DELCO ZERO WASTE INFO SESSION

JUNE 29TH, 2021

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Nothing Left to Waste

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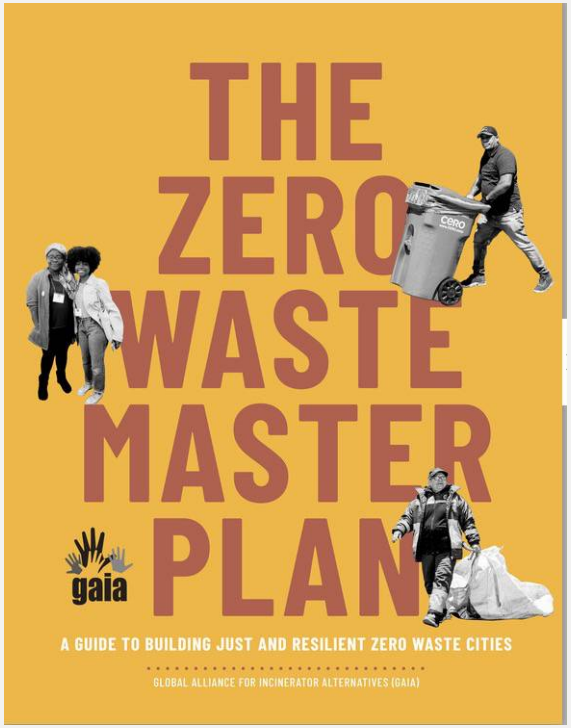
GAIA's Zero Waste Master Plan:

Step by step guide for planning and implantation of zero waste strategies.

https://zerowasteworld.org/zwmp/

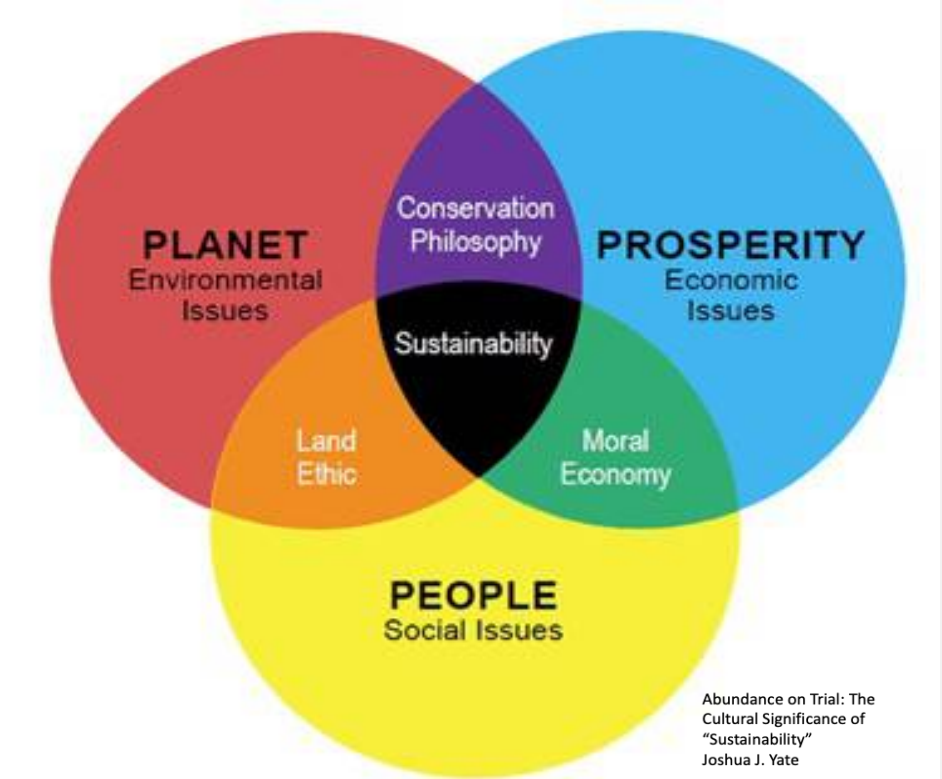


WHY ZERO WASTE?

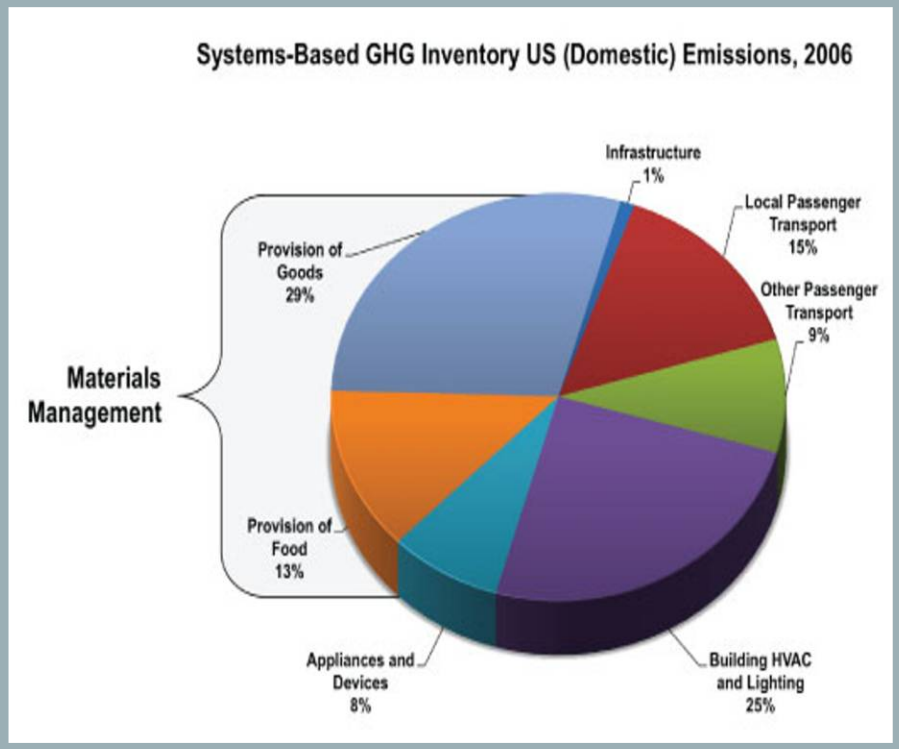
Mitigate impacts of climate change.

