

Zero Waste Workshop

**Missouri Recycling
Association**

Kansas City, MO

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Zero Waste =

Reduce

Reuse

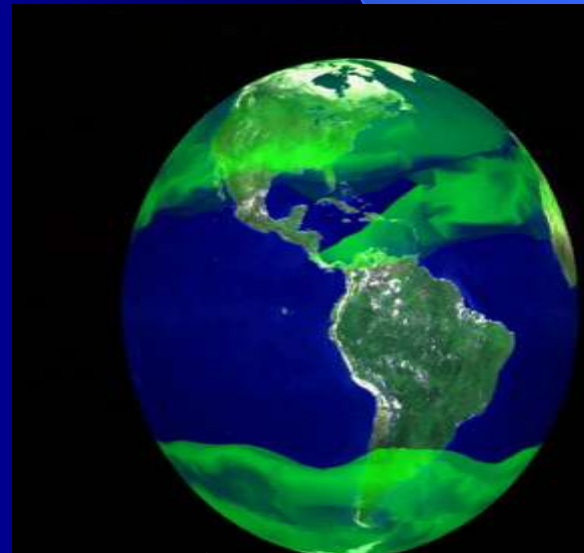
Recycle

Definition of Zero Waste*

- 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.

Is Zero Waste Attainable ?

- **Nature Is The Model**
- **Zero Waste, Or Darn Close**
- **Businesses Have Achieved Over 90% Waste Reduction**



Picture: Methane Earth; Credit: [GISS](#), [NASA](#)

Zero Waste builds on and works with ...

- **Pollution Prevention**
- **Natural Step**
- **Natural Capitalism**
- **CERES Principles**
- **Design for the Environment**
- **Triple Bottom Line**
- **Factor 4, Factor 10**
- **ISO 14001**

Can we Afford Zero Waste?

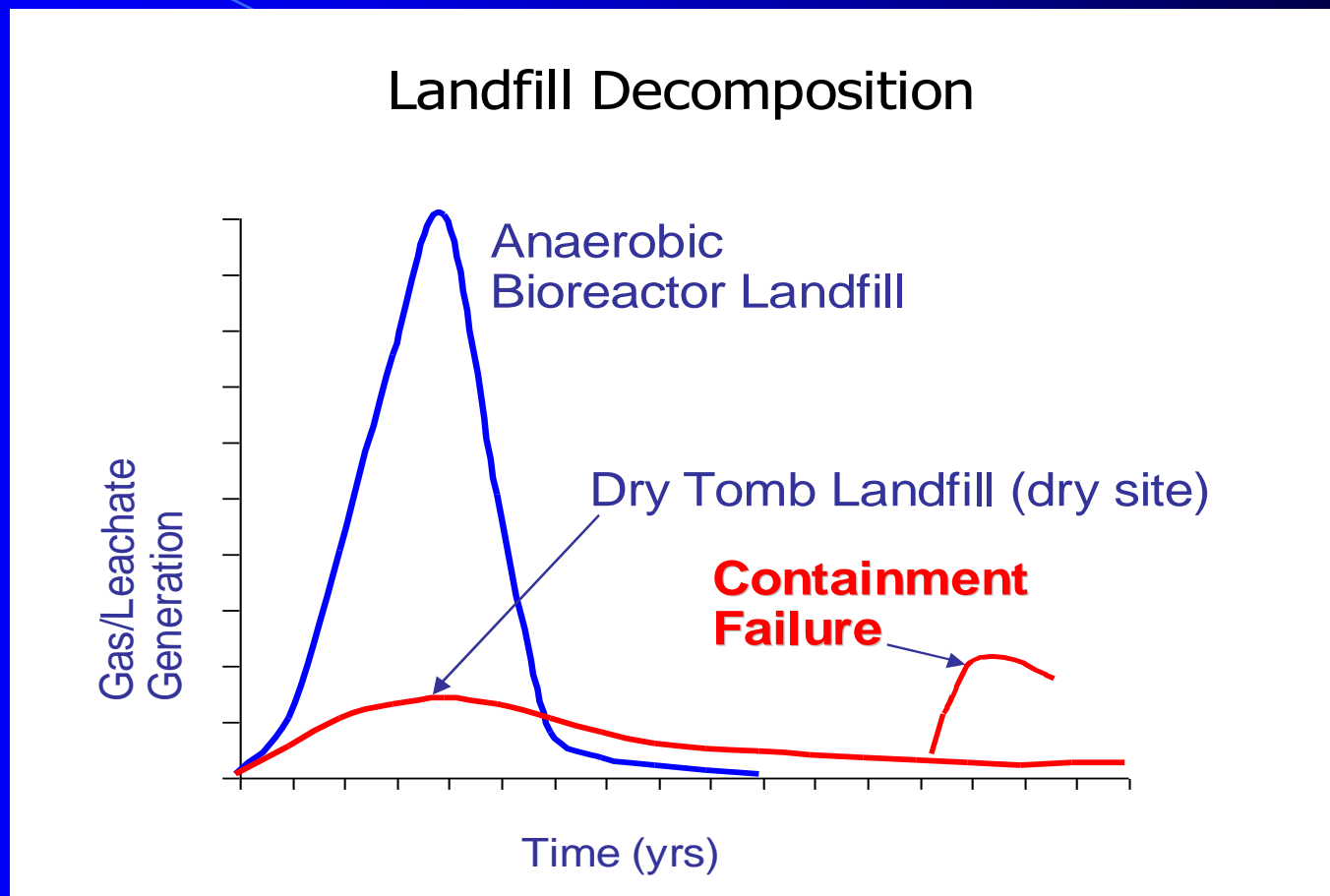
- **Decentralized approach**
- **Shifts costs and responsibility to producers, providing clearer choices for consumers**
- **Costs to decline over time for Cities or Ratepayers**
- **Businesses save \$ by:**
 - **Eliminating waste**
 - **Product & process Improvements**
 - **More reuse, recycling and composting**

