City of Philadelphia

Office of Clean & Green Initiatives, Sanitation Department, and Office of Sustainability

REQUEST FOR INFORMATION

on

SOLID WASTE MANAGEMENT

August 1, 2025

Response by

Mike Ewall, Esq.

and

Energy Justice Network

1. GENERAL INFORMATION

1.1	Organization/Respondent Name*:	Energy Justice Network
1.2	Street Address:	1434 Elbridge St
1.3	City, State, Zip:	Philadelphia, PA 19149
1.4	Primary Business:	Environmental Justice Advocacy
1.5	Point of Contact Name*:	Mike Ewall, Esq.
1.6	Title:	Executive Director
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1.9	Organization Web Address:	http://www.energyjustice.net

2. PROPOSAL INTRODUCTION

Energy Justice Network is a national nonprofit organization headquartered in Philadelphia. Founded in 1999, our paid staffing has ranged from zero to six full-time employees at any given time, plus part-time employees/contractors and volunteers.

Energy Justice Network is a research-based organization that supports communities to transition to clean energy and zero waste systems with a focus on preventing and avoiding polluting industrial operations such as trash incineration.

Our Executive Director, Mike Ewall, has been deeply involved in waste issues since 1990. In 2004, he authored the Zero Waste Hierarchy that informed the City of Oakland's waste hierarchy before being adopted as the international standard defining Zero Waste through the Zero Waste International Alliance (ZWIA). He serves on ZWIA's technical committee for changes to the internationally peer-reviewed definition of Zero Waste and the Zero Waste Hierarchy.[1] He also serves as an advisor to Zero Waste Canada and consults with many local community groups such as Delco Environmental Justice, Zero Waste Montgomery County (MD), and Zero Waste New York. He is a certified Zero Waste Associate and has served as a zero waste consultant for county governments in developing their zero waste plans.

Since the mid-1990s, well before pursuing a law degree, Ewall developed local ordinances that, in Pennsylvania, effectively blocked a multi-state nuclear waste dump, a hazardous waste incinerator, three crematoria, and other unwanted waste facilities. His work developing local and state clean air laws has also been effective in holding existing industrial polluters accountable in three other states so far.

In Philadelphia, he served on Councilmember Gilmore-Richardson's Environmental Stakeholder Group's Air and Waste Committees where he drafted bills for introduction, including the Waste Contracting for Clean Air Act. This bill would preclude incineration technologies from being used under city waste contracts.

[1] See https://zwia.org/zero-waste-definition/ and https://zwia.org/zwh

3. PROPOSAL BODY

Section 1: Methodologies, measurement tools, and best practices to evaluate the comparative health and environmental impacts of residential waste management practices.

3.1.1 Methodology recommendations for the City's upcoming residential RFP.

The waste disposal and recycling RFPs should be informed by the comprehensive climate, health and environmental impact life cycle analysis (LCA) commissioned by the County of Delaware, PA and published in 2023. It is the most recent, relevant, and comprehensive study of incineration vs. landfilling in the region and it specifically looks at the Reworld (Covanta) Delaware Valley trash incinerator in the City of Chester, PA (Delaware County), comparing it to the Rolling Hills Landfill in Berks County, which is owned by the Delaware County Solid Waste Authority (DCSWA).

DCSWA is in the process of transitioning from using their landfill for the Reworld incinerator's ash to ending the county's use of incineration, skipping the incinerator, and hauling their unburned trash directly to Rolling Hills Landfill. The LCA also compared the status quo to adoption of the Zero Waste Plan.

The results show that incineration (and landfilling ash) is 2.3 times more harmful for health and the environment than using the landfill directly.

The LCA study was conducted using the most comprehensive LCA tool for waste systems: the Measuring Environmental Benefits Calculator (MEBCalc™) by Sound Resource Management Group.[2] If the City of Philadelphia wanted to conduct a new LCA using this model, it can hire Dr. Jeffrey Morris, the economist and solid waste expert at Sound Resource Management Group who developed the model. His CV is attached.

Unlike other LCA tools, this tool looks at nine different health and environmental criteria, including climate impacts, but also cancer and non-cancer effects of toxic chemicals, impacts on respiratory health from pollutants like nitrogen oxides that trigger asthma attacks, and impacts of particulate matter, such as heart attacks and strokes. The model can also monetize these impacts using accepted standard economic values for the social cost of carbon and other pollutant impacts. This enables the model to present a single chart that can sum up the diverse impacts into a dollar value representing externalized health and environmental costs. These are costs that people pay in medical bills and that society pays in impacts from climate change, premature deaths and many other harms.

Completing an LCA requires extensive work, and there is not sufficient time to prepare one before the RFP would be issued, though it *might* be possible to conduct one before new contracts would be issued.

[2] Measuring Environmental Benefits Calculator (MEBCalc™), Sound Resource Management Group. srmginc.com/mebcalc/

The following chart shows the major differences between three common LCA tools for waste disposal systems. The first two are EPA tools: the Waste Reduction Model (WARM) and the Municipal Solid Waste Decision Support Tool (MSW DST). The Measuring Environmental Benefits Calculator (MEBCalc™), used in the Delaware County study and the Montgomery County, MD study also shared below, is the most comprehensive and detailed of the models.

Life Cycle Analysis (LCA) Characteristics of WARM, MSW DST and MEBCalc™ models

	LCA Model		
Features	**WARM**	**MSW DST**	**MEBCalc**
Impacts included in model			
-Climate change	✓	✓	✓
-Human health (respiratory)		limited	✓
-Human health (toxic chemicals)		limited	✓
-Human health (carcinogens)		limited	✓
-Eutrophication		limited	✓
-Acidification		limited	✓
-Eco-toxicity		limited	✓
-Ozone depletion			✓
-Smog formation		limited	✓
Monetized Environmental Score			✓
Energy Impacts Included	✓	✓	limited
# of MSW Materials Included	54	~30	27

Additional Comparison of WARM & MSW DST: H. Scott Matthews (Carnegie Mellon University), Cynthia J. Manson (Industrial Economics, Inc.), *Comparative Analysis of EPA Life Cycle Models: Differences between MSW-DST and WARM in Examining Waste Management Options*, prepared for EPA Office of Resource Conservation and Recovery, Internal Review Draft-Do Not Distribute, 11-12-2009.

Two of the more recent LCA studies that best summarize impacts of incineration vs landfilling are contained in reports done for Montgomery County, MD[3] and Delaware County, PA.[4] They are represented in the summary charts on pages 6-10.

Climate impacts are the largest of the nine evaluated, and the climate impacts of incineration are shown to be worse than landfilling, as other studies have shown as well. The results also show that implementing Delaware County's Zero Waste Plan has huge environmental and health benefits. The LCA's also shows that transportation impacts, despite the use of diesel trucks, are very small compared to the impacts of the disposal facilities themselves, and that no reasonable transportation distance to a landfill can justify using incineration closer to the city, since the

[3] "Beyond Incineration, Best Waste Management Strategies for Montgomery County, Maryland," Zero Waste Montgomery County, March 2021. https://www.energyjustice.net/md/beyond.pdf

[4] "Delaware County's Path Toward Zero Waste," Zero Waste Associates, March 2024. https://drive.google.com/file/d/1_ZEDM_z5MifMx2JfRJRvmuKbvVeUAfus/ Find just the LCA portion here: https://energyjustice.net/incineration/DelcoLCA.pdf

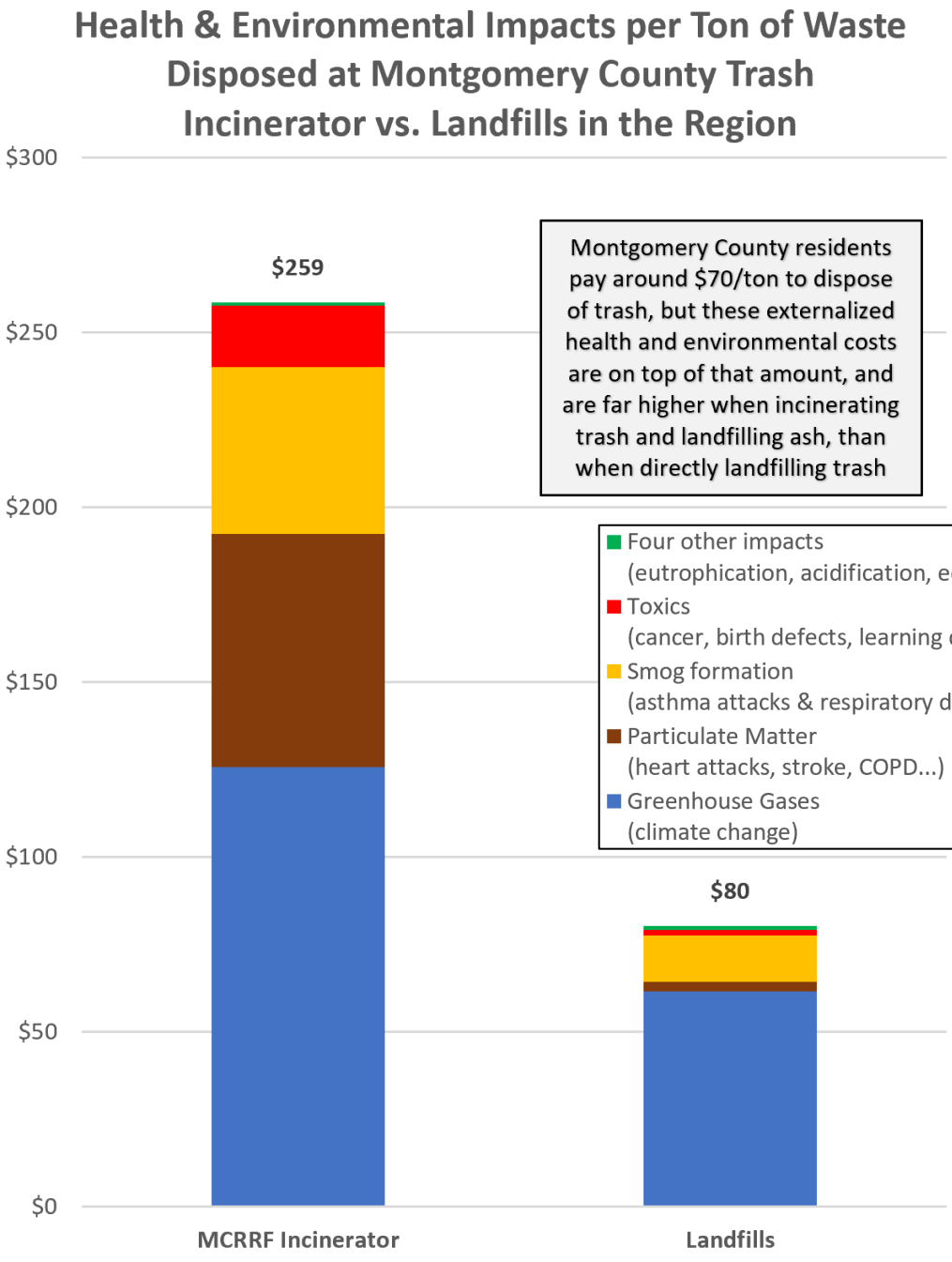
transportation impacts do not close the gap between landfilling and incineration. Based on the Maryland analysis (see chart on page 7), trash would need to be hauled via diesel-powered trash transfer trailer to a landfill in California to almost catch up to the emissions from local incinerators.