Create healthy, just and equitable communities.

Build local, resilient economies.



Life-Cycle Approach

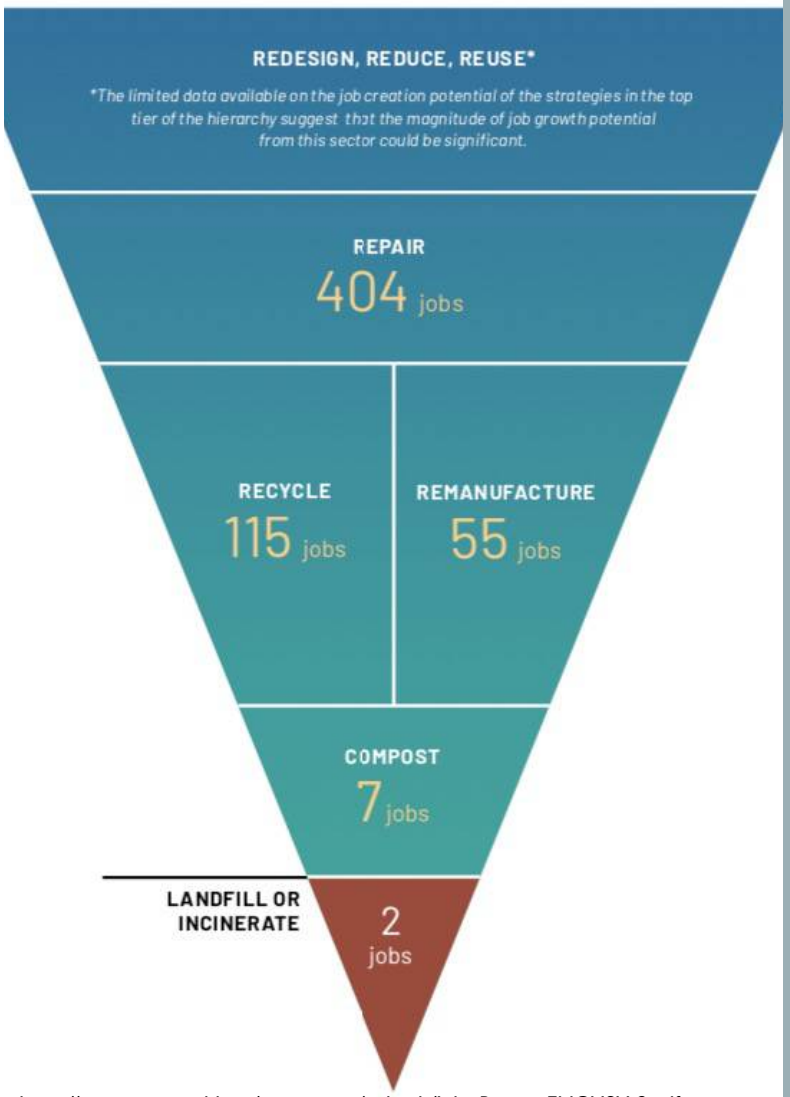


The Provision of Goods and Food Accounts for 42% of GHG Emissions

Healthy Communities

Pollutant (in pounds except CO2e)	Emissions (2016-19 avg pounds/year)	Rank in DelCo*	Health Effects
Global Warming Pollution (in tons of CO_2 equivalents)	1,020,104	4	Extreme weather, disease, crop damage, species extinction
Nitrogen Oxides	2,337,532	1	triggers asthma attacks, chronic respiratory disease and stroke
Carbon Monoxide	778,951	1	headaches and dizziness; increases lifetime risk of heart disease
Sulfur Dioxide	295,382	2 (now #1)	triggers asthma attacks; chronic respiratory and heart diseases; stroke
Particulate Matter	112,608	3	heart attacks, stroke, irregular heartbeat, aggravated asthma, decreased lung function, difficulty breathing
Fine Particulate Matter	78,854	2	same as above, but worse, gets deep into lungs and into blood stream
Volatile Organic Compounds	22,878	12	eye, nose and throat irritation, headaches, loss of coordination and nausea, liver, kidney and central nervous system damage, cancer
Hydrochloric Acid	18,377	3 (now #2)	irritates eyes, skin, and nose, damages lungs
Lead	46	2	damages nervous system and kidneys, lowers IQ, increases likelihood of antisocial behavior
Mercury	42	1	damage to nervous, digestive, and immune systems, lowers IQ
Nickel	41	2	allergy, cardiovascular and kidney diseases, lung fibrosis, lung and nasal cancer
Cadmium	5	2	kidney disease; lung cancer
Arsenic	4	2	lung, skin, bladder, and liver cancers; irritation of the skin and mucous membranes and effects in the brain and nervous system
Chromium (VI)	4	2	lung cancer, shortness of breath, coughing, and wheezing

http://www.chesterresidents.org/pdf/CovantaAirPollution.pdf



https://zerowasteworld.org/wp-content/uploads/Jobs-Report-ENGLISH-2.pdf

Jobs and Economic Development

- Opportunity for a just transition
- Recycling alone is a significant contributor to the economy:
  - The U.S. domestic recycling industry accounts for 757,000 stable jobs and $36.6 billion in wages. $117 billion annual economic benefit. Provides $6.7 billion in state, local and federal taxes.
  - In PA: $4,223,681,600 industry creating 20,199 jobs and $475 million in taxes

Key Take-Aways For Today

- Establish clear goals – way beyond diversion
- Understand that waste is not inevitable
- Fix recycling as a critical bridge strategy
  - (Even though recycling alone won't get us to zero waste)
- Build in accountability
  - Hold producers accountable for our waste before it hits our homes
  - Hold the community accountable for what happens to our waste after it leaves the curb
- We need to address the current miss-allocation of resource and invest in the top of the hierarchy as we work towards system change