What if We *Don't* Design for Zero Waste ?

- **Mining & Manufacturing Impacts Continue**
- **Landfill Impacts and Liabilities Continue**
- **Need 3-6 More Planets For U.S. Lifestyle to be Replicated**

Landfill Liabilities

Graph prepared by California Integrated Waste Management Board, 2003



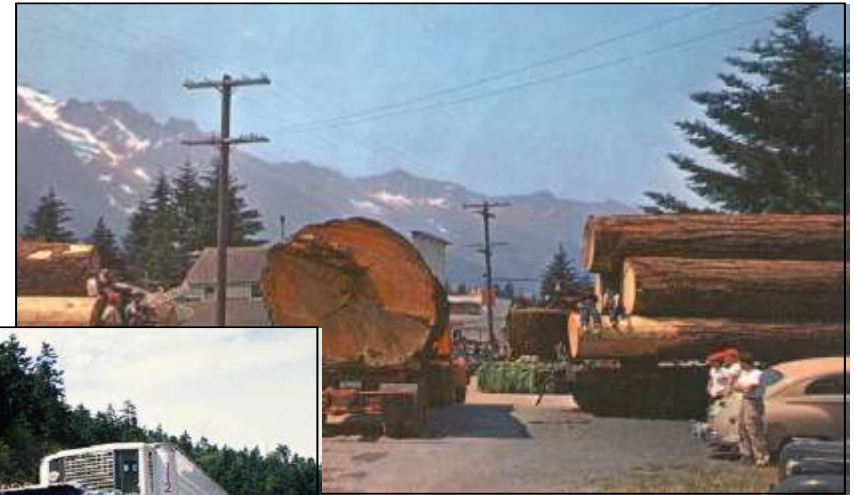
Zero Waste is about:

- Responsibility
- Stewardship
- Competence
- Vision
- Ingenuity
- New Thinking
- New Technologies
- Planning Ahead
- Smartness
- Forward-thinking
- Balanced Alternatives
- Efficiency
- Prudence
- Caring

Pillars of Zero Waste

- **Upstream**
- **Downstream**
- **Green Businesses & Jobs**

Upstream = 71 x MSW Waste



CA Product Stewardship Council

MISSION

“To shift California’s product waste management system from one focused on government funded and ratepayer financed waste diversion to one that relies on producer responsibility in order to reduce public costs and drive improvements in product design.”

www.caproductstewardship.org

CA 20-Year History of EPR

EPR Programs in CA	Responsibility
Beverage Containers	Govt.–Producers – Retail
Tires	Government – Retailers
Used Oil	Government – Retailers
Monitors	Govt.–Producers – Retail
Cell Phones	Retailers Takeback
Rechargeable Batteries	Retailers Takeback