Montgomery County, MD is working to close their county-owned trash incinerator by September 2026. It is a Reworld-operated facility that is the county's largest industrial air polluter. Our *Beyond Incineration* report, produced at the request of Montgomery County's County Executive, Marc Elrich, includes a MEBCalc LCA comparing the county's incinerator to ten landfill options in PA, VA, and OH. Summary slides from that analysis are on pages 6-7.

Delaware County, PA is working to end its use of the Reworld incinerator in the City of Chester. The LCA study produced for their Zero Waste Plan evaluates incineration vs. landfilling, and also compares the impacts of adopting the Zero Waste Plan. In addition, it includes a sensitivity analysis (see chart on page 10) to examine incineration vs. landfilling under three scenarios of landfill gas capture rates (70%, 30% and 0%). It found that, even if there were no landfill gas capture, the overall health and environmental impacts of incineration would still be greater than those of landfilling. Looking solely at climate impacts, incineration is more harmful than landfilling unless the gas capture rate is under 30%. Gas capture rates are typically assumed to be 75%. While that figure is probably optimistic, it's reasonable to assume that gas capture rates are not as low as 30%. Summary slides from that analysis are on pages 8-10.[5]

[5] Life Cycle Assessment summary slides on the following pages are also available online at https://energyjustice.net/incineration/LCA.pdf

Incineration vs. Landfilling



Montgomery County residents pay around $70/ton to dispose of trash, but these externalized health and environmental costs are on top of that amount, and are far higher when incinerating trash and landfilling ash, than when directly landfilling trash

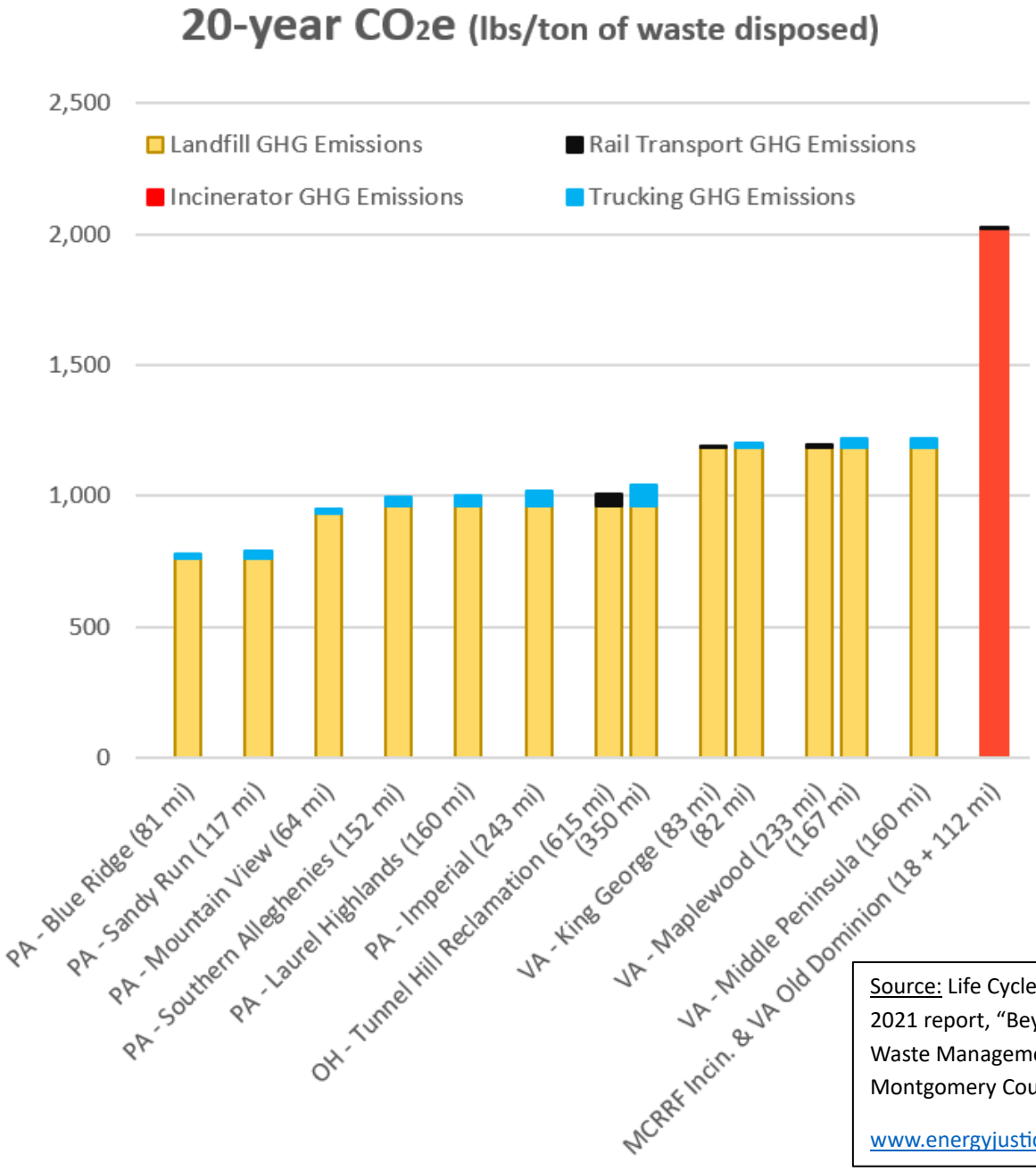
Montgomery County Resource Recovery Facility (MCRRF) trash incinerator is 3.2 times as harmful for health and environment as landfills in the region (a composite of 10 regional landfills in PA, VA & OH).

Source: Life Cycle Assessment (LCA) from 2021 report, "Beyond Incineration: Best Waste Management Strategies for Montgomery County, Maryland"

www.energyjustice.net/md/moco

Transportation Impacts Insignificant

Greenhouse Gas (GHG) Emissions in Carbon Dioxide Equivalents (CO_2e)



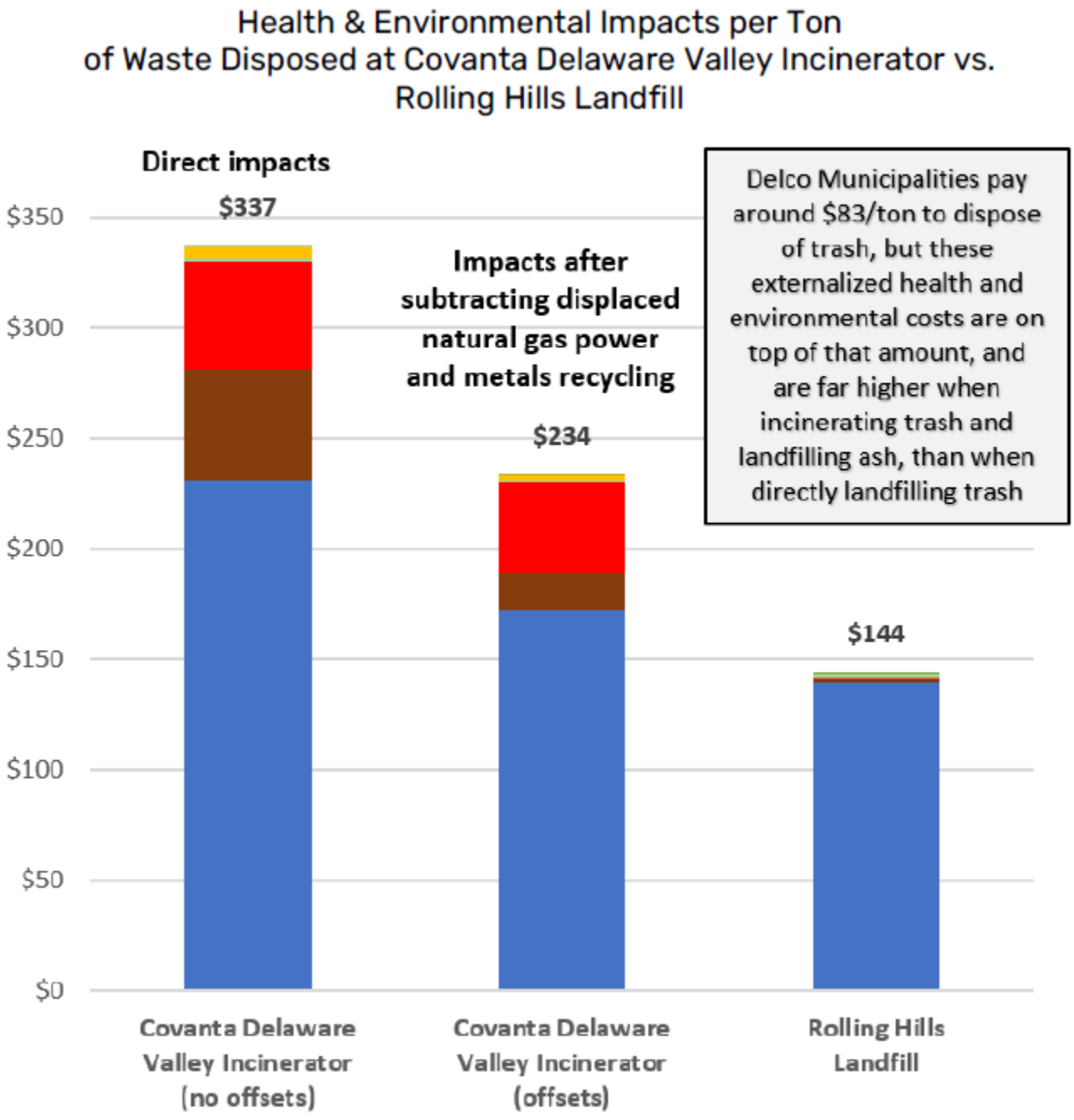
Note: This chart shows greenhouse gas emissions per ton of waste disposed. The "20-year" is a reference to the potency of methane, which is measured in terms of how much more potent it is compared to carbon dioxide. Methane has a global warming potential (GWP) that is over 80 times more potent than CO2 over a 20-year time frame and close to 30 times more potent over a 100-year time frame. This evaluation uses the 20-year GWP, which makes landfills (yellow) look worse than if measured over 100 years.