ESTABLISH CLEAR GOALS BEYOND DIVERSION

Setting Goals

Peer Reviewed, International Definition of Zero Waste:

The conservation of all resources by means of responsible production, consumption, reuse, and recovery of products, packaging, and materials without burning, and with no discharges to land, water, or air that threaten the environment or human health.

https://zwia.org/zero-waste-definition/

City of Boston Guiding Principals for Zero Waste:

- Make zero waste a key priority: define the goal, develop a strategy, expand resources, work collaboratively
- Focus first on using less and diverting more: lead by example, facilitate residential waste reduction, engage large generators of waste
- Support this work through local business development: work on job training; draw on leadership in innovation and research; encourage measures to improve the safety, health, and jobs of workers; put materials to highest and best use
- Sustain this work through culture change: build a culture of zero waste citywide, engage meaningfully with all stakeholders, embrace all communities, conduct linguistically and culturally appropriate public education, grow the next generation of zero waste leaders

https://www.boston.gov/sites/default/files/imce-uploads/2019-06/zero_waste_bos_recs_final.pdf

Moving Beyond Diversion

Diversion	Zero Waste
Diversion Goal	**Zero Waste Goal**
"90% Diversion"	Climate Change Environmental Justice Human and Ecosystem Health Cost Savings
Diversion Questions	**Zero Waste Questions**
Can we recycle it? Can we compost it?	Do we need it? What are the alternatives? Can we redesign it?
Diversion Measurement	**Zero Waste Measurement**
Tons	Carbon Reductions Economic Cost Human Health/Toxicity (Emissions)

NOTHING LEFT TO WASTE

WASTE IS NOT INEVITABLE

Question:
How many recycled plastic park benches and “upcycled” Capris Sun tote bags does it take to get to a zero waste world?

NOTHING LEFT TO WASTE

The Linear Economy

(A Proven Broken Model)

Extraction → Production → Distribution → Consumption → Waste

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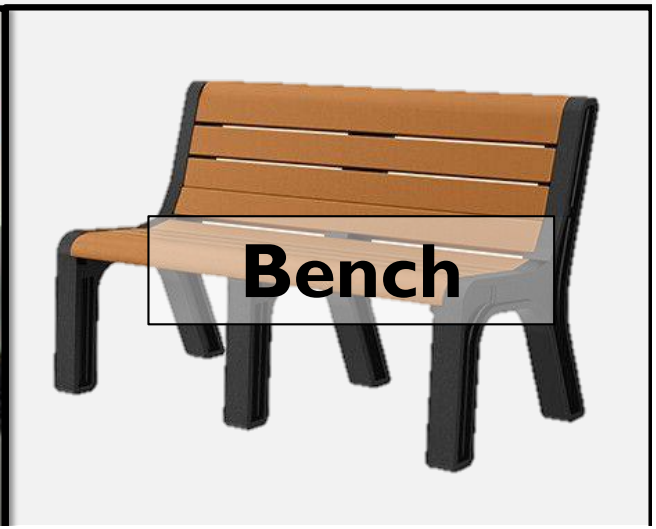
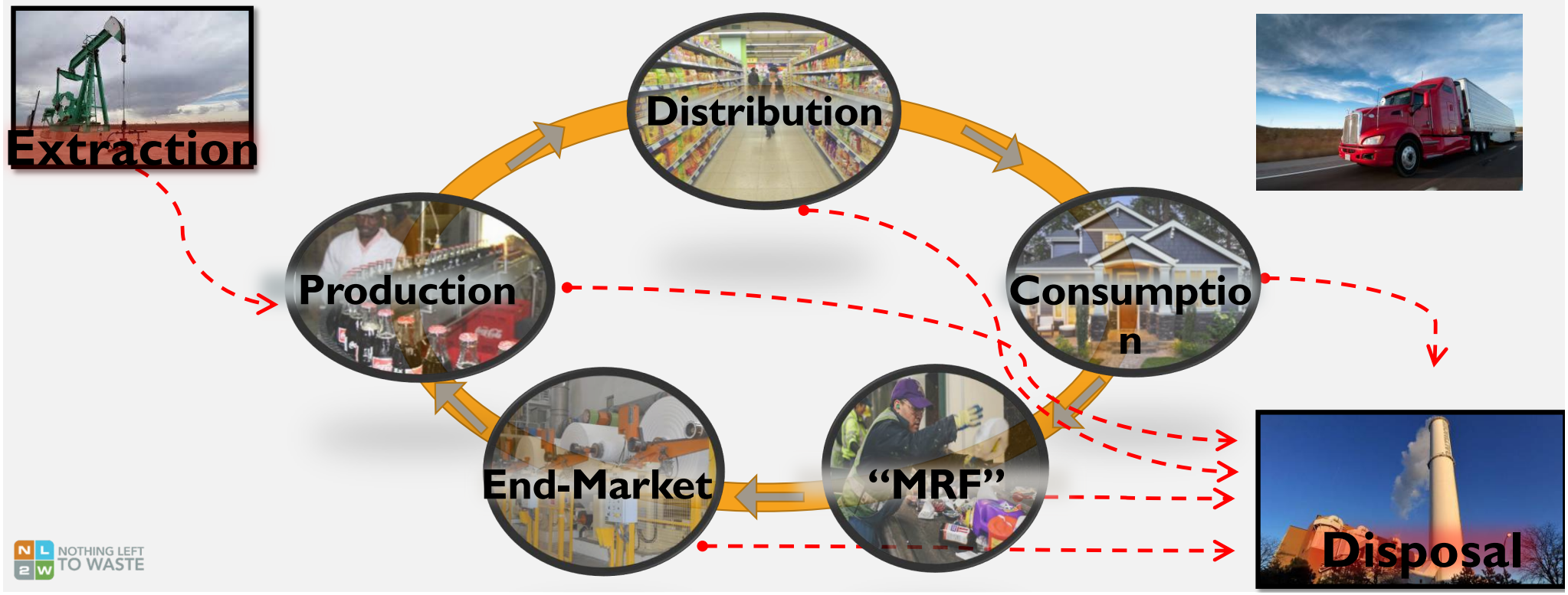


The Circular Economy

(Is it enough?)