Downstream

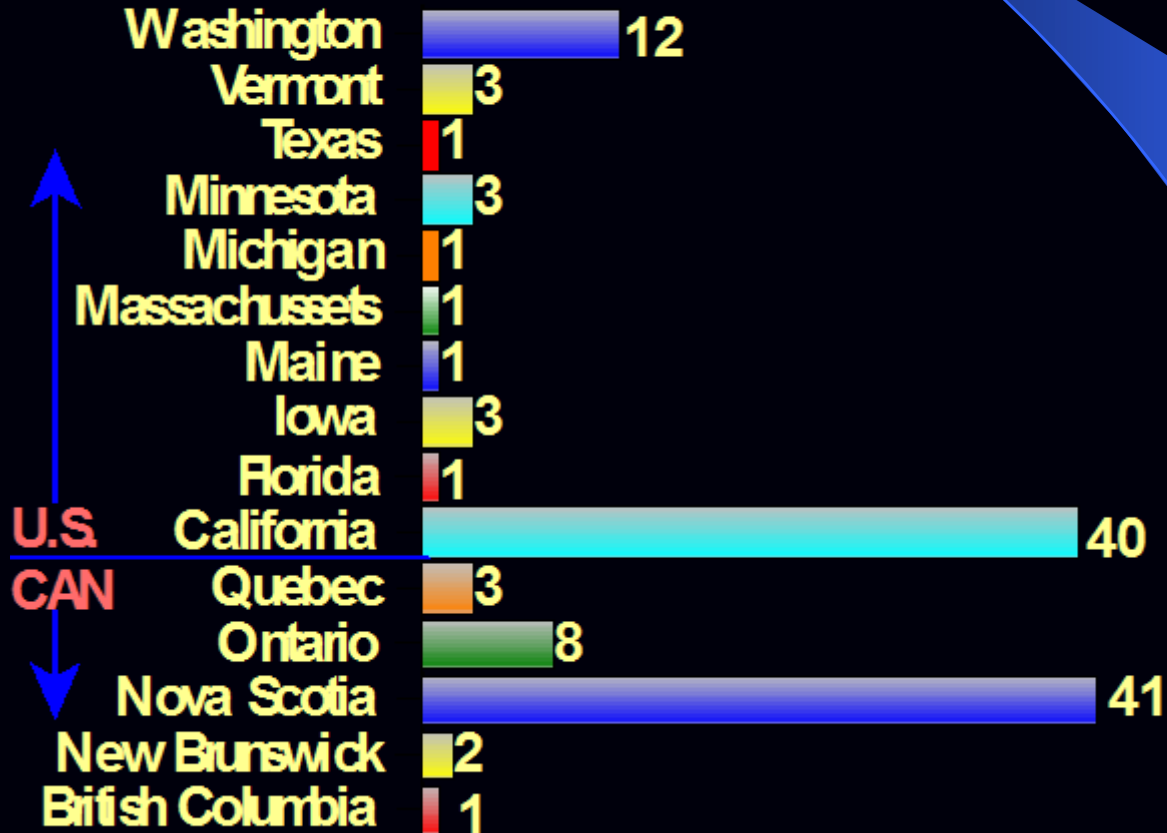
- Ensure the **highest and best use** of products and packaging at the end of their useful lives
- **Reuse** products and packaging, retaining their **original form and function**
- **Recycle or compost materials** that are not reduced or reused

Reduce First!

- **Design out Waste**
- **Waste is not Inevitable**
- **Businesses save the most by eliminating inefficient practices**
- **Refuse and Return**

121 Cities separating food and soiled paper

NUMBER OF ORGANICS PROGRAMS BY STATE OR PROVINCE (2008)



Alameda County Billboards



WHO YA' CALLING GARBAGE?

FOOD SCRAP RECYCLING.
MAKE IT SECOND NATURE.
WWW.STOPWASTE.ORG

This billboard features three yellow bananas on the left. A green speech bubble points from the bananas to the text "WHO YA' CALLING GARBAGE?". On the right, a green trash bin is overflowing with food scraps. Below the bin, the text "FOOD SCRAP RECYCLING. MAKE IT SECOND NATURE. WWW.STOPWASTE.ORG" is displayed.



WHEN FOOD SCRAPS DREAM

FOOD SCRAP RECYCLING. MAKE IT SECOND NATURE.
WWW.STOPWASTE.ORG

This billboard features a large field of sunflowers on the left, enclosed in a green thought bubble shape. Three small green circles lead from the thought bubble to a green trash bin on the right, which is overflowing with food scraps. Below the bin, the text "FOOD SCRAP RECYCLING. MAKE IT SECOND NATURE. WWW.STOPWASTE.ORG" is displayed.

Alameda County Transit Ads



Typical Equipment - Three cart set-out



Compostables carts are 60-90 gallons

Typical Equipment - Food Scraps Only Container



Typical Food only container is 12-15 gallons

Typical Equipment - Split body truck



Different Collection Strategies for Collection of Source Separated Organics

Material Streams			Frequency	
I	Wet (Food, soiled paper and other contamination)	↔*Dry (Recyclables and rubbish)	Weekly	
II	Rubbish	Recyclables	↔ Organics**	Weekly
III	Rubbish		↔ Organics**	Biweekly
		Recyclables		Weekly
IV	Rubbish	↔ Recyclables		Biweekly
			Organics**	Weekly
V	Rubbish	↔ Recyclables	↔ Organics**	Biweekly

