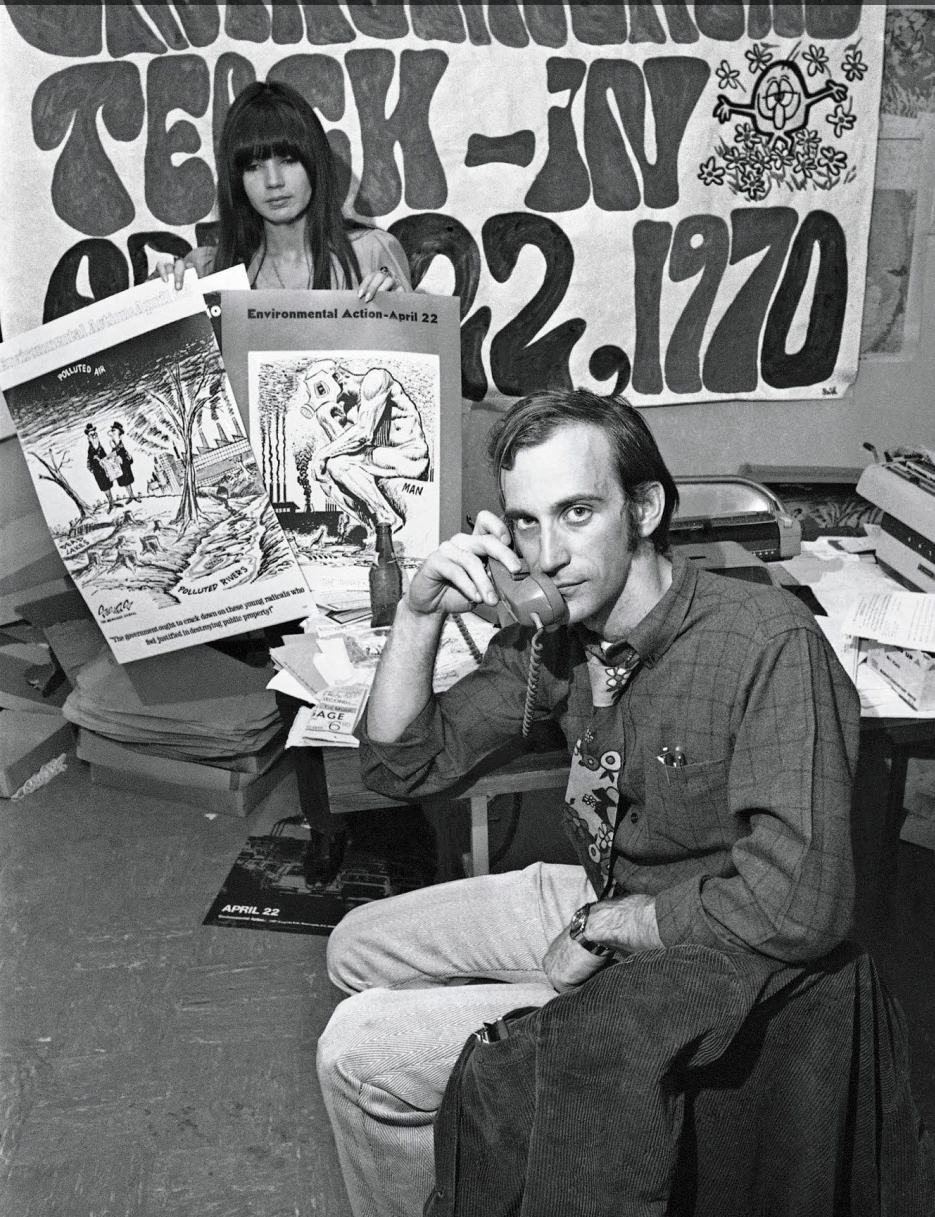
The Idea for the First Earth Day

A black and white photograph of Senator Gaylord Nelson. He is a middle-aged man with light-colored hair, smiling and looking slightly to his right. He is wearing a dark suit, a white shirt, and a patterned tie. He is standing behind a podium that has several microphones attached to it. In the background, an American flag is visible, slightly out of focus.

Senator Nelson announced the idea for a teach-in on college campuses to the national media, and persuaded Pete McCloskey and Denis Hayes to organize campus teach-ins and they choose April 22, a weekday falling between Spring Break and Final Exams, to maximize the greatest student participation.