REDUCTION: REUSE/REPAIR/SHARE

THE GREENWASHING OF SINGLE USE PLASTICS IN PA

Current Proposed/Existing Investment in Plastics to Energy Facilities:

- Pyrolysis Plant in Berks County turning plastic waste into jet fuel.
- Proposed Plastics Sorting Facility - Erie, PA, sorting mixed plastics with a plan to send non-recyclable plastics as a substitute for coke for in iron furnaces.
- Spec Fuel - Philadelphia, MRF residual from Philadelphia's curbside recycling is processed and marketed as fuel to cement kilns.

Collection and Sorting Pilot - ACC MRF of the Future

- Feasibility of collecting flexible packaging with single stream recycling
- Lack of end market for the material collected

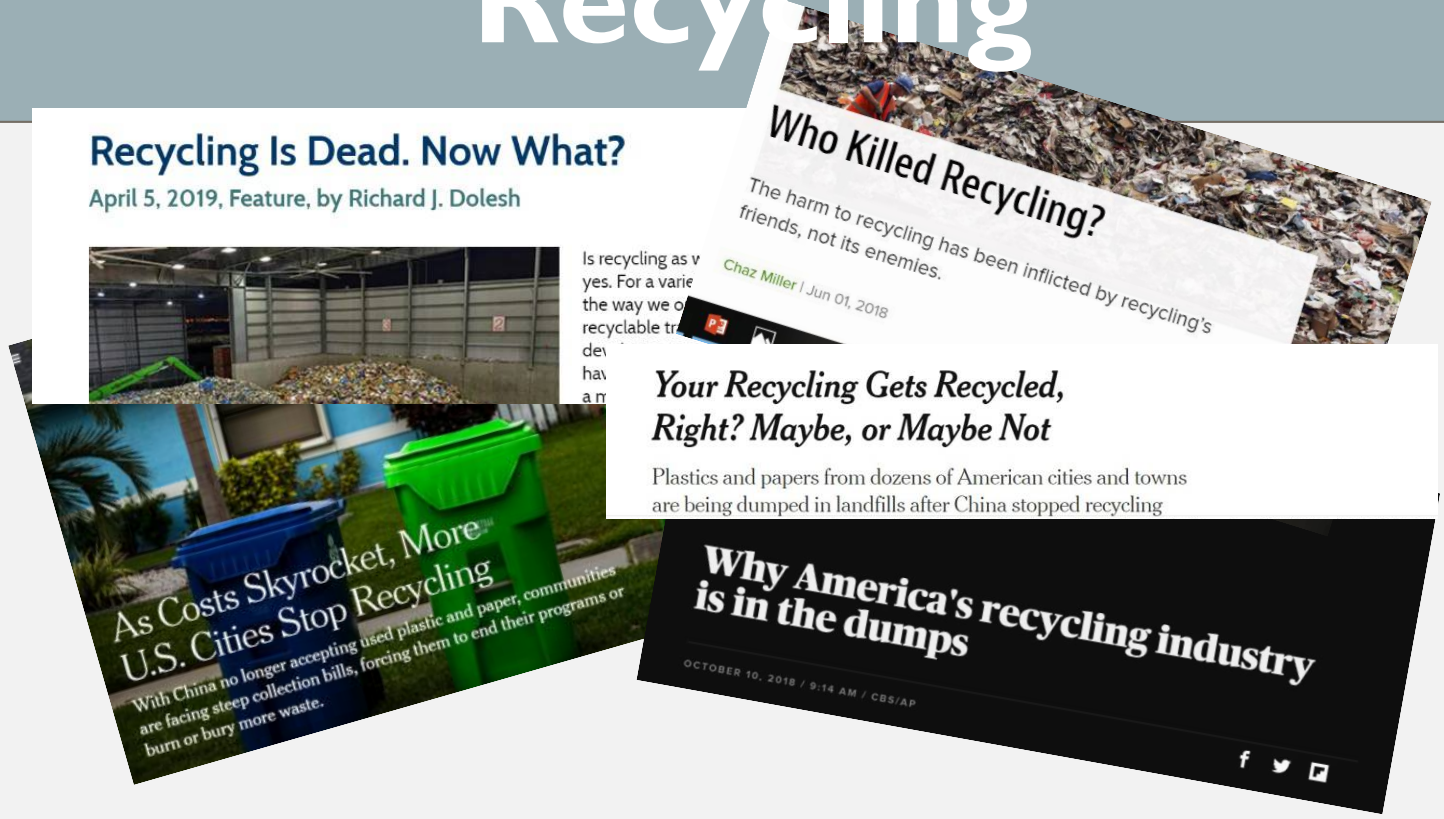
"Advanced Recycling Bill" HB1808

- Defines chemical recycling, pyrolysis and gasification as "advanced recycling"
- Changes regulatory burden of those processes from waste to manufacturing

RECYCLING AND COMPOSTING

The State of Recycling

How did we get here?



Who's Accountable for Recycling's Current State?