Processing Options

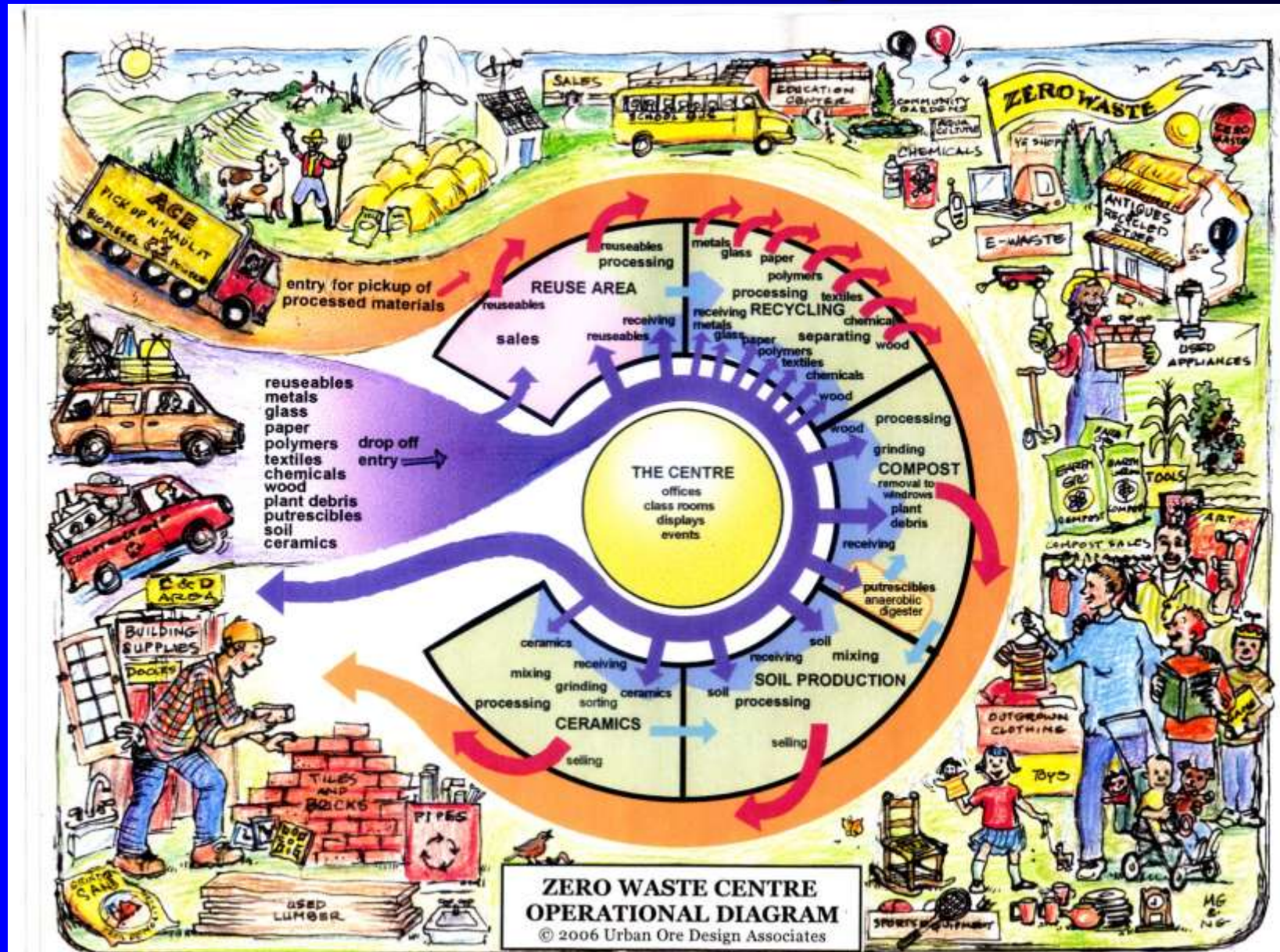
Aerobic		Anaerobic
Windrows	In-Vessel	Digesters
● Open turned piles	● Shipping container	● Sewage Plant Digesters
● Static aerated piles	● Silo	● Wet Digesters
● Covered - Pod	● Tunnel	● Dry Digesters
● Covered - Fabric	● Channel	
	● Rotating Drum	

Resource Recovery Parks

- Reuse, Recycling & Composting Processing, Manufacturing and Sales
- Like Airports or Shopping Centers
- Drop & Shop Convenience for Public
- Lower Waste Fees
- Buy @ Discounts
- New Manufacturers