Source: Life Cycle Assessment (LCA) from 2021 report, "Beyond Incineration: Best Waste Management Strategies for Montgomery County, Maryland"

www.energyjustice.net/md/moco

Transportation climate impacts (trucking in blue, rail in black) are minor compared to incineration (red) or landfilling (yellow). No realistic transportation distance can justify incinerating in-county over hauling waste to distant landfills. Even driving a diesel truck across the country to reach a landfill fails to catch up to the impacts of incineration. Similar results are found when looking at pollutants other than GHGs.

Incineration vs. Landfilling

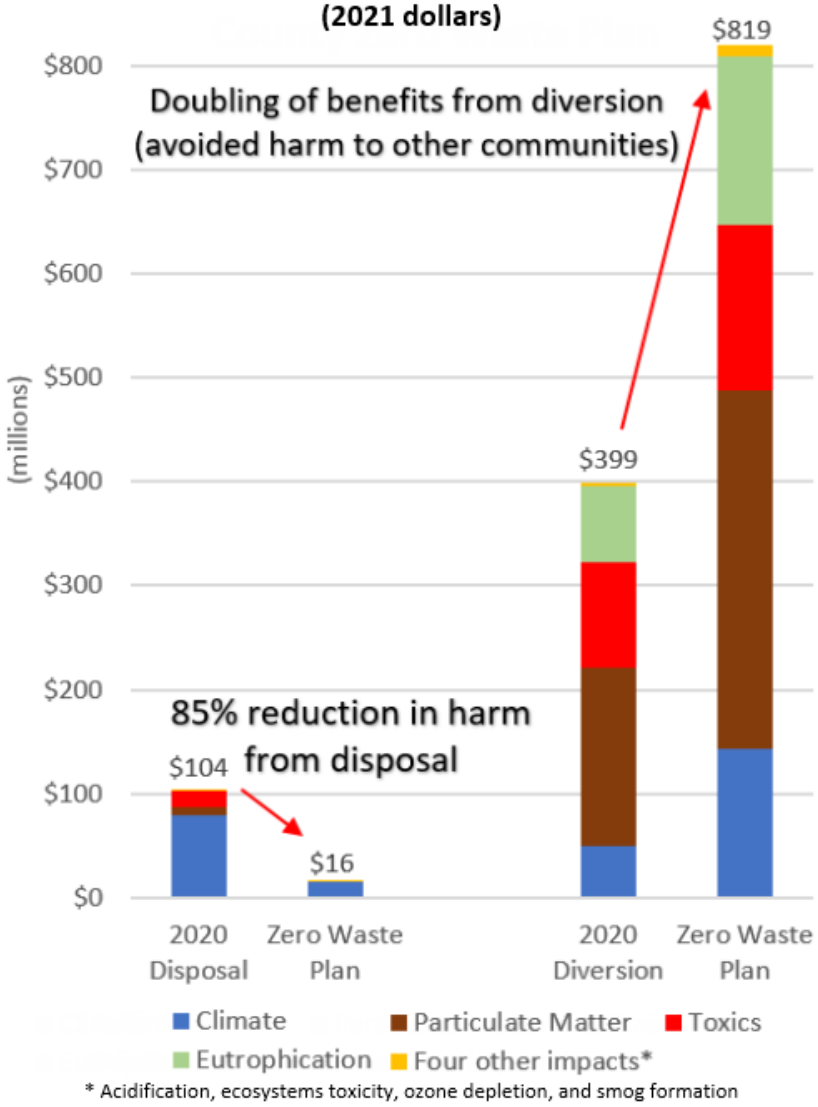


Incinerating trash at the nation's largest trash incinerator and landfilling its ash is <u>2.3 times as harmful</u> as directly landfilling trash at the same

<u>Source:</u> Life Cycle Assessment (LCA) from 2024 report, "Delaware County's Path Toward Zero Waste," Zero Waste Associates, March 2024. www.energyjustice.net/incineration/DelcoLCA.pdf

Impacts of Adopting Zero Waste Plan

Annual Health and Environmental Impacts of Implementing Delaware County Zero Waste Plan
(2021 dollars)



* Acidification, ecosystems toxicity, ozone depletion, and smog formation

85% reduction of disposal impacts from a combination of diverting materials from disposal, and switching from incineration (and landfilling ash) to direct use of landfilling.

Note: This chart combines Figure S1 / Figure 1 and Figure S4 / Figure 5, but all expressed in positive dollars. Table A1, A2, B1, and B2 provide the raw numbers behind this chart.

While the previous chart looked at externalized health and environmental costs per ton, this looks at the entire impact of Delaware County, Pennsylvania's waste system (all tons in a year), showing $104 million dollars of health and environmental costs per year.

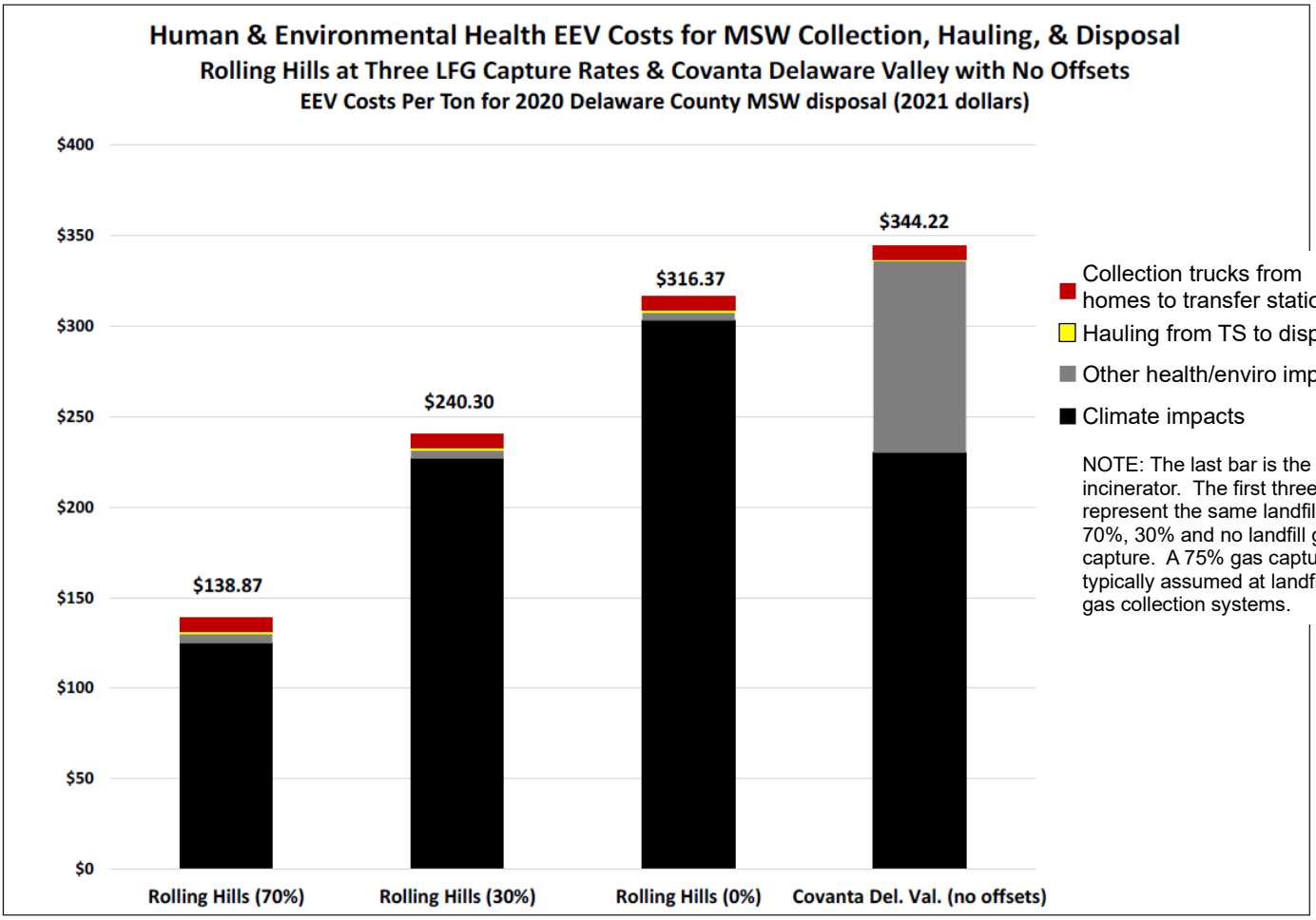
Adopting the Zero Waste Plan (ending incineration and reducing waste) cuts those harms by 85%, while the benefits (avoided harms) that already happen from current recycling efforts (about $400 million a year) would be doubled.

Examples of these avoided harms are not needing to log or mine new raw materials because we're now consuming less, reusing/repairing, recycling and composting.