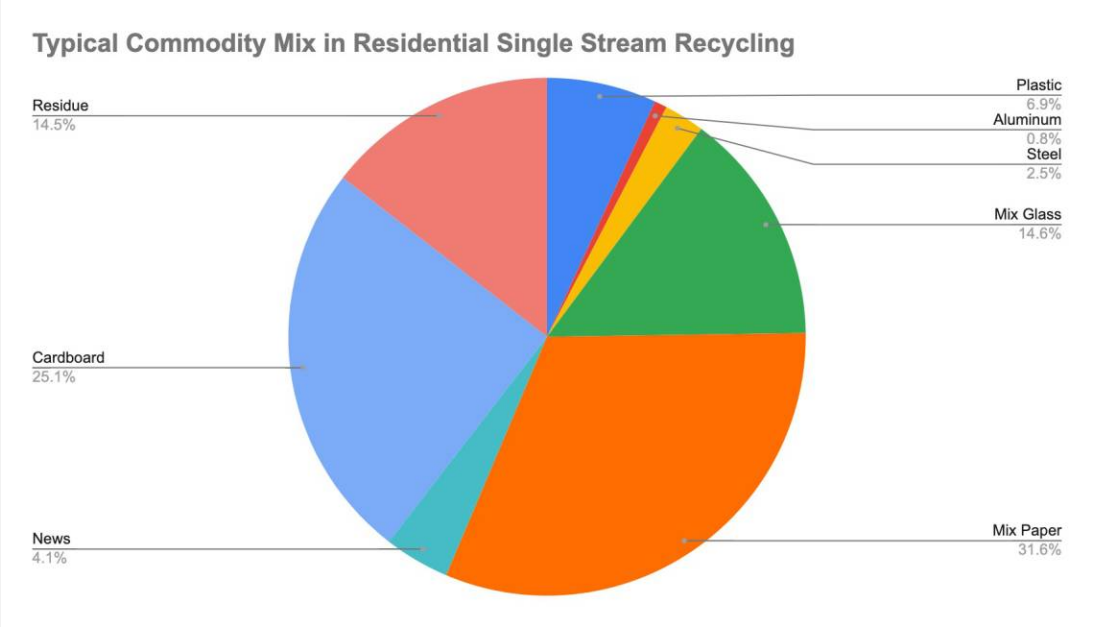
- ✓ Consolidation to multinationals - Drive to maximize profits through efficiencies
  - ✓ **Haulers**: Single stream, carts, high-compacting collection trucks.
  - ✓ **MRFs**: Reliance on export and threshold for high contamination rates. Mega MRFs.
- ✓ **Cities**: Drive for high diversion rates with measurement at "curb".
- ✓ **Brands:** Proliferation of plastic packaging with lack of producer responsibility.

NOTHING LEFT TO WASTE

- IMPACT:
  - Inclusion of materials that aren't recyclable
  - Handling of materials in a way that destroyed their value.
  - Emphasis on convenience over quality, education and end-markets.
  - Disconnection between generators, haulers, processors, manufacturers and end-markets.

RECYCLING (MOSTLY) STILL WORKS, BUT NEEDS IMPROVEMENT

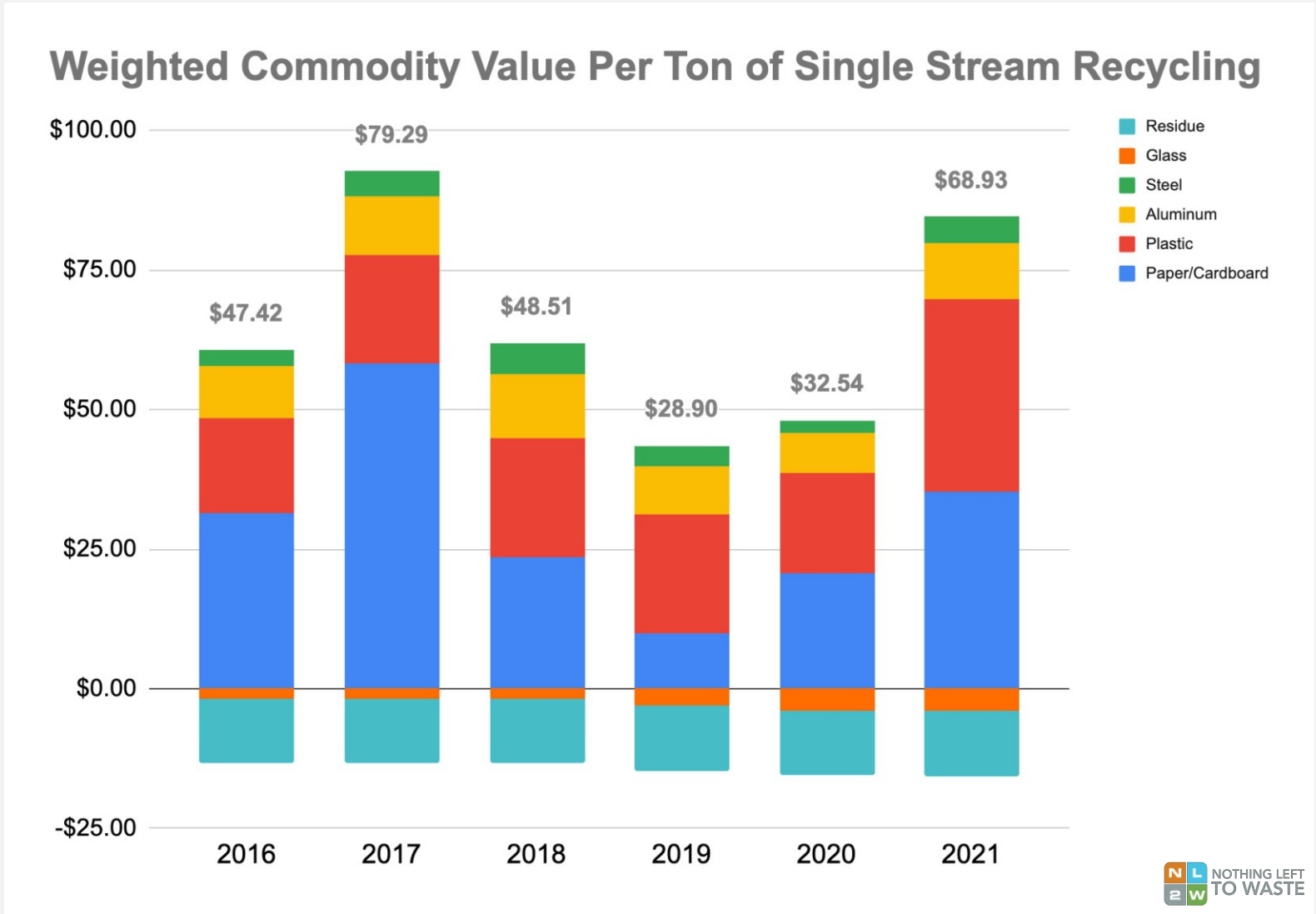
- Paper (60% of the recycling stream):
  - Billions of investments in domestic paper processing
  - Paper markets have recovered.
- Plastics:
  - No more market for mixed plastic is forcing people to recognize that only 1,2 and 5 plastics are potentially recyclable.
  - While the value is at an all time high, most end uses are not considered circular (very little bottle to bottle)
- Glass:
  - Huge demand for recycled glass feed stock by glass manufacturers. Glass can be infinitely recycled.
  - Many MRFs in PA use glass as alternative daily landfill cover, or other low value uses.
- 40% of the worlds raw material needs are met through recycled feed stock.