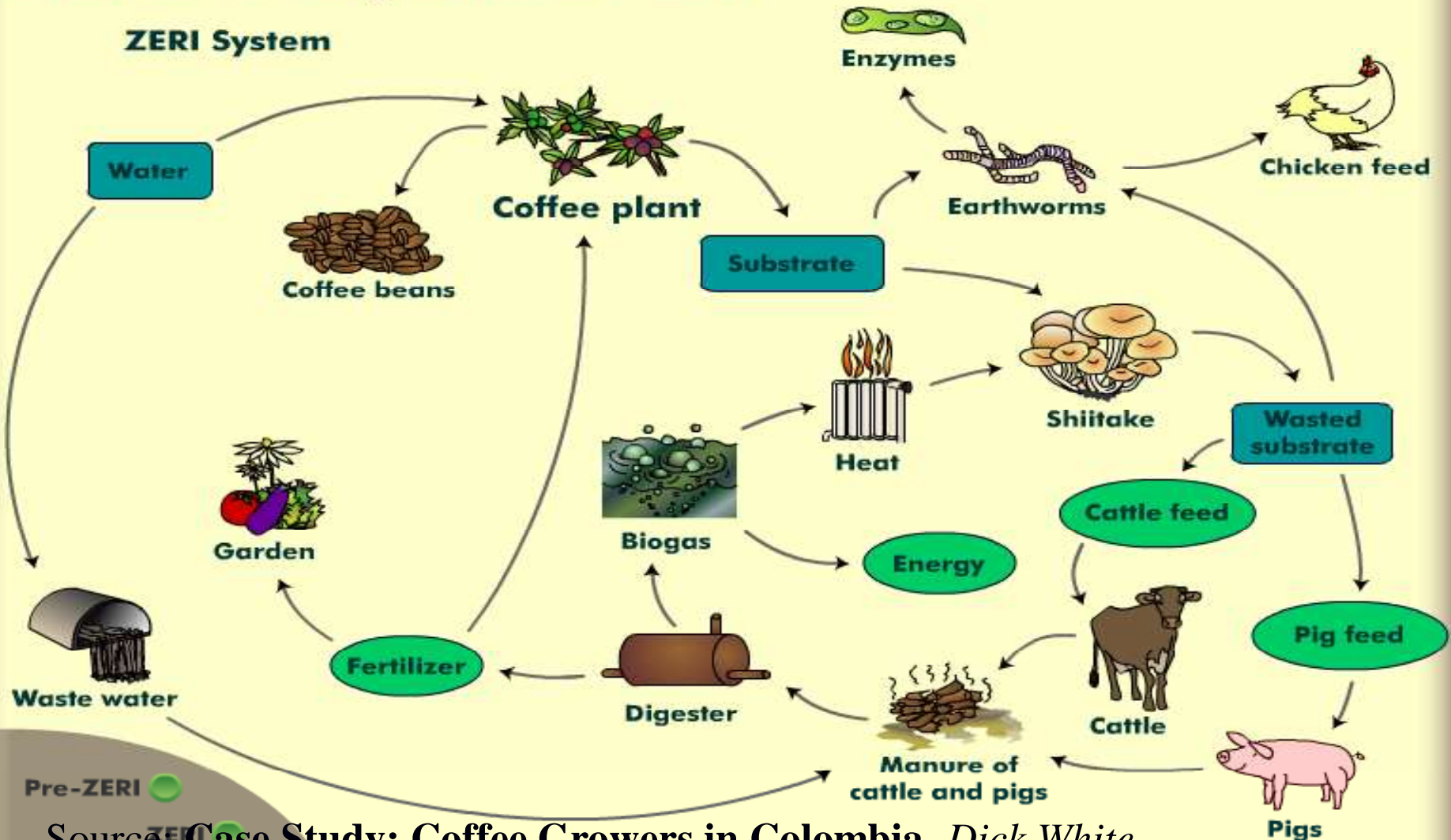
Resource Recovery Park, U.K.



Use More of What Nature Produces

Mushroom farming on coffee wastes

ZERI System



Source: Case Study: Coffee Growers in Colombia, Dick White

ZERI Product Cascading

Out: In	Clean- ing	Fish Farm	Algae	Irriga- tion	Mush- rooms	Earth- worms	Total
Water	100: 10	100: 72	100: 10	100: 8	100: 0	100: 0	100: 100
Fibers	100: 0	100: 6	100: 0	100: 0	100: 40	100: 54	100: 100
Mushroom Compost						100: 50	
Chickens							
Manure							

Source: Pauli, Gunter, *Upsizing*, "Output-Input Table," 1998, p. 117

Incentives

- **Change Economics So What Was Marginal Is Now Economic**
- **Pay For What You Want: Waste Prevention, Reuse, Recycling & Composting**
- **Don't Pay For Wasting (Or Much Less)**
- **Recognize Waste As Symptom Of Inefficiency**
- **Harness Forces Of Marketplace**

Incentives

- **Restructure Marketplace**
- **Revise To Encourage Waste Prevention, More Reuse, Recycling & Composting:**
 - **RFPs & Contracts, Rates, Ordinances, Land Use Permits, Facility Permits, General Plans, Zoning, Policies, & Definitions**
- **Tax Bads, Not Goods**