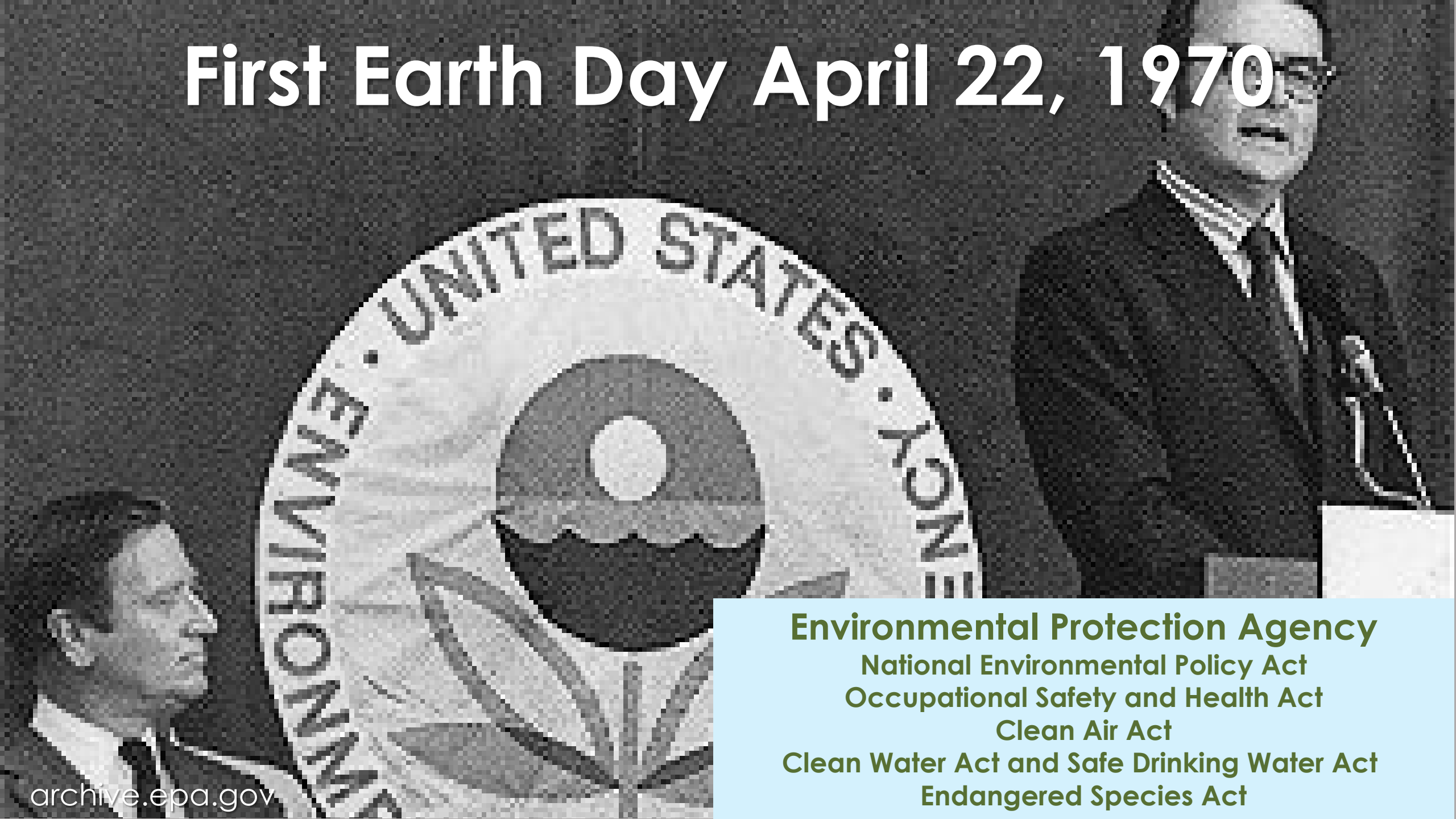
Senator Gaylord Nelson – alumnipark.com

First Earth Day April 22, 1970



The First Earth Day inspired 20 million Americans to take to the streets, parks and auditoriums to demonstrate against the impacts of 150 years of industrial development which had left a growing legacy of serious human health impacts.

First Earth Day April 22, 1970



Environmental Protection Agency

National Environmental Policy Act

Occupational Safety and Health Act

Clean Air Act

Clean Water Act and Safe Drinking Water Act

Endangered Species Act

Resource Conservation and Recovery Act

RCRA

RCRA was signed into law **on October 21, 1976** to address the increasing problems the nation faced from our growing volume of municipal and industrial waste.

Subtitle D (Subpart A) affects new, existing and lateral expansions of Municipal Solid Waste Landfills, April 9, 1994