Source: Life Cycle Assessment (LCA) from 2024 report, "Delaware County's Path Toward Zero Waste," Zero Waste Associates, March 2024. www.energyjustice.net/incineration/DelcoLCA.pdf

Incineration worse than the worst landfills; Transportation impacts insignificant

Yellow lines show difference between hauling from two transfer stations 3 and 13 miles from the incinerator (last bar) vs. trucking all trash to landfill 60 miles away (first 3 bars)



Two notable lessons from this chart. First, it includes a sensitivity analysis to see how much the landfill gas capture rate matters. Even with zero gas capture (all leaking out), the overall impacts of incineration are worse than landfilling because the other impacts of incineration – asthma, cancer, heart attacks, etc. (grey) – add up to significant harm on top of the climate impacts (black). If only looking at climate impacts, landfill gas capture rate would have to be as low as 30% to be comparable to incineration.

Source: Life Cycle Assessment (LCA) from 2024 report, "Delaware County's Path Toward Zero Waste," Zero Waste Associates, March 2024. www.energyjustice.net/incineration/DelcoLCA.pdf

The collection trucks (red) are the same in all scenarios. The greater hauling distance to landfill (yellow) in the three landfill scenarios is more than the nearby incinerator, but so insignificant that trucking emissions cannot justify a preference for incinerating in-county vs. trucking to landfills.

We recommend using the existing Delaware County study as guidance because:

1) It involves the same waste incinerator in Chester that is the main one used by Reworld (Covanta) under the current and previous contract and is the most likely incinerator to be accepting Philadelphia's trash if a new contract is awarded to Reworld. The LCA uses actual emissions data from that incinerator in its analysis, and the emissions would be about the same for the foreseeable future.

2) Pollution control changes aren't significant. The incinerator has always been missing two of the four pollution control devices common to trash incinerators. One of them is in the process of being installed: selective non-catalytic reduction (SNCR) for limiting releases of nitrogen oxides (NOx) that trigger asthma attacks. However, these new controls are only expected to reduce emissions of this one pollutant by 18%, which does little to change the LCA results. Installing modern controls (selective catalytic reduction, or "SCR") would reduce their NOx emissions by 70-80%, but these were not required by DEP. The NOx emissions are reflected in the yellow part on the first two bars on this chart on page 7.

3) The data on landfills will not change much when evaluating a different landfill because most of the details on landfills are related to waste composition, not site-specific metrics. The waste composition data is from the most recent PA DEP statewide waste composition study and uses the southeast regional data, which is a composite of two samples at transfer stations in Philadelphia and one at the Reworld incinerator in Plymouth Township, Montgomery County. The Delco LCA waste data is actually more reflective of Philadelphia's trash stream than of Delaware County's waste composition.

4) Site-specific metrics at landfills like rainfall won't vary much among landfills in the region. Landfill gas management methods vary (such as flaring at Rolling Hills Landfill, which is not as environmentally harmful as the burning for energy that takes place at Fairless Landfill in Bucks County, where over half of Philadelphia's trash goes), but this is not significant enough a difference that it would make any landfill worse, environmentally, than using any incinerator.

Other examples of data-driven analysis of environmental impacts of landfills and incinerators are exemplified in three reports we were commissioned to write for the City of Miramar, Florida. The city (pop. 135,000; 41% Black, 41% Latine) sits on the border of Broward and Miami-Dade Counties and is opposing efforts by both counties to rebuild and expand large waste incinerators. The Miami-Dade County incinerator, operated by Reworld (Covanta) burned down in February 2023 after a massive three week long fire.

Most Responsible Landfill Options for Miami-Dade County evaluating 63 landfills in Florida and Georgia and identifying the best of them after scoring 18 criteria using U.S. Census, EPA, and other data sources.
https://energyjustice.net/fl/landfills.pdf

Operating Track Record of the "Cleanest and Greenest" Trash Incinerator in the United States documenting 176 incidents at the Palm Beach Renewable Energy Facility 2 trash incinerator in its first decade of operation. This is not comprehensive and the review of DEP air files did not even touch the inspection reports. This is the model incinerator that Miami-Dade County looks to emulate.
https://energyjustice.net/fl/wpb2history.pdf

Quantitative Analysis of Projected Emissions from Proposed Miami-Dade County Trash Incinerator showing that the proposed new 4,000 ton/day trash incinerator would be among the largest industrial air polluters in the county. The analysis uses actual emissions data from the nation's newest trash incinerator (Palm Beach Renewable Energy Facility 2) and models emissions from a new incinerator at the larger size sought by Miami-Dade County, and adjusting two pollutants downward to reflect adoption of EPA's proposed Large Municipal Waste Combustor regulations for new facilities. Even with a new incinerator meeting these requirements, making it the cleanest in the nation, it would rank among the largest industrial air polluters in Miami-Dade County, where other major industrial polluters already operate.
https://energyjustice.net/fl/mdcincin.pdf

Expanding on the previous report, we were commissioned by the Sierra Club Loxahatchee Group to produce a similar and more thorough report on the pollution levels to be expected from the new incinerator planned by Palm Beach County, Florida to replace the older of the two they currently have. See:

It's Not Green: New Trash Incinerators in Palm Beach County are Expensive Major Air Polluters showing that a modern new incinerator (50-100% larger than the old "REF1" incinerator it would replace) would be among the largest industrial air polluters in the county, even if built under the proposed new standards.
https://energyjustice.net/fl/pbcincin.pdf

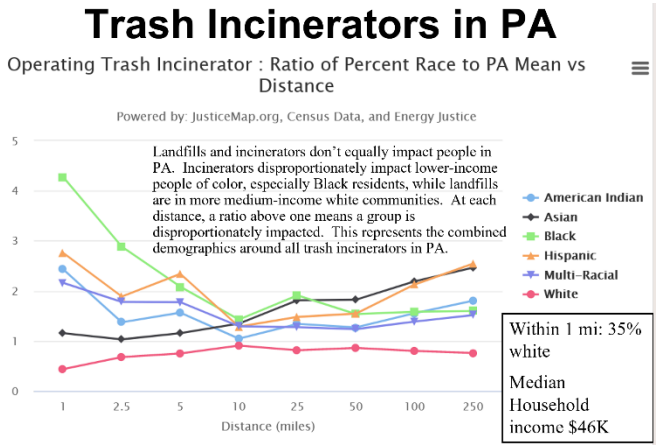
We are adept at navigating PA DEP and U.S. EPA air emissions data, waste flow data, Energy Information Administration data, and academic literature. We'll soon be releasing a report on academic studies that have found health impacts in communities living near trash incinerators, even near the "modern" ones that are cleaner than the five that surround Philadelphia.

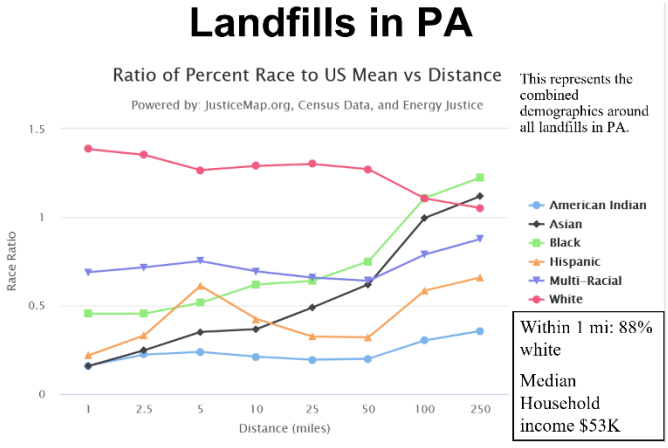
We have also done innovative mapping and environmental justice analysis work, based on U.S. Census demographics data and various data sources on energy and waste facilities. We run:

- www.ejmap.org which tracks existing, proposed, closed, and defeated energy and waste industry facilities
- www.ejmap.org/justice, a.k.a. JusticeMap, which is a sub-site that makes race and class Census data easily navigable with a Google Maps interface that is provided as a layer on the main www.ejmap.org site.
- We also have an environmental justice analyzer tool that we are updating and rebuilding, which allows us to analyze environmental justice impacts across entire industries, which is how we're able to look at all landfills or incinerators in PA or the nation and show the

degree to which these industries may or may not be disproportionately impacting people of color or low-income people at a range of distances from 0.1 to 250 miles. It is through this, and through an understanding of the demographics around individual incinerators and landfills in our region that we are confident in stating that incinerators are a major environmental justice concern, most disproportionately impacting Black residents, while landfills are not. Landfills in PA impact far fewer people, and surrounding communities tend to be more white than average, and not as low-income as communities around incinerators.

Results showing the environmental justice industry-wide differences between incinerators and landfills in PA are in these two charts from our analyzer tool, showing that incinerators disproportionately impact Black residents while landfills have a slightly disproportionate impact on white residents. If all facilities were impacting people equally by race, the line would follow the ratio of one at all distances. The trends clearly show otherwise. Similarly, the overall number of people impacted and the median household income around the two disposal industries also show significant differences.





SAMPLE CRITERIA TO INCLUDE IN CITY'S WASTE MANAGEMENT RFPs:

There are two main ways to ensure that the more environmentally responsible technology is used for the City of Philadelphia's waste disposal:

1) specifying the eligible technology, or
2) establishing criteria by which health and environmental impacts can be assessed.

Based on a wealth of information already settling the question, we recommend keeping things simple and opting for method #1. However, we provide sample language in this section for both methods.

1) Specifying the eligible technology.

There are only two options that are commercially viable at this time: landfills and incinerators. While other types of incinerators (gasification, pyrolysis, plasma arc), mixed waste processing, anaerobic digestion, and various waste-to-fuels schemes have been proposed and experimented with for years in this region and across the country, none of them are appropriate or commercially available options. As discussed later in this document, the technologies used for mixed waste processing and anaerobic digestion, if applied properly, can be part of a Zero Waste solution, they are not commercially available anywhere in the U.S. Montgomery County, Maryland is exploring replacing their trash incinerator with such a system, known as Material Recovery and Biological Treatment (MRBT), with stabilized residuals being landfilled, but this is years away and would only be for their own county's trash.