Hawai'i New Rules & Incentives

- **Producer and Retailer Responsibility, take-back of non-recyclable, reusable or compostable products and materials**
- **Source Separation (of designated organics, reusables & recyclables)**
- **Compostable Organics out of Landfill**
- **Construction & Demolition (C&D) reuse and recycling plans & permits**

Durango Policies & Programs

- **Focus first on Reducing and Reusing**
- **Extended Producer Responsibility for products & packaging and ban problems**
- **Improve Recycling and Composting (develop infrastructure)**
- **New rules & incentives (e.g. linear PAYT & fees on wasting to fund recycling)**
- **Educate, promote, and advocate for ZW**
- **Lead by Example**

Green Businesses and Jobs

- **Expand, attract, and support green businesses and green collar jobs**
- **Reserve sufficient land for Zero Waste infrastructure**
- **Reinvest resources locally**
- **Develop new markets**

Purchasing for Zero Waste

- **Precautionary Principle**
- **Return to Vendor**
- **Lease, Rent and Share Equipment**
- **Reduce Packaging**
- **Reusable Shipping Containers**

Source: Alicia Culver, Green Purchasing Institute

Purchasing for Zero Waste

- **Buy Recyclable, Recycled and Compostable Items**
- **Buy Remanufactured Equipment**
- **Purchase Durables**
- **Buy Less Toxic Products**

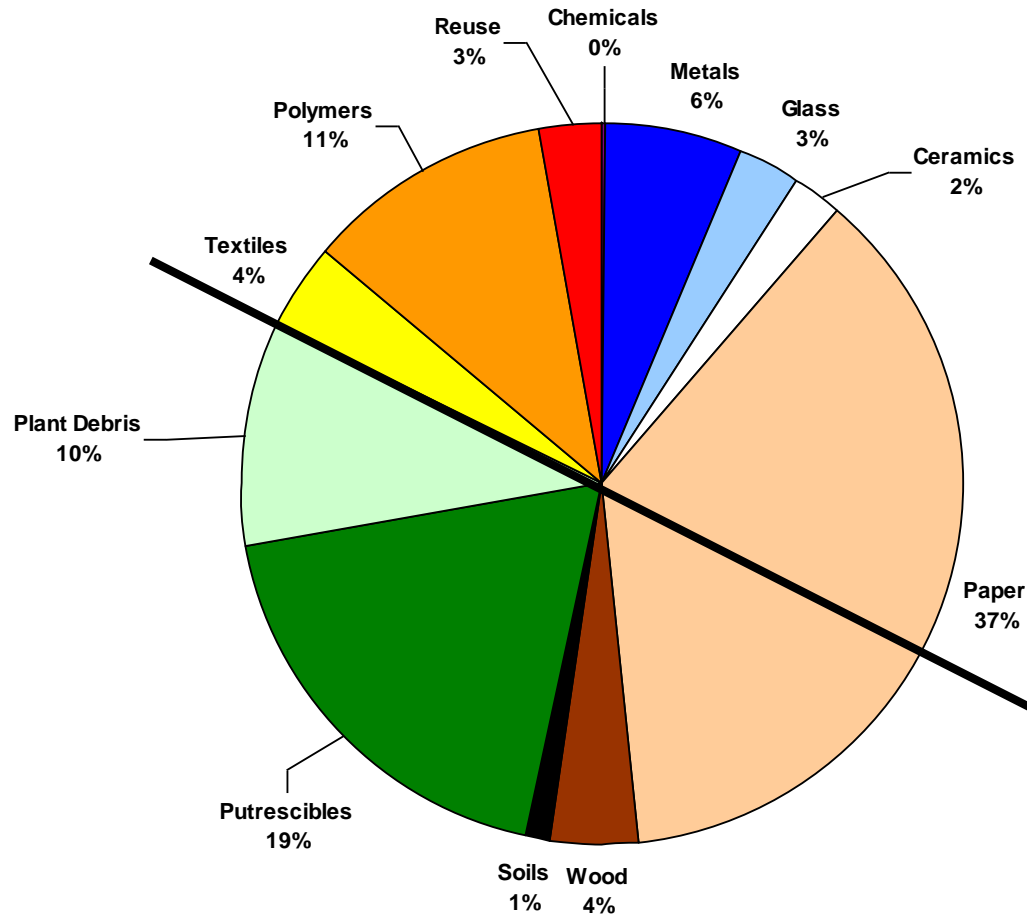
Zero Waste Plan Scope

- **Review Data, Policies and Programs**
- **Participation Strategy**
- **Service Opportunities Analysis**
- **Menu of Policies, Programs and Facilities**
- **Economics And Funding**
- **Draft Zero Waste Plan**