Virginia House Bill 1205

United States
Environmental Protection
Agency

Office of
Public Affairs (A-107)
Washington, DC 20460

Volume 15
Number 2
March/April 1989

EPA JOURNAL

Introducing
William K. Reilly,
EPA's New Administrator

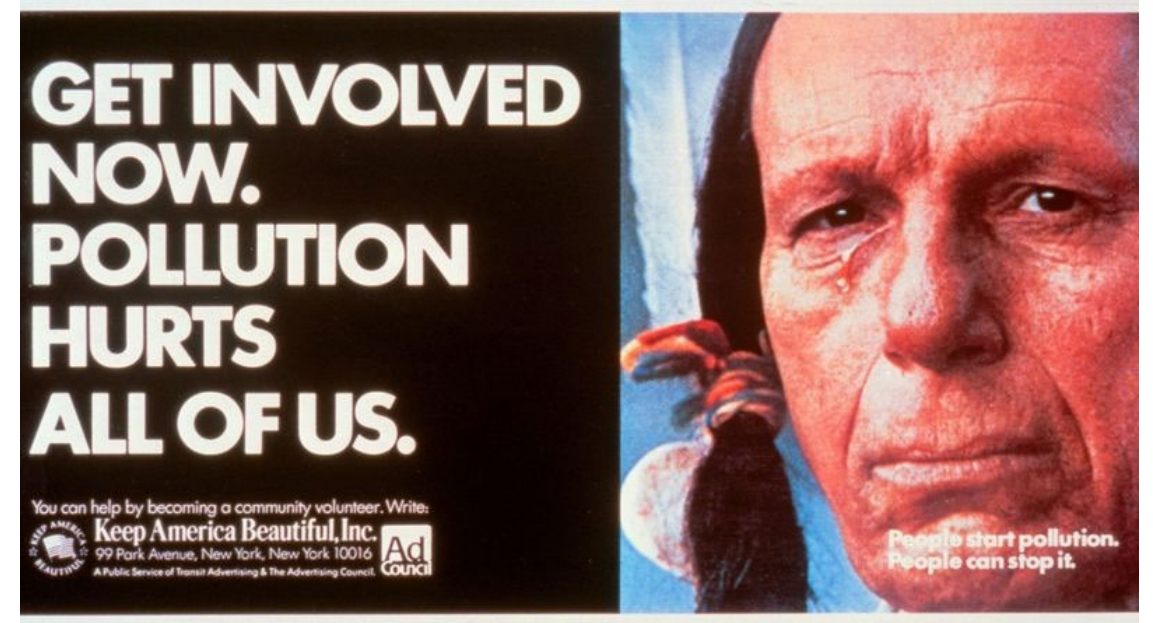
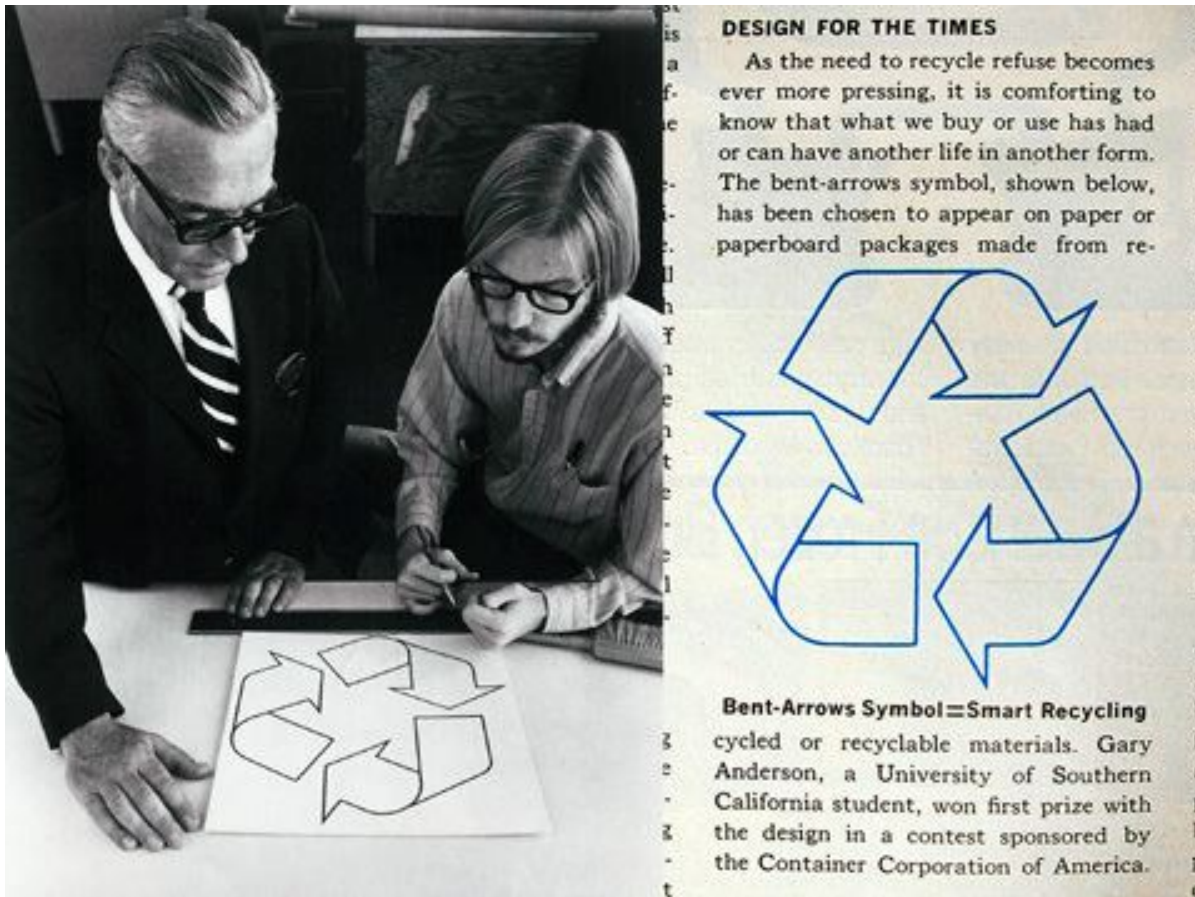


The Garbage Crisis: —Understanding It —Finding Answers

Garbage Crisis?