Since the only two viable options are landfilling and incineration, and since the life cycle analysis conducted by Delaware County clearly shows incineration to be more harmful for climate, health, and environment, we recommend simply limiting the RFP to landfill options only. This is the path that Delaware County is on, as it works to end its use of incineration. Other cities and counties have issued RFPs that limit responders to using just one type of disposal facility, and have also required a proven track record with a minimum number of years in operation.

The city is not legally required to open an RFP to all options. Chapter 17-100 of the Philadelphia City Code includes local bidding preferences and prohibitions on alcohol advertising within city contracts for advertising on public properties. Similarly, the City of Baltimore has provisions in their city code that prohibits contractors from using specified species of hardwoods. Without having to have a prohibition spelled out in the City Code, an RFP can either limit response to landfill only, or can prohibit responses that involve incineration.

The **waste disposal RFP language** can be as simple as this:

> *The contractor shall dispose of Municipal Solid Waste or Residual Waste at an appropriately-permitted Municipal Solid Waste or Residual Waste landfill.*
>
> *The contractor shall not convey Municipal Solid Waste or Residual Waste to an Incinerator or a Waste-to-Fuel facility, or to a transfer station where such Discarded Materials would be subsequently conveyed to an Incinerator or a Waste-to-Fuel facility.*

Any **recycling RFP language** can similarly state:

> *The contractor shall not convey Source Separated Recyclables to an Incinerator or a Waste-to-Fuel facility, or to a transfer station, Processing, or Recycling facility where the Source Separated Recyclables or any materials separated from the Source Separated Recyclables would be subsequently conveyed to an Incinerator or a Waste-to-Fuel facility.*

The recycling RFP language for separate contracts for electronic waste, tires, hazardous waste, or other waste streams may require other specifics to prevent problematic waste disposal methods.

For electronic waste, in addition to avoiding incineration, vendors should be *e*-Stewards certified to avoid the use of prison labor or dumping on developing nations (typically in Africa and Asia).

For tires, the main concern is incineration, both in the Reworld incinerators currently used in Chester City (Delaware County) and Plymouth Township (Montgomery County), but also in cement kilns that burn tires such as LafargeHolcim in Whitehall, PA. There are also heat and toxicity problems with tires being used for artificial turf, such as sports fields and playgrounds, so any new contract for tire recycling would be well-advised to avoid these markets as well. A lack of alternative markets may be a problem, and effort may need to be put in to find appropriate markets that at least avoid tire burning, which is more polluting than coal burning.[6]

For pharmaceutical waste and certain hazardous wastes, including oil-based paints, disposal by burning at trash incinerators (pharmaceuticals) or cement kilns (oil-based paints), typically in Black communities, is common. Finding alternatives may be a challenge here as well, but with some effort and creativity, Philadelphia could build the market for better waste management. As a large city, forward-thinking contract language could incentivize the development of non-burn alternatives. This could be done in a way that uses the status quo only for as long as non-burn alternatives are unavailable, but can allow for a revision or breach of contract as soon as a non-burn alternative is available that can process some or all of the city's waste stream in question. By guaranteeing a market to a new market player with the proper technology, even mid-stream during a multi-year contract, it creates the market for new solutions, such as the use of supercritical water oxidation (SCWO) as a safe alternative for pharmaceutical waste disposal, certain hazardous wastes, or concentrated PFAS sources like fire-fighting foam.[7]

Any **composting RFP language** can state:

> *The contractor shall convey Source Separated Organics to an aerobic composting facility or an anaerobic digestion facility provided that the receiving facility does not co-process sewage sludge (a.k.a. "biosolids") or the organic fraction of mixed municipal solid waste. Preference will be given to aerobic composting processes to avoid methane production.*[8]
>
> *The contractor shall not convey Source Separated Organics to an Incinerator or a Waste-to-Fuel facility, or to a transfer station, Processing, or Recycling facility where the Source Separated Recyclables or any materials separated from the Source Separated Recyclables would be subsequently conveyed to an Incinerator or a Waste-to-Fuel facility.*

[6] https://www.energyjustice.net/files/ny/TiresVsCoal.pdf
[7] https://www.ga.com/pfas-waste-destruction-systems
[8] For some of the thinking behind this, please see https://zwia.org/composting-and-anaerobic-digestion-policy/ and https://sewagesludgeactionnetwork.com

The following definitions, where used above, should accompany the RFP and any resulting contract:

Discarded Materials. *Municipal Waste, Residual Waste, Construction and Demolition Waste, Source Separated Organics, or Source Separated Recyclables generated in the City and contracted by the City for collection, including non-recyclable material mixed in with Source Separated Recyclables.*

Incinerator. *Any facility that meets the definition of a "municipal waste combustor" per 40 CFR 60.51a. In addition, the term "incinerator" shall include cement kilns, power plants, industrial boilers, or any facility which uses plasma arc, gasification, pyrolysis, or similar technology where such Discarded Materials are used primarily for their energy value, and not for use as a raw material to be reused, Recycled or composted.*

Municipal Waste. *"Municipal Solid Waste" as defined in 25 Pa. Code § 271.1.*

Processing. *"Processing" as defined in 25 Pa. Code § 271.1, including the use of any Waste-to-Fuel facility.*

Recycling. *"Recycling" as defined in 25 Pa. Code § 271.1, except that the term "Recycling" does not include use of an Incinerator or Waste-to-Fuel Facility.*

Residual Waste. *"Residual Waste" as defined in 25 Pa. Code § 271.1.*

Source Separated Organics. *Food scraps, soiled paper, and/or yard waste kept separate from municipal waste at the point of origin for the purpose of composting. Source Separated Organics does not include compostable plastics.*

Source Separated Recyclables. *Materials that are kept separate from municipal waste at the point of origin for the purpose of Recycling. The term includes any material collected in a Recycling program, including, but not limited to, clear glass, colored glass, aluminum, steel and bimetallic cans, high-grade office paper, newsprint, corrugated paper, other marketable grades of paper, and plastics.*

Waste-to-Fuel Facility. *Any facility that markets, packages, Processes or converts Discarded Materials to be provided or sold as burnable fuels for the purpose of being combusted for energy (electricity, heat, or transportation fuel). The term "Waste-to-Fuel Facility" does not include a landfill or an anaerobic digester.*

2) Establishing criteria by which health and environmental impacts can be assessed.

If a more complicated criteria is desired, emissions data can be used to distinguish between waste facilities, which could be framed as a performance indicator.

There are a few challenges with this approach, however:

- Landfills and incinerators are like apples and oranges in that their emissions aren't measurable in the same place and manner.

  At trash incinerators, air emissions can be monitored at the smokestack, though only four pollutants are monitored continuously: carbon monoxide, nitrogen oxides, sulfur dioxide, and hydrochloric acid. The rest, if monitored at all, are tested once per year under optimal operating conditions, which has been demonstrated to significantly underestimate emissions.[9]

  At landfills, much of the air emissions are fugitive emissions that leak out at various points and are not regularly monitored or easily able to be monitored. Where landfill gas is collected and burned, it is a point source that can be monitored, but monitoring requirements are fairly non-existent and, in the case of flares, may be impossible because there is not enough of a smokestack (or *any* smokestack in the case of unshrouded flares) where monitoring devices can even be placed. Furthermore, at the Fairless Landfill in Bucks County, where over half of Philadelphia's trash currently goes, the landfill gas is piped to a common landfill gas burning facility that includes gas from the other nearby closed landfills that WM owns in Falls Township, making it arguable whether to count those emissions as if all are from the active landfill.

- Picking one or more pollutants to report can be tricky.

  While it may be tempting to use greenhouse gases (GHGs), this is the most complicated and should be avoided. It is complicated by several factors. There is disagreement in reporting methods over whether to use the most current global warming potentials (GWP) for methane simply because EPA's tools have chosen to stick with outdated climate science from the International Panel on Climate Change (IPCC) Fourth Assessment Report (AR4) from 2007, even though the modern science (IPCC's Sixth Assessment Report from 2021) would be most appropriate. Also, the 20-year GWP should be used, even though most models use the 100-year GWP figures, because we don't have 100 years to stop climate change. The latest science shows the 20-year GWP for methane to be around 82 times as potent as carbon dioxide (CO_2), though using old 100-year GWP data as various models do (including all from EPA) makes methane out to be only 25 times as potent a greenhouse gas as CO_2. The life cycle assessments referenced above use the 20-year

[9] https://energyjustice.net/fl/pbcincin.pdf#page=9

figure of 86x (from IPCC's Fifth Assessment Report), which is the worst-case scenario, weighing against landfills, yet even with this high weighting, GHG emissions from incineration have been documented to be more per ton of waste than from landfills.

Compounding the use of GHG data is that the incineration industry plays number games with the data. They first erase about half of the emissions under the scientifically discredited theory that biogenic carbon does not count. Then they assume that fossil fuels are displaced by any electricity generated, which is often not true, but allows them to further subtract from their GHG emissions. Astoundingly, even when comparing to landfills, they'll sometimes subtract what they think is coming out of landfills, as if it is appropriate for industries to subtract one another's emissions when trying to compare the two. Finally, they'll further subtract emissions they estimate would come out of mining and smelting metals that they assume would happen if they do not recycle metals out of their ash that come through the incinerator unburned. With all of this creative accounting, the incinerator industry makes themselves out to have negative GHG emissions, and to be better than landfills. A more detailed writeup on incinerator GHG accounting can be found in our recent comments (supported by 50 organizations) to New York State on their Greenhouse Gas Reporting Program.[10]

Multiple life cycle analysis studies have shown incineration to be worse for the climate than landfills. Even notoriously pro-incinerator consultants, Arcadis, who are members of a pro-incinerator lobbying group,[11] recently documented in their consulting for Montgomery County, Maryland that incineration is slightly worse for the climate than landfilling.[12] They found this even when using EPA's WARM model, which is controversial for its pro-incinerator bias (including its erasure of biogenic carbon emissions and outdated assumptions on fossil fuel displacement). In fact, no published version of EPA's WARM model has been peer-reviewed. In early 2022, in a meeting we held with top staff at EPA's Office of Land and Emergency Management, which oversees the WARM model, EPA admitted to us that the model had never been peer-reviewed despite having had 15 versions published by that time. A peer-review and data quality review was conducted at our request later in 2022[13] followed by a public comment period that ended in early 2024.[14] Much feedback came in showing the model to be biased in favor of incineration, and outdated in some ways.[15,16,17] Version 16 (the latest version) was released in December 2023 without any of this feedback having been incorporated into the model.