Weighted Basket Value/Ton of Single Stream

	Single Stream Composition	2021 Index Value/Ton	2021 Basket Value/Ton
PET (#1)	3.35%	$271.94	$9.11
HDPE NAT (#2)	1.05%	$1,708.09	$17.93
HDPE COL (#2)	1.06%	$685.15	$7.26
Mix Plastics (#3-#7)	1.28%	-$50.00	-$0.64
PP (#5)	0.12%	$622.27	$0.75
Aluminum	0.78%	$1,279.39	$9.98
Steel	2.53%	$187.50	$4.74
Mix Glass	14.60%	-$27.50	-$4.02
Mix Paper	31.60%	$34.85	$11.01
News	4.09%	$50.44	$2.06
Cardboard	25.07%	$88.97	$22.30
Residue	14.47%	-$80.00	-$11.58
Basket Value/Ton			$68.93

NOTHING LEFT TO WASTE


Weighted Commodity Value Per Ton of Single Stream Recycling
$100.00
$75.00
$50.00
$25.00
$0.00
-$25.00
$47.42
$79.29
$48.51
$28.90
$32.54
$68.93
2016
2017
2018
2019
2020
2021
Residue
Glass
Steel
Aluminum
Plastic
Paper/Cardboard
NOTHING LEFT TO WASTE

Rev Share Key Components:

- Need to separate out collection and processing.
- Composition analysis (Control)
- Specific Grades (Accountability)
- Published Indices (Transparency)
- Reasonable expectations (Budgeting)

Revenue Share Model Comparisons

Revenue Share %	**0%**		**50%**		**100%**	
Processing Cost/Ton	$80.00		$100.00		$120.00	
	Low (2019)	**High (2021)**	**Low (2019)**	**High (2021)**	**Low (2019)**	**High (2021)**
Market Value/Ton	$28.90	$68.93	$28.90	$68.93	$28.90	$68.93
Rev Share/Ton	$0.00	$0.00	$14.45	$34.46	$28.90	$68.93
Net Cost/Ton to City	**$80.00**	**$80.00**	**$85.55**	**$65.54**	**$91.10**	**$51.07**
Value to Vendor	*$108.90*	*$148.93*	*$114.45*	*$134.46*	*$120.00*	*$120.00*

NOTHING LEFT TO WASTE

Composting

- 1/3 of what's left in garbage
- Particularly important to keep compost out of landfills where it generates methane.
- Food waste prevention and back yard composting has the greatest environmental impacts
- With organics could move to every other week garbage
- Need more processing capacity
  - Community Composting
  - Combined with Yard Waste

ACCOUNTABILITY

Best Practices in RFPs/Contracting

- County:
  - Work to Find Mission Aligned Businesses
  - Long Term Contract (10 years+)
  - Start the procurement process early.
  - Provide Site/Location
  - Policy to support diversion and reduce contamination

- Municipalities:
  - Decouple service (separate collection and processing)
  - Value "other" benefits
  - Transparency and reporting
  - Fines/Penalties
  - Facility evaluation (residual rate, grades sorted, env. Impact)

NOTHING LEFT TO WASTE

Zero Waste Policy Goals

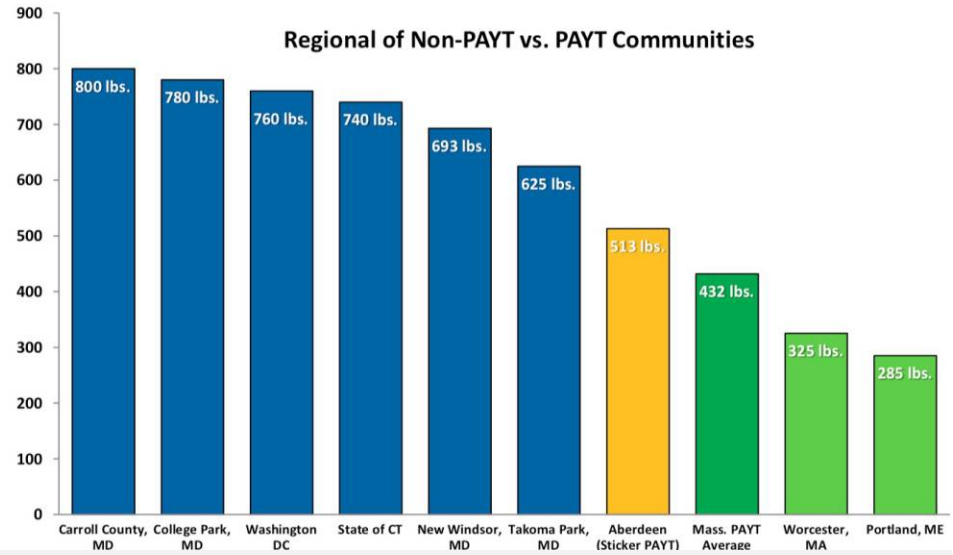
- Goals:
  - Promote reuse over recycling.
  - Phase out avoidable, single use plastics
  - Replace 3,6,7 plastics with less toxic, more recyclable alternatives
  - Include the full cost of disposal in price paid by consumers (instead of putting responsibility on community).
- Mechanisms:
  - Extended Producer Responsibility
  - Packaging Ordinance
  - Market Development Funds
  - Defining "Recyclable"
  - Carbon Tax or Fees

NOTHING LEFT TO WASTE

Pay as you Throw

- Measure per capita waste as the benchmark, not recycling rate
- Waste Zero see's an average of 44% waste diversion with 17-20% less overall generation.
- Can be cart based (size) or per bag fee.
- Requires moving from taxes – more transparent.
- More equitable.