Changing Behavior

Gary Anderson's three arrow recycling design



Keep America Beautiful Ad

The Publics View of Landfills



Our View of Landfills

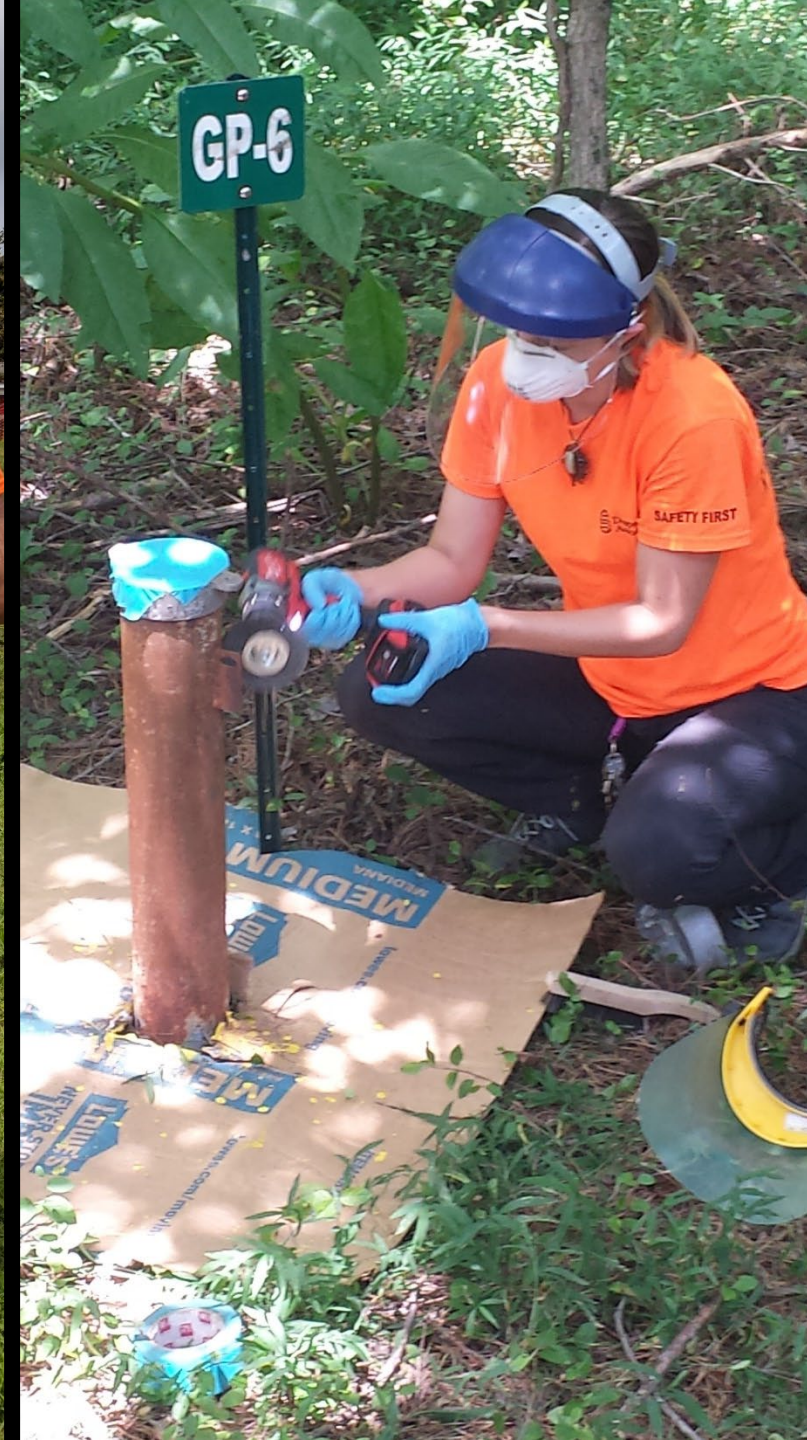






Landfills Today

Landfill Siting
Landfill Liners
Construction Design Standards
Leachate Management
Groundwater Monitoring
Corrective Action
Air Emissions / Landfill Gas
Stormwater Management
Prevent Haz Waste
Daily cover
Secure Facilities
Record Keeping
Operator Training
Closure
Post Closure
Financial Assurance



**And the trash
keeps coming**



Part of The Problem is Consumption

Humans have **consumed more resources** in the past

50 years

than in all of our previous history

Between 1960 and 2008 consumption in the US has nearly tripled

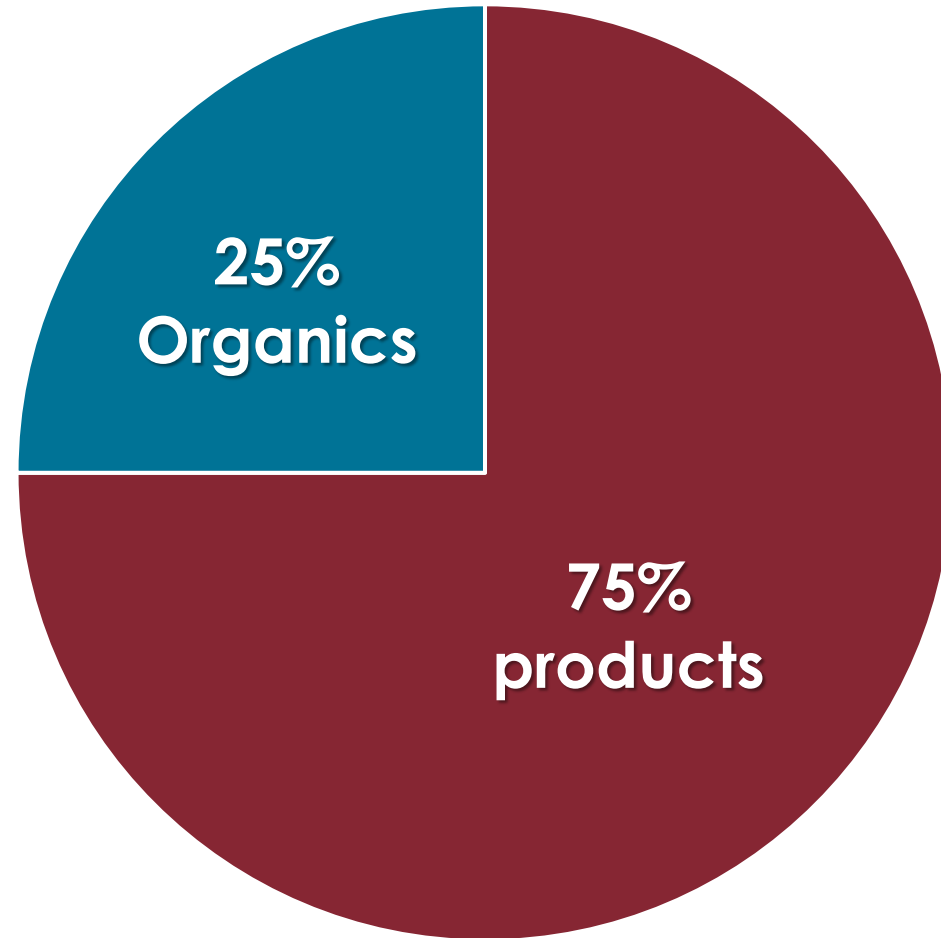


A large landfill of food waste under a sunset sky. The image shows a massive pile of discarded food items, including plastic packaging, cardboard boxes, and various food scraps, stretching across the landscape. A yellow excavator is visible on the right side of the pile. The sun is low on the horizon, creating a warm, orange glow over the scene. The sky is a mix of orange and blue.

Around the globe we throw away
1.3 billion metric tons of food each year

795 Million people suffer chronic undernourishment
 $\frac{1}{4}$ of wasted food would feed 870 million people

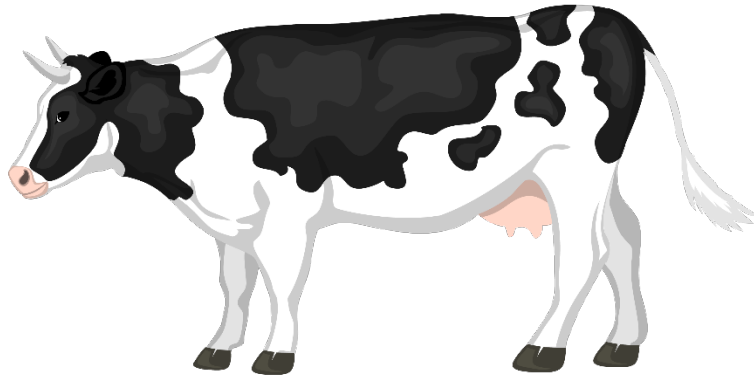
What Do We Throw Away



The average American generates



4.4 pounds of trash
per day



1,606 pounds per year



As tall as the Leaning
Tower of Pisa
192 ft³

But only recycles or composts 1/3 of that waste

The average office worker's waste generation





What is Zero Waste ?