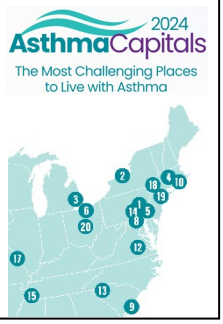
[10] https://energyjustice.net/ny/GHGreporting.pdf
[11] https://fwtec.us/associate-members/
[12] https://www.montgomerycountymd.gov/DEP/Resources/Files/trash-recycling/zero-waste/MSW-Analysis-5_16_25b-with-Appendices.pdf#page=62 &
https://montgomerycountymd.granicus.com/MetaViewer.php?view_id=169&clip_id=18132&meta_id=199630#page=11
[13] https://www.epa.gov/waste-reduction-model/data-quality-and-peer-review
[14] https://www.epa.gov/warm/warm-public-comment-period
[15] See public comment docket at: https://www.regulations.gov/docket/EPA-HQ-OLEM-2023-0451
[16] Energy Justice Network comments on EPA WARM Model. https://downloads.regulations.gov/EPA-HQ-OLEM-2023-0451-0112/attachment_1.pdf
[17] Partnership for Policy Integrity comments on EPA WARM Model. https://downloads.regulations.gov/EPA-HQ-OLEM-2023-0451-0112/attachment_7.pdf

Due to the complexity and controversy around GHG accounting, and the lack of a credible, standardized public model, we do not recommend using GHGs as a metric within an RFP.

Perhaps the best pollutant to use as a metric would be nitrogen oxides (NOx), a pollutant that contributes to ground-level ozone and triggers asthma attacks. Philadelphia is consistently ranked as a top ten "asthma capital" by the Asthma and Allergy Foundation of America (see their rankings in sidebar).[18]

Philadelphia Metro Area ranked…

#4 in 2018
#4 in 2019
#7 in 2021
#9 in 2022
#8 in 2023
#5 in 2024



NOx is one of four pollutants that are monitored continuously at trash incinerators in Pennsylvania, and is one that would also be released from landfill gas burners.

Using the most recent available data from the PA Department of Environmental Protection (DEP), for 2023, here are the numbers for the top six waste facilities receiving municipal solid waste from Philadelphia in 2024:

Disposal Facility	Facility Type	County	Owner	Philly MSW Tons (2024)	% of Philly MSW (2024)	Tons NOx (2023)	Tons CO_2 (2023)	Tons CH_4 (2023)	Tons N_2O (2023)	GHGs (CO_2e) (2023)	Total tons received (2023)	GHGs per ton	NOx lbs per ton
Reworld Plymouth	Incinerator	Montgomery	Reworld	37,620	3%	417	430,910	123	16	445,364	378,841	1.2	2.20
Reworld Delaware Valley	Incinerator	Delaware	Reworld	355,139	28%	1,090	839,698	296	39	874,617	1,233,095	0.7	1.77
Wheelabrator Falls	Incinerator	Bucks	WIN Waste	73,208	6%	651	468,780	165	22	488,316	1,033,758	0.5	1.26
Conestoga Landfill	Landfill	Berks	Republic	3,552	0.3%	11	21,752	3809	0.27	334,164	618,554	0.5	0.04
Modern Landfill	Landfill	York	Republic	112,514	9%	19	114,442	3056	0.7	365,225	1,014,757	0.4	0.04
Fairless Landfill	Landfill	Bucks	WM	687,681	54%	26	299,406	3492	2	586,296	3,621,270	0.2	0.01

Data in the chart above is based almost entirely on PA DEP data from their waste database (latest full year: 2024)[19] and their air emissions database (latest data: 2023; all data is in short tons, not metric tons).[20]

Data on nitrogen oxides (NOx) is included, as well as the greenhouse gases carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). To calculate the greenhouse gases in carbon dioxide equivalents (CO_2e), we used the 20-year global warming potentials from the latest IPCC assessment report (AR6), which shows that methane is 82 times as potent than CO_2 and that nitrous oxides are 273 times as potent.[21]

Since it would be inaccurate to compare total emissions from facilities without adjusting

[18] https://aafa.org/asthma-allergy-research/our-research/asthma-capitals/
[19] http://cedatareporting.pa.gov/reports/powerbi/Public/DEP/WM/PBI/Solid_Waste_Disposal_Information
[20] http://cedatareporting.pa.gov/reports/powerbi/Public/DEP/AQ/PBI/25%20Year%20Site%20%20Level%20Emission%20Inventory%20Report
[21] https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_FullReport.pdf#page=1034

for the size of the facility, we took the 2023 emissions data and divided it into the 2023 data for the total tons of waste received in that year, resulting in the final two columns showing GHGs (in tons of CO_2 equivalents released per ton disposed) and NOx emissions (in pounds released per ton disposed).

The emissions comparison shows that incinerator NOx emissions average 60 times that of landfills, and that greenhouse gases from incinerators average 2.2 times that of landfills.

One could further scrutinize this methodology by pointing out that incinerator emissions are all immediate and that landfill emissions span decades as waste breaks down. This is why a full life cycle analysis is the more accurate method, as it accounts for those landfill releases over time. In the Delaware County LCA, it shows that Reworld Delaware Valley is 2.3 times as harmful as using a landfill.

There is no perfect methodology short of a full LCA conducted by a neutral party using a model that looks at more than just climate, such as the LCA performed for Delaware County. Imperfect methodologies would leave the city vulnerable to litigation.

It would be a mistake to ask RFP respondents to provide emissions data in their bids, which could come in using different methodologies. Emissions data is already reported to the PA DEP in reporting requirements where there could be legal accountability if a company manipulated data (and DEP has technical staff who can properly evaluate it). Since waste corporations (especially the large incinerator operators) are known to present their data in advantageous ways that can be quite misleading, it would be too much to expect the Sanitation Department to dissect this data and evaluate its credibility.

Since emissions data is already public and online, an evaluation using emissions data could be done by the Sanitation Department using the same methodology from the same DEP data source (as we did above). Note that if the Department were to choose to use EPA data on greenhouse gases, their CO_2 emissions data for incinerators is not as complete as PA DEP's data is. In most EPA data, the biogenic fraction is erased. This is usually over half of the CO_2 emissions. In the case of Reworld Delaware Valley incinerator, 59% of the CO_2 is erased unless you locate the biogenic fraction in EPA's Greenhouse Gas Reporting Program's Emissions by Unit and Fuel Type dataset[22] and add that CO_2 back in. Furthermore, EPA's methane and nitrous oxide (N_2O) data is in CO_2 equivalents, but using outdated (AR4) global warming potentials (GWP) over 100 years. One must correct that data to modern science (AR6). Using the 20-year GWPs, this means dividing the methane data by 25, then multiplying it by 82, and dividing the nitrous oxide data by 298 and then multiplying it by 273. EPA's data is in metric tons, not short tons, so further corrections are needed to make it match DEP's data. DEP's data is in short tons and includes all GHG emissions, without the subtractions and CO_2-equivalent adjustments.

[22] https://www.epa.gov/ghgreporting/data-sets

3.1.2 Methodology recommendations for ongoing waste management planning.

For ongoing waste management planning, the most accurate tool would be the MEBCalc LCA tool described above (results attached). However, this is not a simple, affordable, or readily available option for routine evaluations. Many places use EPA's WARM model, but this is limited by the fact that the model still only looks at one criteria (GHGs), ignoring all other pollutants that contribute to asthma, cancer, heart attacks, stroke, learning disabilities, and much more. EPA aims to eventually incorporate these other pollutants into the model, but that could be years off. There is also the problem that there are two major flaws in the WARM model that bias it in favor of incineration, which have not yet been addressed, as EPA has yet to incorporate the peer review and public comment feedback into a new version of the model.

Given this, we recommend following the Zero Waste Hierarchy, as codified by the Zero Waste International Alliance.[23] City staff could even get trained and certified by Zero Waste USA[24] and/or GBCI's TRUE Zero Waste certification,[25] for help understanding how to implement and evaluate waste systems with Zero Waste methodologies.

The Zero Waste Hierarchy and the internationally peer-reviewed definition of Zero Waste explicitly reject incineration technologies, based on the understanding that these technologies are far more harmful than landfilling. After focusing on redesign, reduction, reuse, recycling, and composting, the Zero Waste Hierarchy recommends a material recovery and biological treatment (MRBT) system be used prior to landfilling residuals. This is backed up by a MEBCalc life cycle analysis study showing this back-end process to be the least harmful compared to incineration or conventional landfilling.[26]

Following the Zero Waste framework also informs other waste management practices, such as appropriate use of anaerobic digestion – using it for contaminated waste streams that belong in a landfill like sewage sludge and the organic fraction of mixed municipal waste as a means to biologically stabilize waste prior to landfilling, but not using digestion for relatively clean feedstocks like source separated food scraps and yard waste, which should be aerobically composted and returned to the soil.[27]

There is no need to reinvent the wheel. It is well established what the best solutions are, and spending time on fancy models and evaluation tools would just waste time coming back to the same conclusion that others have already figured out. However, if the city wants to have a MEBCalc analysis run on any systems, we're sure that Dr. Jeffrey Morris at Sound Resource Management Group[28] would be happy to consult for the city to do this (see CV attached). No one else out there has such a comprehensive model or the knowledge base to do such comparisons.