Service Opportunities Analysis

- **Services Needed for Zero Waste, by Materials, Program and Facilities - Evaluate:**
 - **Franchisee, Other Collectors, Self-Haul**
- **Services Needed by Sources**
 - **Family, MultiFamily, Commercial, City Govt., Schools, Self Haul**

Know Your Discards

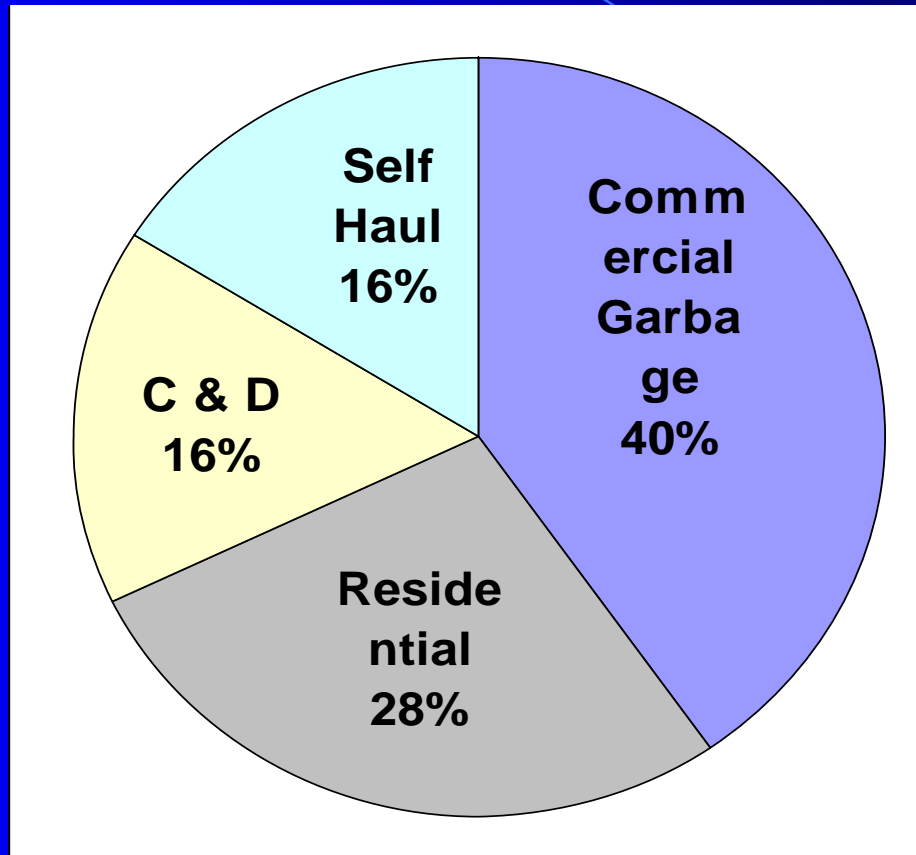


Know Your Discards Value

Material	% in Wastes	Value (\$/ton)
Reusables	6%	\$400
Putrescibles	26%	\$35
Paper	21%	\$100
Ceramics (C&D)	10%	\$15
Metals	9%	\$80
Polymers	9%	\$150
Soils	6%	\$15
Glass	4%	\$25
Textiles	3%	\$20
Plant Debris	3%	\$35
Wood	2%	\$15
Chemicals	1%	\$200

Richard Anthony, Resource Management in the New Millennium, 2005,
http://www.richardanthonyassociates.com/presentations/rm_2005.ppt

Know Your Discards Sources



(Ref. Bill Worrell, San Luis Obispo County Integrated Waste Management Authority)

Where would you take this discard?

(Circle item if you don't know;
mark "TB" if you take back to store)

1. Reusables	3. Plant Debris
Working large appliances	Leaves & Grass
Working small appliances	Prunings and trimmings
Durable plastic	Large branches & stumps
Usable textiles and leather	4. Putrescibles
Usable furniture	Vegetative food scraps
Usable mattresses	Fish and meat waste
Used books and catalogs	Compostable paper
Used building materials	Sewage sludge and manures
Other bulky items	5. Wood
Other reusables / repairables	Untreated wood
2. Paper	Treated wood
Cardboard	6. Ceramics
White ledger	Concrete
Newsprint	Asphalt paving
Magazines / catalogs	Mixed C&D
Other office paper	
Paperboard	
Composite paper and plastic	