It means zero discards to landfills, incinerators and the environment.

Zero Waste Approach

More than just recycling - Recycling is the last resort

Using a zero waste approach means:

Preventing waste from occurring in the first place

Pre-planning for materials that must be managed and ultimately disposed of

Assessing the type and amount of these materials

Seeking out practical ways to reduce, reuse and/or repurpose significant amounts of material

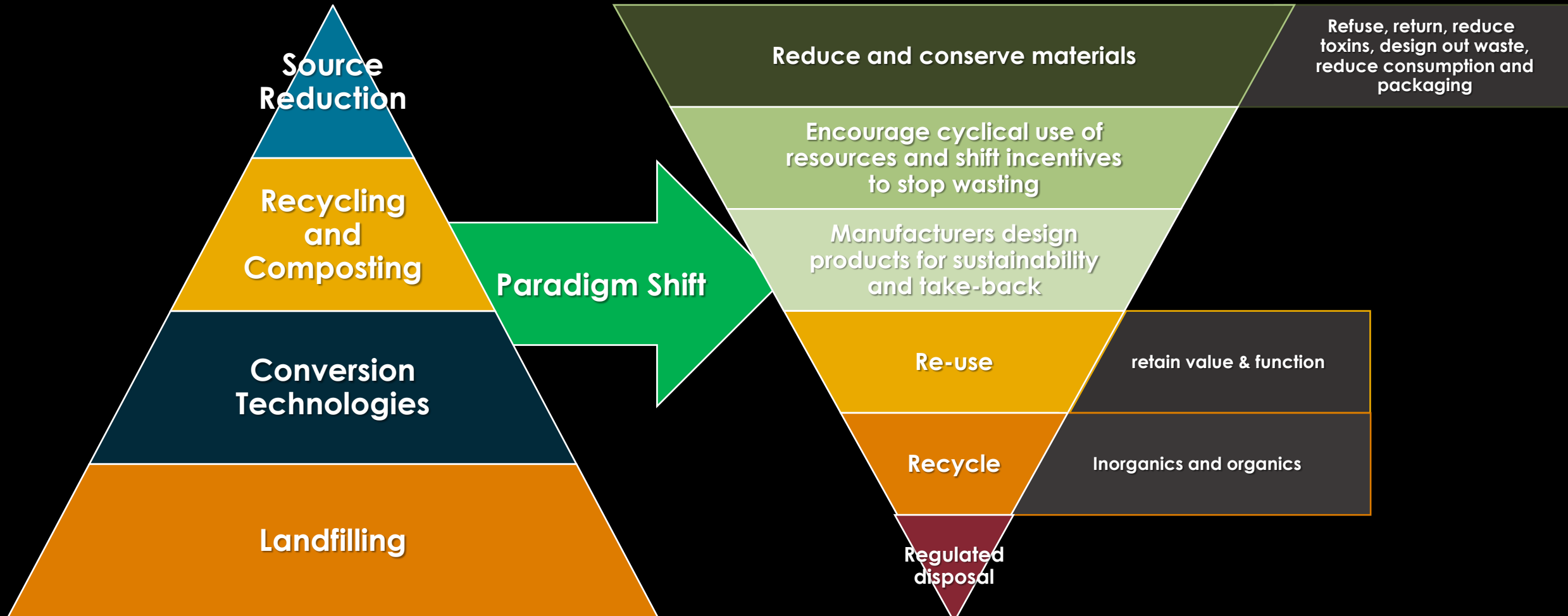
Composting as much as possible

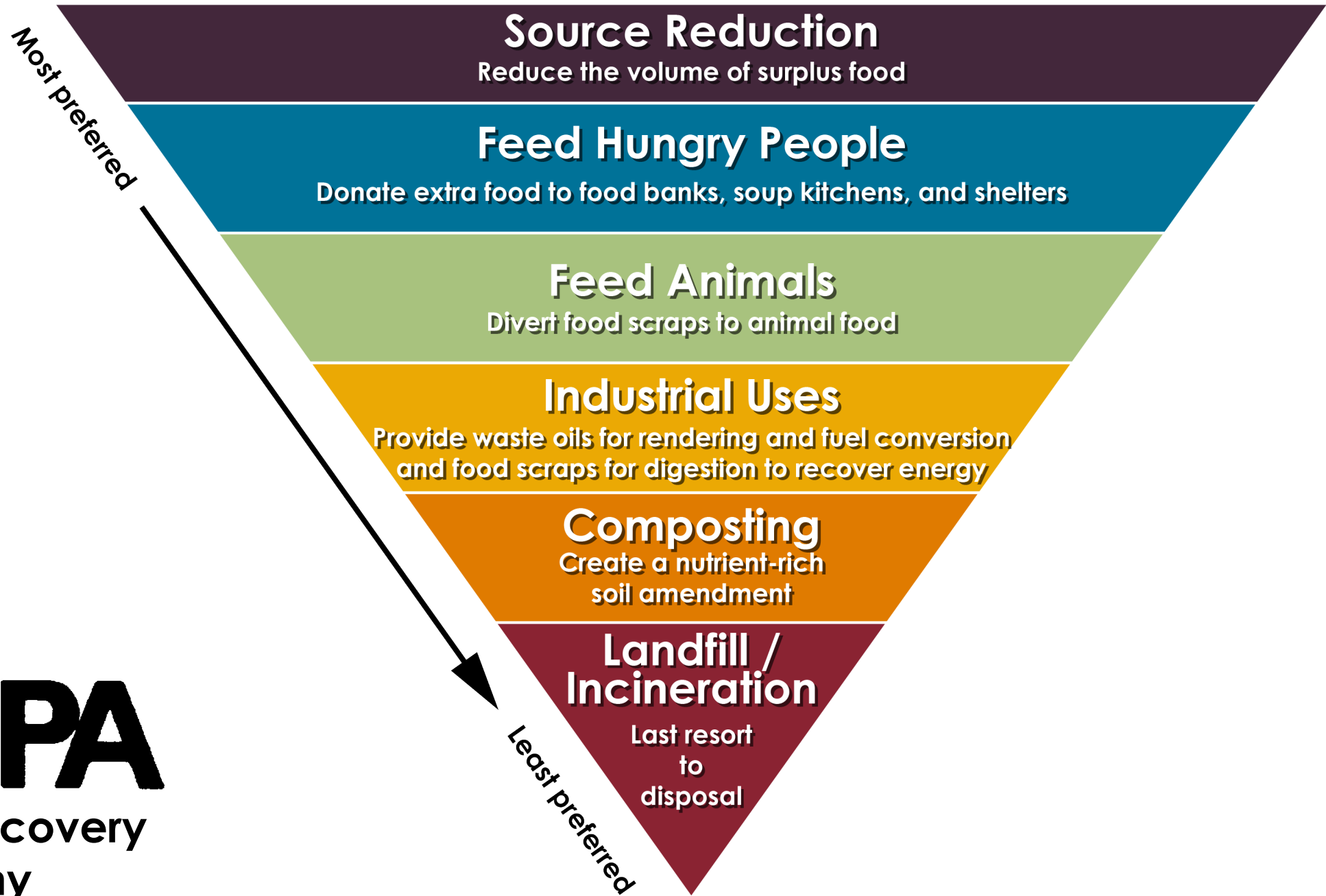
Recycling as much as possible



Conducting these actions **locally** or within the nearby region

Solid Waste 101 - The Hierarchy





Others moving in this direction

Baltimore launches plan to get to 'zero waste,' starting with closure of city trash incinerator



By SCOTT DANCE

BALTIMORE SUN | FEB 24, 2020 | 10:33 AM



The Wheelabrator Baltimore trash incinerator near Russell Street and Interstate 95.(Lloyd Fox / Baltimore Sun / Baltimore Sun)

A coalition of environmental and community groups and half a dozen Baltimore City Council

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Zero Waste Stadium- ASU



Distillery

Example of Reuse Highest and Best Use