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[23] https://zwia.org/zwh
[24] https://zerowasteusa.org/education/
[25] https://true.gbci.org
[26] https://ecocycle.org/content/uploads/2023/02/Report-Zero-Waste-System-Leftovers.pdf
[27] See https://zwia.org/composting-and-anaerobic-digestion-policy/ and http://www.energyjustice.net/digesters
[28] https://srmginc.com

Another option is to look at other Zero Waste Plans that have been developed for cities and counties. There are leading Zero Waste consultants like Zero Waste Associates[29] who can be hired to develop a real Zero Waste Plan for the City of Philadelphia. Note that the city's 2017 "Zero Waste and Litter Action Plan"[30] is, by definition, NOT a Zero Waste Plan. Incineration is forbidden in a Zero Waste[31] system, and the plan recommends incinerating "any materials that cannot be recovered or recycled" and incorrectly labels this a Zero Waste principle.[32] The plan also points to the EPA's Waste Management Hierarchy which places incineration above landfilling. In a 2022 meeting with EPA's Office of Land and Emergency Management (the agency's waste division), they admitted to us that the agency has no documentation to back up the placement of incineration above landfilling in their hierarchy. In July 2022, EPA placed a disclaimer on their hierarchy, stating that "EPA is now in the process of reviewing the waste hierarchy to determine if potential changes should be made based on the latest available data and information."[33] This process is not a quick one, though, and revisions to this hierarchy will take place after EPA revises the WARM model, which might not be able to happen until a future presidential administration.

To obtain free advice that follows the Zero Waste Hierarchy, the city can study Zero Waste Plans that have been developed for other cities and counties.

Here are some examples of model plans and programs:

- Delaware County, Pennsylvania
- Montgomery County, Maryland
- Washington, DC
- Austin, Texas
- Alameda County, California
- San Francisco, California

As far as other tools, we recommend keeping environmental justice impacts in the center of the conversation. This includes the total population impacted by harmful facilities, as well as the race and class demographics of those people. Our www.ejmap.org/justice tool is one that can be used for this purpose, which we routinely use to evaluate the latest U.S. Census data around facilities. The "analyze" tool in the upper right of the orange toolbar (next to the question mark) allows a user to plug in any distance from a point on the map to evaluate demographics within that radius. More comprehensive tools such as EJSCREEN (no longer available from EPA) can also be used if there is a desire to look beyond just the population, race and class data, though the flexible radius option of our mapping tool may not be an option there.

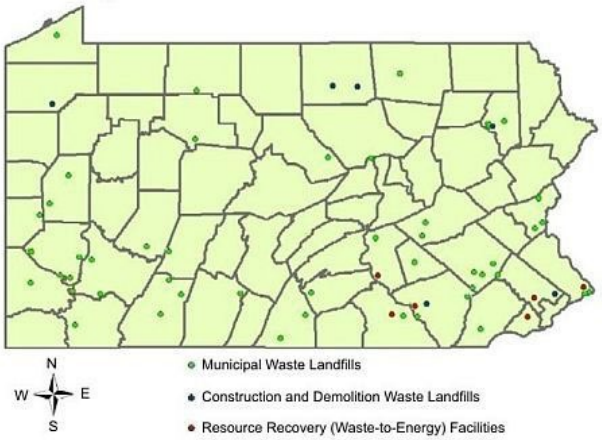
[29] https://zerowasteassociates.com/ (find their contact info at the end of the video on the main page)
[30] https://www.phila.gov/media/20190821131753/Zero-Waste-Litter-Action-Plan-2017.pdf
[31] See the internationally peer-reviewed definition of Zero Waste and the Zero Waste Hierarchy at https://zwia.org/zero-waste-definition/ and https://zwia.org/zwh
[32] https://www.phila.gov/media/20190821131753/Zero-Waste-Litter-Action-Plan-2017.pdf#page=6
[33] https://www.epa.gov/smm/sustainable-materials-management-non-hazardous-materials-and-waste-management-hierarchy

3.1.3 Operational health and safety recommendations.

To minimize health and environmental impacts of disposal operations including the criteria air pollutants, air toxins, greenhouse gas emissions and soil and water pollutants, the number one recommendation is to end the city's use of incineration. Our city is already surrounded by five trash incinerators (3 in PA, 2 in NJ), comprising the most intense cluster of trash incinerators in the U.S. These five incinerators are all among the top seven industrial air polluters in the 7-county area of Philadelphia and the six contiguous counties, according to data reported to EPA's National Emissions Inventory. Ending incineration will do more to reduce criteria air pollutants, air toxins, greenhouse gas emissions and soil and water pollutants than any other solution that could be accomplished within a year. Longer-term, Zero Waste solutions such as unit-based pricing ("pay as you throw"), curbside composting collection, and deconstruction will also go a long way toward reducing these impacts.

Section 2: Information about the capacity and availability of large-scale residential waste management providers to meet the City's ongoing residential waste management needs without compromising high service levels, including potential opportunities and challenges to expand and diversify service delivery.

3.2.1 Large provider capacity:



Pennsylvania has a glut of landfill capacity, which is why 44 states plus DC, Puerto Rico, Canada, and some other countries have dumped in Pennsylvania over the years.[34] We still have 43 operating MSW landfills,[35] while the more populated state of New York has only 25, a fact that underlies the status of New York as the nation's largest waste exporter and Pennsylvania as the largest importer since at least 1992 when it was first documented by the Congressional Research Service.[36] While it sometimes seems as landfills are "filling up" and "running out of space," PA DEP is constantly granted expansion permits. In fact, DEP will not accept a landfill expansion permit from a landfill unless it has under five years of projected capacity remaining.[37] This leads to an ongoing perception of landfills "running out of space," which has been a narrative for decades. Data is available from EPA and DEP databases on permitted and remaining capacity at PA landfills, which we could analyze upon request.

[34] http://cedatareporting.pa.gov/reports/powerbi/Public/DEP/WM/PBI/Solid_Waste_Disposal_Information
[35] https://www.pa.gov/agencies/dep/programs-and-services/business/municipal-waste-permitting/mw-landfills-and-resource-recovery-facilities
[36] https://actionpa.org/waste/crs_report_1993.txt Find newer CRS reports at https://actionpa.org/waste/
[37] 25 Pa. Code § 271.202.(f) https://www.pacodeandbulletin.gov/Display/pacode?file=/secure/pacode/data/025/chapter271/s271.202.html

3.2.5 Recycling recommendations: The Department's residential recycling goal for FY26 is 15%. What approaches or initiatives could be implemented to substantially improve this percentage and stay on target with the goal of 90% waste diversion by 2045?

The primary answers to this are to adopt unit-based pricing ("pay as you throw"), and to invest in adequate recycling education and enforcement. More on that in section 3.3.2.

One critical approach is for the Sanitation Department to 1) label recycling trucks so that it's clear that they are recycling and not trash trucks, and 2) stop the practice of trashing recycling by dumping both trash and recycling in the same truck. The Department used to admit that this was widespread deliberate practice, in response to China's National Sword policy, then the COVID-19 pandemic. In the past couple of years, this practice has continued in some neighborhoods, though the Department now blames rogue sanitation workers, but claims to have no records or logs showing when recycling trucks are sent out on a given route.

The response to our question on whether ALL trucks are now outfitted with GPS trackers was not clear. PickupPHL could potentially be used to document the extent to which a recycling truck was sent out on a route, but it is unclear to us whether an orange line means that both trash and recycling were collected separately or in the same truck. The protocols for how trucks are coded as green, blue, or orange on that website need to be made clear.

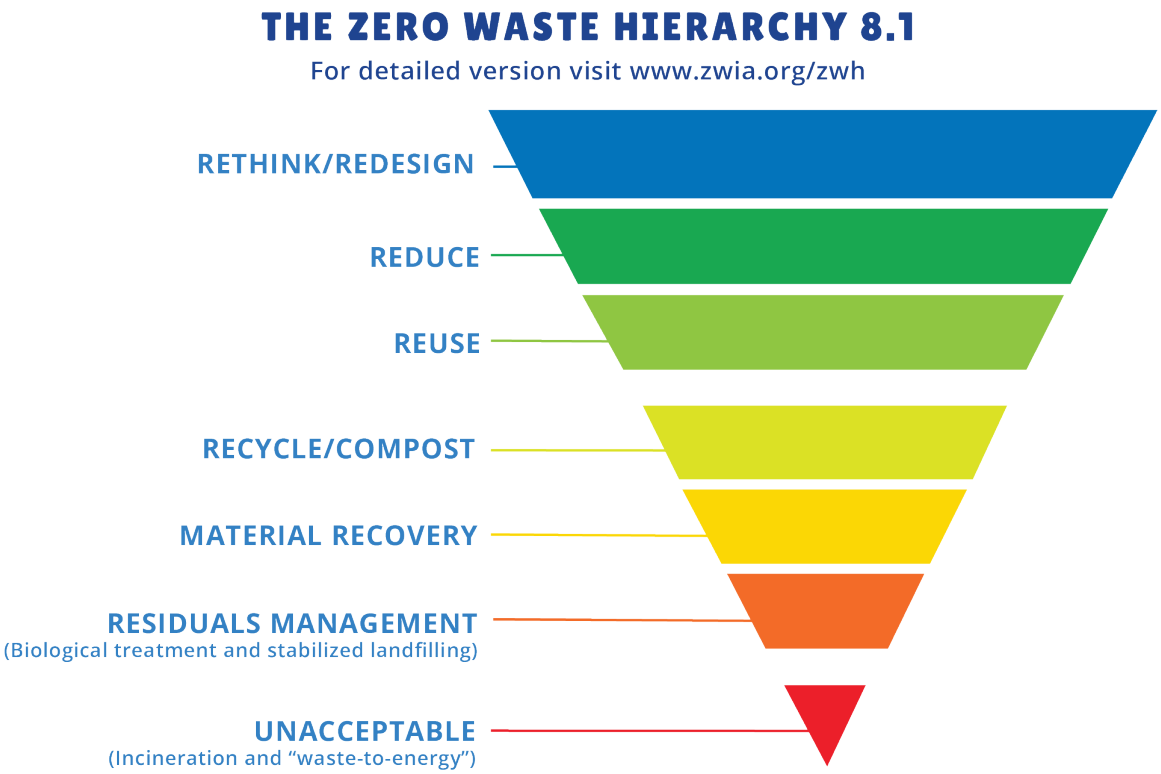
Regardless of whether PickupPHL is involved, the Sanitation Department, in order to comply with Act 101 of 1988, **must** start keeping records of whether recycling is separately collected on each route each day. In the first seven months of 2025, the Sanitation Department trashed recycling on this author's block 36% of the time, which is far better than the 94%, 89%, and 58% rates in 2021, 2022, and 2023, respectively. However, it is still an appalling rate. The Sanitation Department has known about the problems on this block and many others in the city for several years now, has committed to investigate, but has failed to resolve the problem, or to keep records in order to establish how widespread the problem is. This practice is one of the reasons why many people give up on recycling because they do not think it's even being recycled. It is also a violation of state law and must be address systemically across the city, not viewed as isolated problems to be addressed only when and where someone notices and provides a complaint specific enough to convince the Department that it is really happening.