7. Soils	Other plastics
Gypsum wallboard	Carpet
Fines (including rocks and dirt)	Carpet padding
8. Metals	Tires
Aluminum cans	Asphalt Roofing
Steel cans	11. Textiles
Ferrous metals	Poly fibers
Non-ferrous metals	Cotton and wool
Non-working appliances	12. Chemicals and Ewaste
Auto bodies, engines and motors	Batteries
9. Glass	Motor oil, filters & other auto fluids
Clear glass	Paint
Colored glass	Fluorescent lights
Mixed glass	Pharmaceuticals
Window (flat) glass	Other household hazardous wastes
10. Polymers	Disposable diapers /hygiene items
# 1 PET (CRV) containers	Treated medical waste & syringes
#1 PET containers	Treated wood
#2 HDPE (CRV) containers	Brown goods
#2 HDPE containers (e.g., milk jugs)	Computers and peripherals
#4 LDPE Film, plastic bags	TVs and Monitors

Austin Service Opportunities

Material	Opportunities
Food Scraps	Some commercial food discards are accepted at one site. Capacity needed for both residential and commercial discards.
Used Building Materials and Construction & Demolition (C&D) debris	Several locations take selected materials; only one location has capability to grind C&D debris. Need more capacity, preferably multiple sites.
Commercial Businesses under 100 employees; Apartments from 4-100 units	Mandatory Recycling Ordinance (MRO) does not address. Also need to enforce MRO.
Reusables	Need more capacity for all types.
Treated Wood	Habitat ReStore is limited to reusables. Need more capacity.
Fines	Texas Organics blends different soils and organics. Need additional capacity.
Window and Other glass	Need glass market for window and other glass.
#3-7 & other plastic	One market available. Need additional capacity for whole city.
Diapers / Hygiene Products	No markets. These products need to be redesigned.

Menu of Incentives & Policies

- **UPSTREAM POLICIES**
- **DOWNSTREAM POLICIES**
 - **Source Separation, Incentives and New Rules, Composting, Infrastructure**
- **CHANGING THE CULTURE**
- **GREEN BUSINESS, GREEN BUILDINGS AND JOBS**
- **MANAGEMENT OF RESIDUALS**



GLOBAL PRINCIPLES FOR ZERO WASTE COMMUNITIES

www.zwia.org

ZW International Alliance

- www.zwia.org
 - Definition of Zero Waste
 - Zero Waste Business Principles
 - Global Principles for Zero Waste Communities
 - List of Zero Waste Communities

GrassRoots Recycling Network

➤ www.grrn.org

- Zero Waste Communities
- COOL2012.org
- National ZW Conferences
- Zero Waste Business Principles
- Local government Resolutions
- Media Briefing Kit
- Kids Recycle!
- College Zero Waste

Zero Waste Listservs

- ZWIA
- GreenYes (GRRN)
- Organics Out of Landfills
- ZW Businesses
- ZW Communities
- ZW Partners
- ZW Jobs
- CA Product Stewardship Council

ZW Businesses Resources

- **ZW Business Principles**
 - ZWIA
 - GRRN
- **ZW Business Case Studies**
 - GRRN
 - Earth Resource Foundation
- ZW Business Listserv
- CA Product Stewardship Council
- **CA Sustainable Business Council**

ZW Events Resources

- Green Initiatives for Venues and Events
- CalRecycle Venues website
- How to Plan ZW events
- Green Meetings Report
- **Case Studies**
 - Del Mar Fairgrounds
 - Eco-Cycle Farmer's Market ZW Zone
 - Berkeley Ecology Center ZW Zone
 - San Francisco Special Events

ZW Activists Resources

- Global Alliance for Incinerator Alternatives (GAIA)
- ZW Sierra Club
- ZW Partners
- Eco-Cycle
- Institute for Local Self-Reliance
- CRRA
- Los Angeles ZW Challenge
- Austin ZW Challenge

ZW Communities Resources

- Global Principles for ZW Communities
 - List of ZW Communities
 - CIWMB Strategic Plan
 - Urban Environmental Accords
 - Climate Action and Sustainability Plans
- **ZW Community Plans**
 - Oakland
 - San Jose
 - Burbank
 - Austin
 - Telluride
 - County of Hawaii
 - Central Vermont

Incentives Resources

- www.ciwmb.ca.gov/LGLibrary/Innovations/default.htm
 - “Innovations” Case Studies on “Incentives,” “Business Recycling Policies,” “Organics Policies,” and “C&D Policies”
- <http://www.epa.gov/epaoswer/non-hw/reduce/wstewise/wrr/rm.htm>
 - Waste Wise “Resource Management”
- “Strategic Recycling,” Kay Martin, Darkhorse Press

Climate Change & ZW

- Recyclers Global Warming Council
- ZW for Global Cooling Coalition
- Organics Out of Landfills Yahoo Group
- Stop Trashing the Climate
- Zero Waste for Zero Warming
- EPA Climate Change and Waste
- WARM Model



**If you're not for Zero Waste,
how much waste are you for?**

Class Project – ZW Plan

1. Assume types, amounts and sources of materials
2. Design waste out of the system and ID EPR opportunities.

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