Residential Per Capita Benchmark



SOURCE: WASTE ZERO 2019, MONTGOMERY COUNTY PRESENTATION

BEWARE OF FALSE SOLUTIONS

- Incineration
- "Recovery" or "Waste Conversion"
- "Marketing" Driven Solutions ("green washing")
- Chemical Recycling
- Increased costs with no systematic change
- Unjust solutions

NOTHING LEFT TO WASTE

ALLOCATE RESOURCES ACCORDING TO THE HIERARCHY

ZERO WASTE: A JOURNEY, NOT A DESTINATION

Limiting Factors:

- Lack of Services in Marketplace
- Lack of Infrastructure
- Budget
- Policy Reach

http://www.energyjustice.net/zerowaste#:~:text=Zero%20Waste%20is%20defined%20as,idea%2C%20but%20a%20set%20of

ZERO WASTE: A JOURNEY, NOT A DESTINATION

Opportunities:

- Work to support new infrastructure development.
- Level the playing field so zero waste can compete:
  - Don't make long term investments that require perpetuation of waste.
  - End put or pay contracts.
  - Support county wide diversion through contracts, drop offs and transfer stations.
- Attract mission aligned vendors.
- County wide education campaign.

http://www.energyjustice.net/zerowaste#:~:text=Zero%20Waste%20is%20defined%20as,idea%2C%20but%20a%20set%20of

NL2W

NOTHING LEFT TO WASTE

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Link to GAIA Zero Waste Master Plan:

www.zerowasteworld.org/zwmp/

What is the best disposal option for the "Leftovers" on the way to Zero Waste?

By

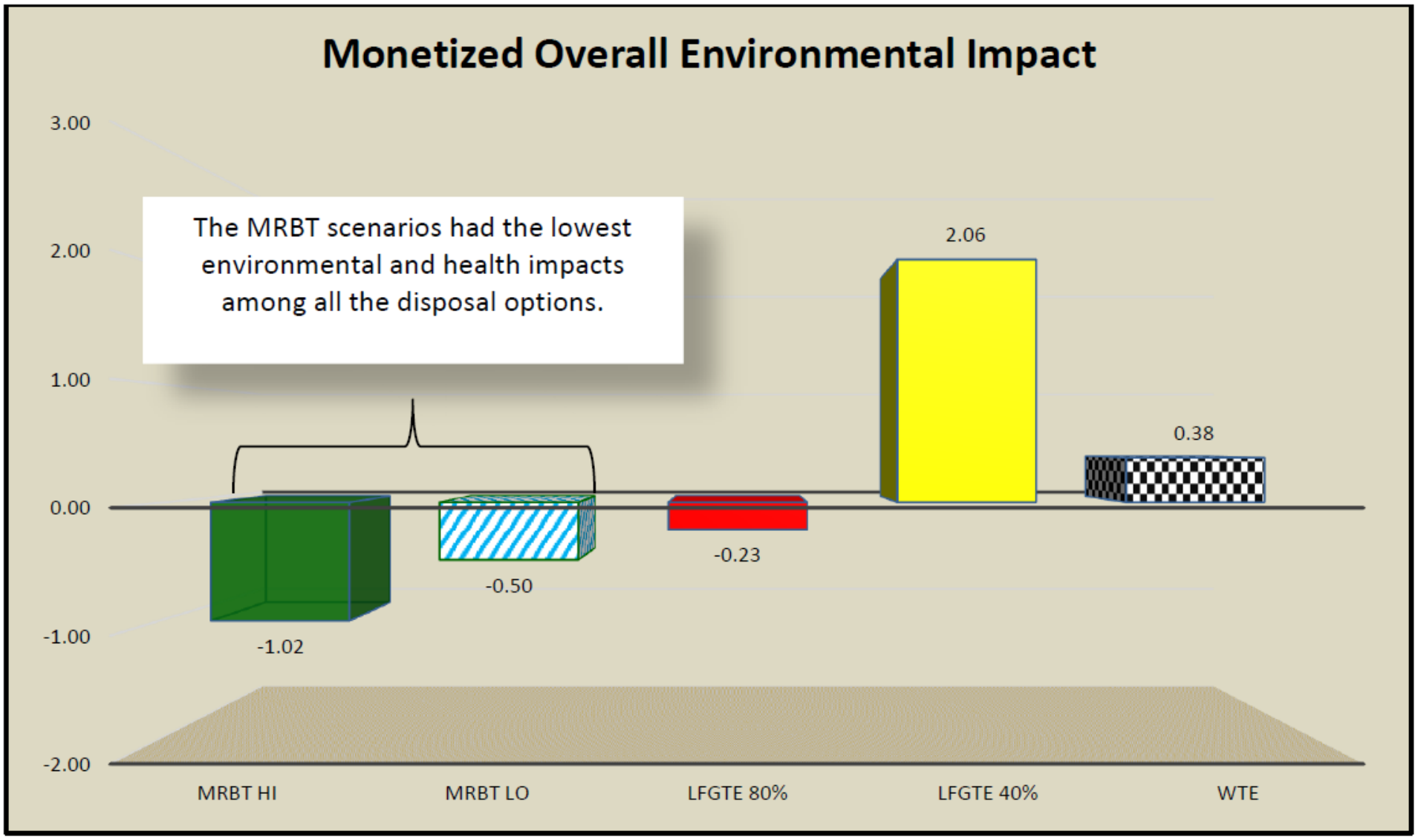
Dr. Jeffrey Morris

Dr. Enzo Favoino

Eric Lombardi

Kate Bailey

www.ecocycle.org/specialreports/leftovers


Monetized Overall Environmental Impact
The MRBT scenarios had the lowest environmental and health impacts among all the disposal options.
3.00
2.00
1.00
0.00
-1.00
-2.00
-1.02
-0.50
-0.23
2.06
0.38
MRBT HI
MRBT LO
LFGTE 80%
LFGTE 40%
WTE

The back end is still a landfill…

1. Direct landfilling
   (bad, but better than incineration)
   - leachate (toxics)
   - air emissions (toxics, methane, odors)