Portland distillery turns their alcohol waste into free hand sanitizer (9 Photos)



By: [Martin](#)
In: [Awesome](#), [Heroes](#), [Humanity](#)
Mar 12, 2020

1002 45 33



Sierra Nevada Brewing Company

The background of the slide is a photograph of the Sierra Nevada Brewing Company building. The building is a light-colored, multi-story structure with a prominent arched entrance. A large green wall, possibly a living wall or ivy-covered facade, runs along the side of the building. The words "SIERRA NEVADA BREWERY" are visible on the building's facade. The sky is clear and blue.

Their Chico, CA brewery was certified as platinum-level zero waste company by the U.S. Zero Waste Council in 2014. Their plant in Mills River, North Carolina is Platinum Certified.

Sierra Nevada claimed to save more than \$5 million when they kept 99.8 to 100% of their waste out of landfills

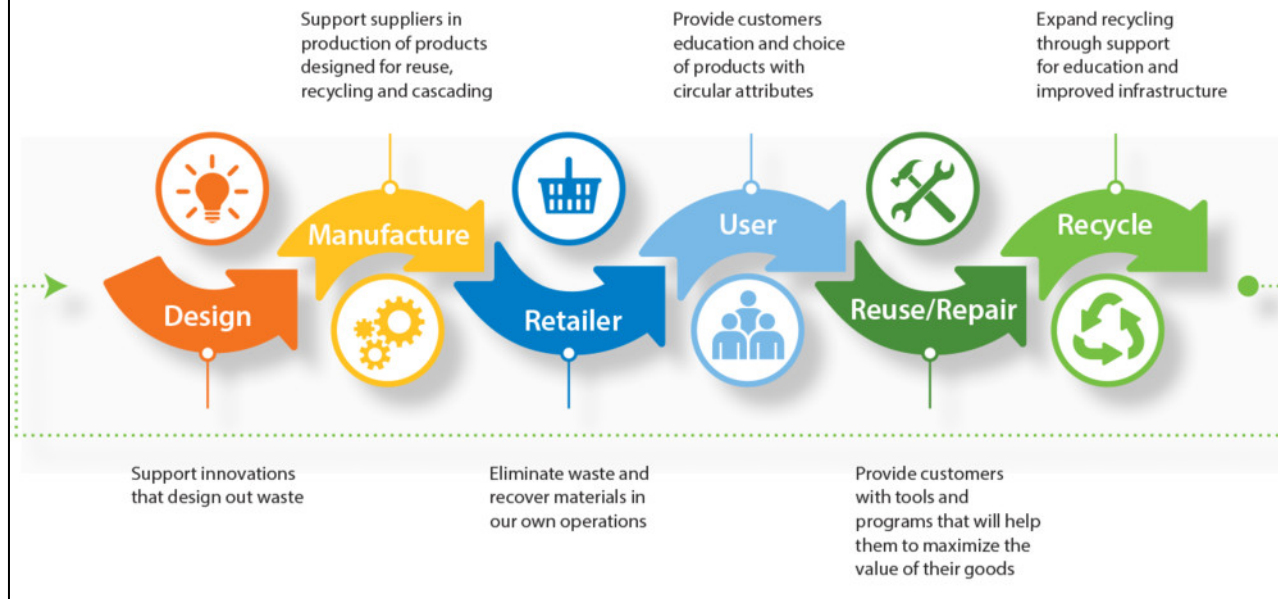
Sierra Nevada sends all of their used brewing ingredients (roughly 150,000 pounds of malted barley and 4,000 pounds of hops daily) to local cattle and dairy farms to be repurposed as feed.

Their Chico, CA brewery is home to the first Hot Rot composting system in the U.S. and has turned more than 5,000 tons of organic waste into usable compost since 2010.