2. Incineration → toxic ash to landfill
   (most polluting and expensive option)
   - leachate (even more toxics)
   - air emissions from ash blowing off site (toxics)

3. Anaerobic digestion → landfill
   (best option; avoids gassy, stinky landfills)
   - odor, leachate and air emissions highly minimized

Plastic & Climate

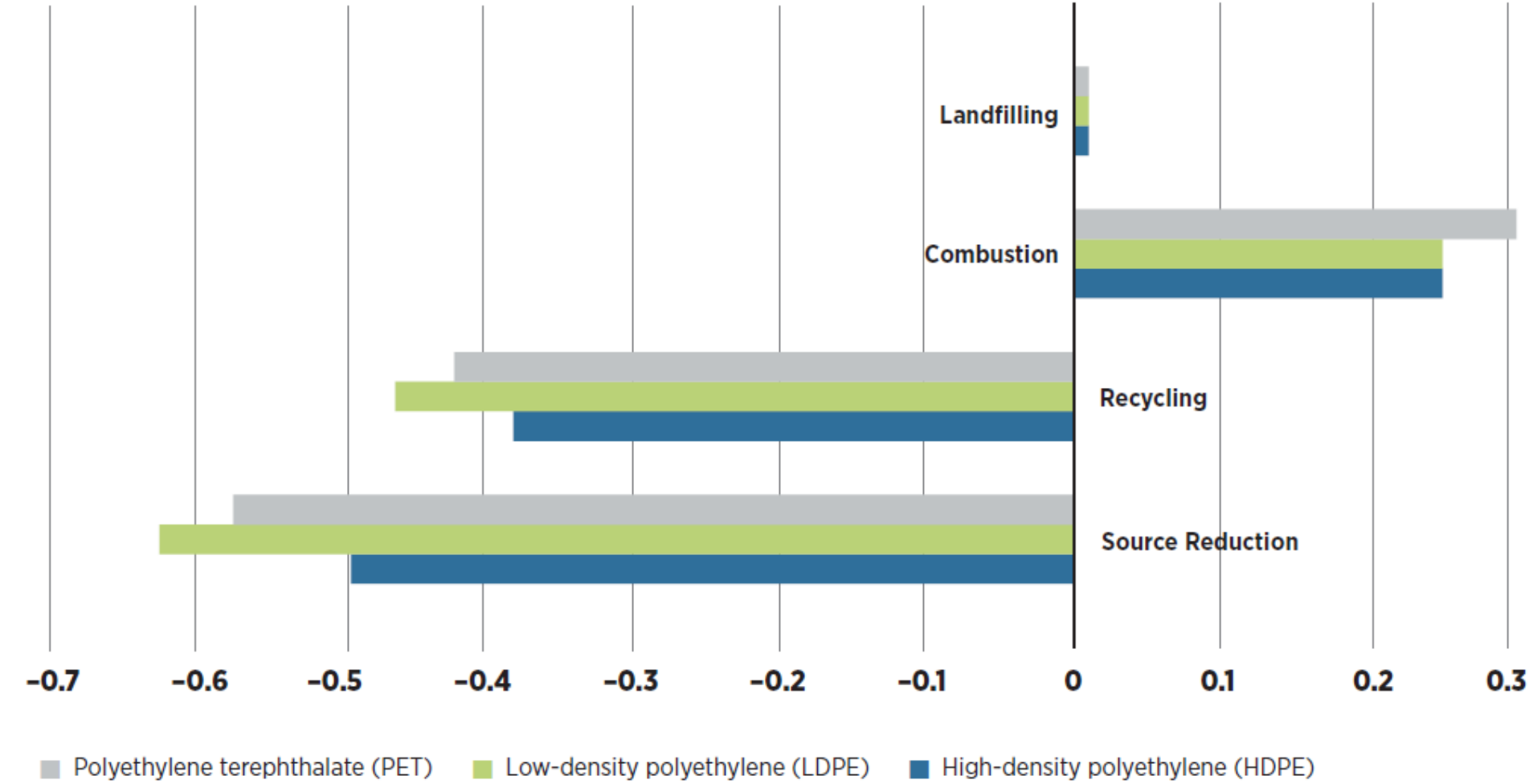
THE HIDDEN COSTS OF A PLASTIC PLANET

CIEL · EIP Environmental Integrity Project · FracTracker Alliance · gaia · 5 Gyres Science to Solutions · #breakfreefromplastic

Better to Landfill than Burn Plastics

FIGURE 16

Net Greenhouse Gas Emissions from Source Reduction and MSW Management Options



Unit: Mt CO_2e/ton

Source: U.S. EPA (2006). *Solid Waste Management and Greenhouse Gases: A Life-Cycle Assessment of Emissions and Sinks Report.* Third edition.

Compostable Plastics

- Polylactic Acid (PLA)
  - Made from biotech corn
  - Glyphosate (Roundup) spraying
    - Cancer; kills / mutates amphibians
  - Estrogen-like chemical leaching
- Consumers confused where to put it
  - Recycling:
    - Contaminates recycling
  - Composting:
    - Often not available, consumers don't know if going to industrial facility that can handle it
  - Trash:
    - Worse than plastics in landfill; both bad if burned

Messing with your hormones…

Mother Jones

POLYSTYRENE (PS) #6

Characteristics: Known by the brand name Styrofoam; contains styrene, which may mimic estrogen

Uses: Takeout containers, egg cartons, meat and fish trays

Positive: 50 percent

POLYCARBONATE (PC) #7

Characteristics: Hard, clear, durable; contains BPA

Uses: Dishes, drinking glasses, reusable water bottles, food packaging, blenders, syringes

Positive: 100 percent

POLYLACTIC ACID (PLA) #7

Characteristics: Made from corn; marketed as biodegradable and compostable

Uses: Takeout containers, fruit and vegetable packaging, yogurt cups, disposable utensils

Positive: 91 percent

Source: www.motherjones.com/environment/2014/03/guide-estrogen-common-plastics-bpa/; more at www.ejnet.org/plastics

Join the Zero Waste Delco Community

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ZeroWasteDelco.or

Add Your Voice – Share Your Zero Waste Experience – Move Delco Forward