Sierra Nevada uses the HotRot compost in their own fields and gardens but they also utilize a local composting company near their brewery in Mills River, NC.

Walmart

How Walmart supports a circular economy



"ACHIEVING ZERO WASTE IS ONE OF
THREE SUSTAINABILITY GOALS THE

Walmart Zero-Waste-to-Landfill Program

Recycle, repurpose, reuse

Walmart compiles disposal and recovery data for 50 separate waste categories, such as cardboard, paper, aluminum, plastic bags and more.



50
separate
waste
categories



571
million pounds
of donated food

Donated food

In 2013, Walmart stores/clubs donated 571 million pounds of food – the equivalent of 368.6 million meals – to local food banks and hunger relief organizations, like Feeding America.

Reused organic material

Walmart worked directly with suppliers to turn 56 million pounds of recovered cooking oil into bio-diesel, soap or a supplement for animal feed.



56
million pounds
of recovered
cooking oil

WWW.COMPANIESFORZEROWASTE.CO

Toyota

A silver Toyota Camry is shown from a rear three-quarter view, parked on a wet, reflective surface at night. The car's taillights are illuminated, and its reflection is visible on the wet pavement. In the background, a city skyline with numerous lights is visible under a dark, starry sky. The overall scene is atmospheric and modern.

In 2013, Toyota became a founding member of the U.S. Zero Waste Building Council.

By 2015 Toyota of North America reduced, reused, and recycled its way to a 96% decrease in total non-regulated waste production.

The 96% waste reduction mentioned above equates to roughly 900 million pounds that would have been sent to landfill.

Toyota currently has 27 North American facilities that meet the U.S. Zero Waste Building Council definition of a zero waste site (10 of the 27 facilities are manufacturing plants).

General Motors

As of 2016, General Motors had 152 zero waste facilities. They credited this success to their employees, recycling, reusing and converting waste to energy, and developing products from recycled materials.

GM's 152 LANDFILL-FREE FACILITIES

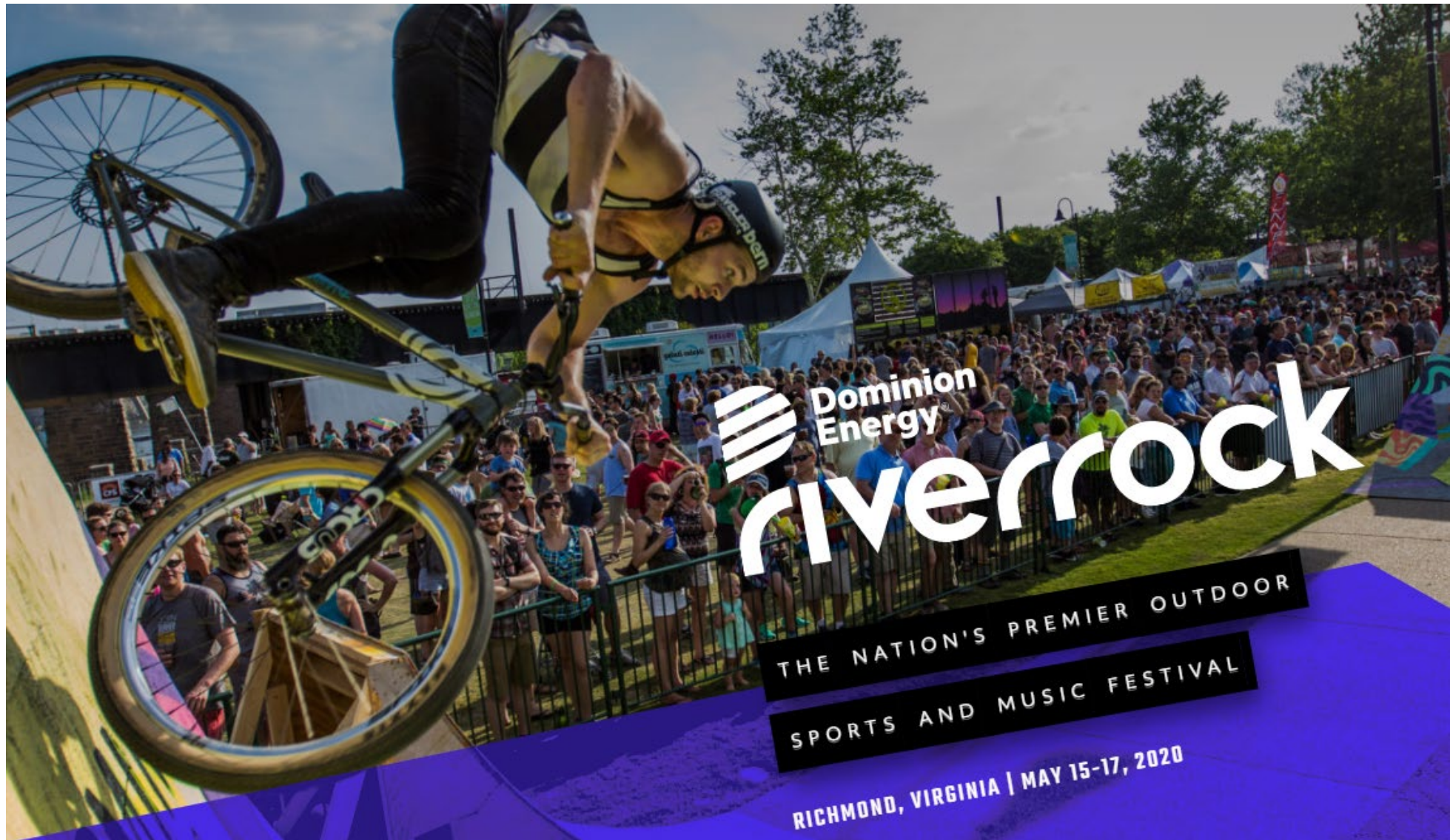


Bonnaroo Music Festival



(Photo: Live Nation owns a controlling stake of the annual Bonnaroo festival, which has onsite composting capabilities. Credit: Bonnaroo)

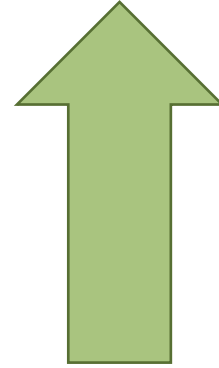
RiverRock



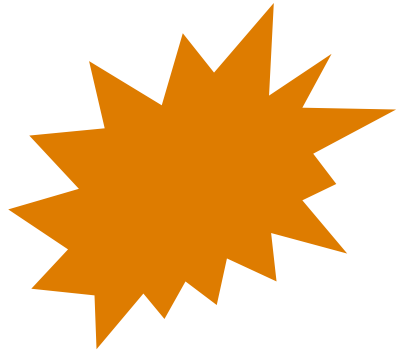
Commitment To Zero Waste Requires



Cultural Change



Continuous Improvement



Challenging Existing
Wasting Practices



Familiarity with Waste
Stream

Planning For 100% Diversion

Evaluate Details of Operations

- Tracking waste to identify solid waste diversion and costs
- Review purchasing records and service contracts
- Waste audit to summarize existing systems, manufacturing processes, and material streams.
- Evaluation of internal policies, programs and infrastructure.



Planning For 100% Diversion

Develop Zero Waste Plan

- Implementation strategies and zero waste policies, including
 - New Rules
 - Mandatory Recycling
 - Product Stewardship
 - Comprehensive Outreach
 - Technical Assistance
 - Training
- Economics and funding
- Required personnel, service opportunities, and/or infrastructure
- Timeline with realistic milestones
- Setting goals



Planning For 100% Diversion

Implement Zero Waste Plan

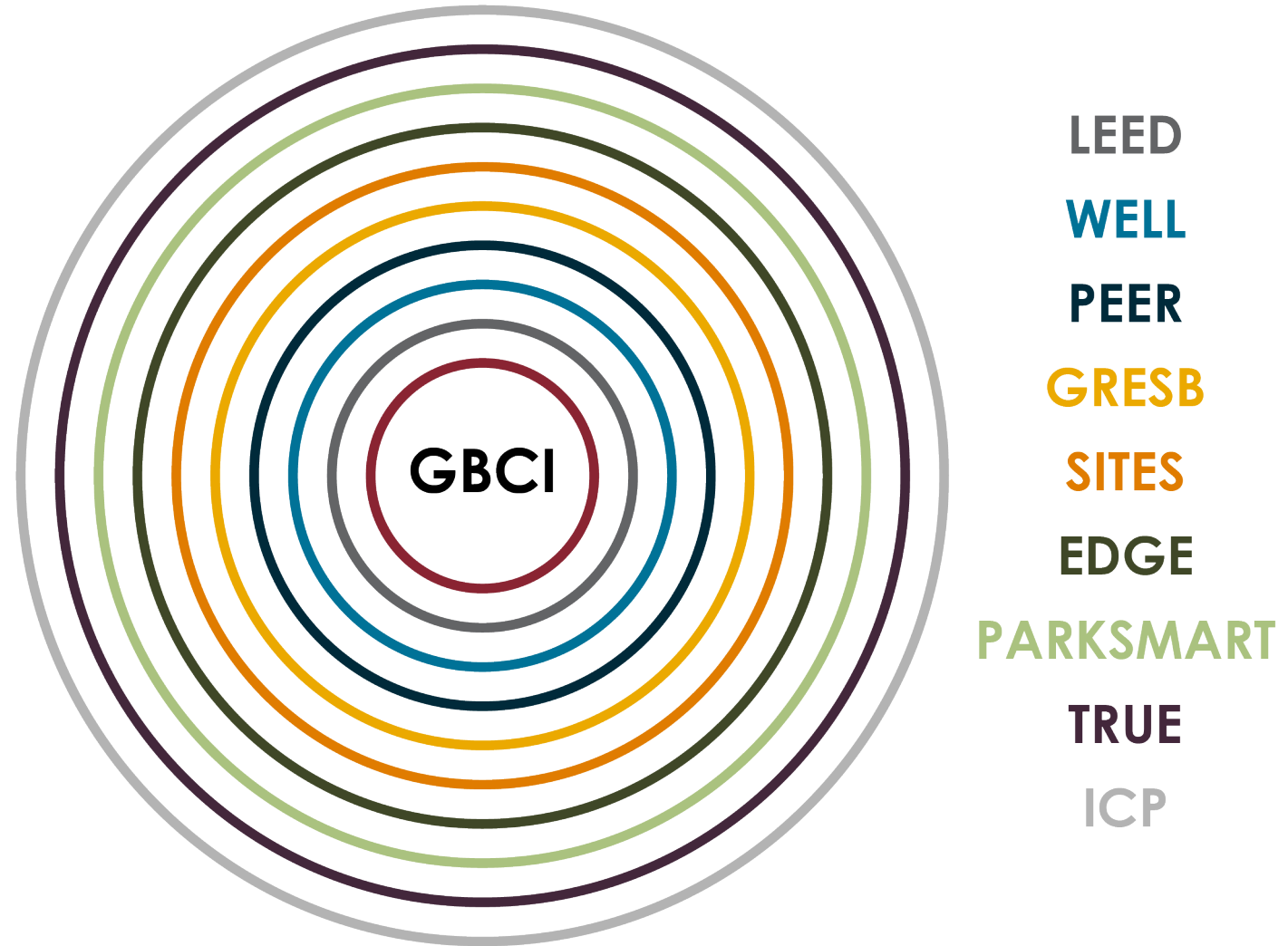
Requires:

- Commitment to continuous improvement
- Continual review of practices and policies
- Employee training and total participation
- Celebration of successes!



Who Certifies?

- GBCI – Green Business Certification, Inc.
- Premier organization independently recognizing excellence in green business industry performance and practice globally.
- Similar to the LEED certification process only focused on the waste stream





Draper Aden Associates

Engineering • Surveying • Environmental Services

How will you make a *Lasting Positive Impact* to our Environment

Ernie Hoch

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