Section 3: Recommendations for solutions that will assist the Department in developing new approaches, innovations, and initiatives to minimize the City's waste streams, including practices that will help the City advance its Safe, Clean & Green mission and Zero Waste goals.

3.3.3 General Information on Zero Waste Strategies: Please share information and long-term strategies and/or holistic approaches for the City to nearly eliminate waste sent to landfills and incinerators. Sharing knowledge of practices or programs in other jurisdictions is also encouraged. Please cite resources and studies where possible.

1) **Formally adopt the Zero Waste Definition and Zero Waste Hierarchy as guiding principles for Department of Sanitation policy and contracts.**

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



2) **Ensure the city is following the state recycling law.**

Implement a log of when recycling trucks are sent out on each route each day and document where this is not happening and where recycling is being trashed in order to diagnose and eliminate the compliance problem. Some Department staff inappropriately call this practice of trashing recycling "commingling," even though that's an old recycling term that means metal, glass, and plastic go into the same recycling bin.

3) **Get staff educated on Zero Waste strategies.** Have leadership in the Office of Clean & Green, the Sanitation Department and the Office of Sustainability, including the Recycling Coordinator and the Environmental Planning Director get informed and trained in Zero Waste through as many of the opportunities below as possible:

   a. Review Zero Waste Plans from other cities and counties (see links in section 3.1.2. above).
   b. Have staff spend time watching the presentations in the Connecticut Coalition for Sustainable Materials Management webinar series from a few years ago. Links to the videos are compiled here.
   c. Attend Zero Waste USA's Zero Waste Associates Course.[38]
   d. Invite presentations from Zero Waste experts and open the meetings up to all on the Solid Waste and Recycling Advisory Committee (SWRAC) list so that the public and SWRAC members can attend and learn as well. Include:
      i. Kristen Brown at Waste Zero and Lisa Skumatz at SERA, Inc. (pay as you throw experts)
      ii. Brenda Platt at Institute for Local Self-Reliance (national composting expert)
      iii. Ruth Abbe at Zero Waste USA (author of the Delaware County, PA and Montgomery County, MD Zero Waste plans)
      iv. Alex Danovitch at Nothing Left 2 Waste in Swarthmore, PA
      v. Kevin Daly at Turbo Haul (mattress recycling operation in Baltimore)
      vi. Recycling Services, Inc. (recycling center in Pottstown, PA)
      vii. Rabbit Recycling (recycling service in Philly)
      viii. Sara Badiali (deconstruction expert in Portland, OR)
      ix. Program administrators for the San Francisco Environment Department, the Oakland, CA recycling department, or the Alameda County, CA Stop Waste agency.

      [I can provide contact info for most of the people above upon request.]

   e. Arrange for tours of facilities such as Turbo Haul's mattress recycling operation in Baltimore, Recycling Services in Pottstown, Rabbit Recycling, and the Prince George's County, MD composting operation.

4) **Adopt unit-based pricing (a.k.a. "pay as you throw")**

Zero Waste strategies are capable of achieving deep reductions in waste generation. Unit-based pricing (UBP) or utility pricing is better known as "Pay as You Throw" (PAYT), but many have tried to rename it to not start with "pay" – calling it "Save as You Throw" (SAYT), or even more exotic acronyms like Save Money and Reduce Trash (SMART) and Fair Trash Reduction (FUTURE).

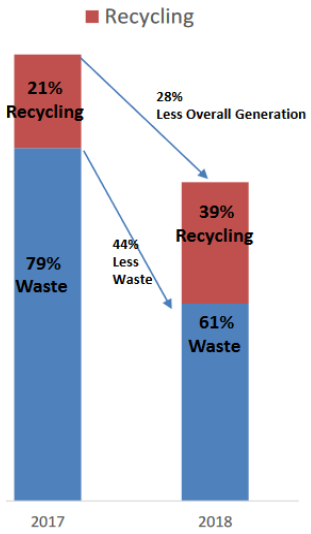
[38] https://zerowasteusa.org/education/

Unit-based pricing has proven to be the single most effective and cost-effective way to rapidly reduce waste.[39,40] When we pay for utilities like electricity, water, or gas, we pay based on our usage. However, with trash, your neighbor could put out ten bags a week and you can put out one, yet you both pay the same amount. There is no incentive to reduce waste. Setting rates on a per-bag or per-container basis results in real waste reductions and cost savings for residents.

Over 10,000 communities use this system. Connecticut officials recently announced a serious push for SAYT as the state prepares for the closure of its second largest waste incinerator.[41] **SAYT has the capability to almost immediately reduce waste generation by an average of 44%, with about half of the savings coming from behavior changes resulting in source reduction and reuse** (higher on the Zero Waste Hierarchy), representing material that does not even have to be removed from the curb to be composted or recycled. When combining SAYT with curbside composting collection, the average waste reduction reaches 70%.[42]

Two experts in unit-based pricing briefed Montgomery County's Zero Waste Task Force in February 2019.[43,44] Additional presentations by experts on the topic are available via the state of Connecticut.[45]

Results of two-month unit-based pricing pilot in New Windsor, MD



Source: WasteZero

The Sanford, Maine example is particularly powerful. The town adopted UBP and saw the typical drop of waste generation by nearly half. One resident, who didn't like it and who had just won the lottery, campaigned to repeal it. The town did, and waste generation jumped back up. A few years later, when he moved out of town and the town decided to restart the program, waste generation dropped again. See the lower right chart on the following page.

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[39] PayAsYouThrow.org, The Recycling Foundation. www.payasyouthrow.org; on effectiveness see Skumatz, note 44 *infra*, p.2, slide 6.

[40] Lisa Skumatz, "PAYT/SAYT – Pros, Cons, and How it Can Work," Presentation to Zero Waste Task Force, Feb. 13, 2019. https://web.archive.org/web/20231117041307/https://www.montgomerycountymd.gov/SWS/Resources/Files/master-plan/pay-as-you-throw-sera.pdf See upper right slide on page 2.

[41] Patrick Skahill, "Could 'Pay as You Throw' be the Future of Connecticut's Trash?," Jan 12, 2021. www.wnpr.org/post/could-pay-you-throw-be-future-connecticuts-trash

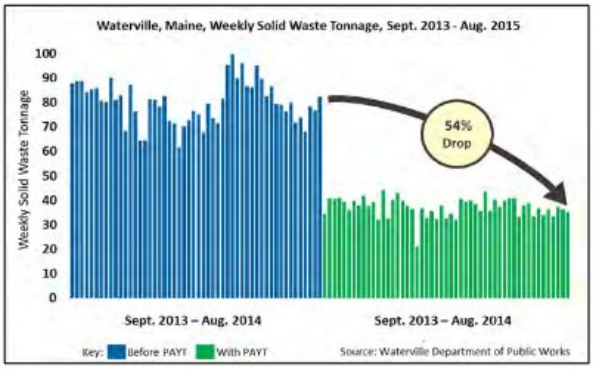
[42] Interview with Kristen Brown, Waste Zero. www.wastezero.com

[43] Kristen Brown, "Closer to Zero Through a Fair Trash Reduction (FUTURE) Program," Presentation to Zero Waste Task Force, Feb. 13, 2019. https://web.archive.org/web/20240127185418/www.montgomerycountymd.gov/SWS/Resources/Files/master-plan/pay-as-you-throw-waste-zero.pdf

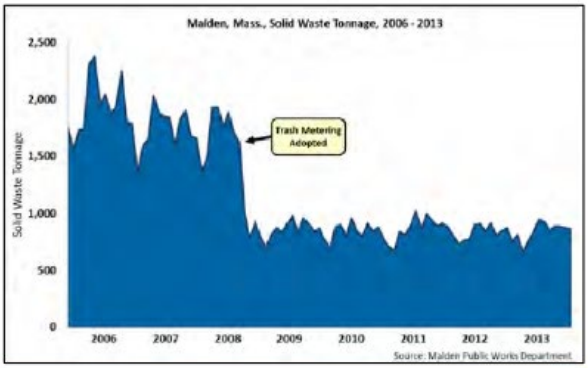
[44] Lisa Skumatz, "PAYT/SAYT – Pros, Cons, and How it Can Work," Presentation to Zero Waste Task Force, Feb. 13, 2019. https://web.archive.org/web/20231117041307/https://www.montgomerycountymd.gov/SWS/Resources/Files/master-plan/pay-as-you-throw-sera.pdf

[45] Unit-Based Pricing (UBP) Working Group, Connecticut Coalition for Sustainable Materials Management. portal.ct.gov/DEEP/Waste-Management-and-Disposal/CCSMM/Unit-Based-Pricing Videos of their presentations are available via docs.google.com/spreadsheets/d/11_lTv80EVuiiOjjN3BpGdYcALJycM63GNi2L67s3N9k/

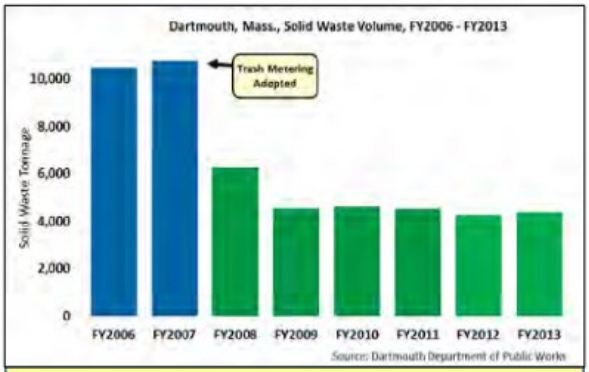
Waste Zero examples of waste reduction impacts of unit-based pricing



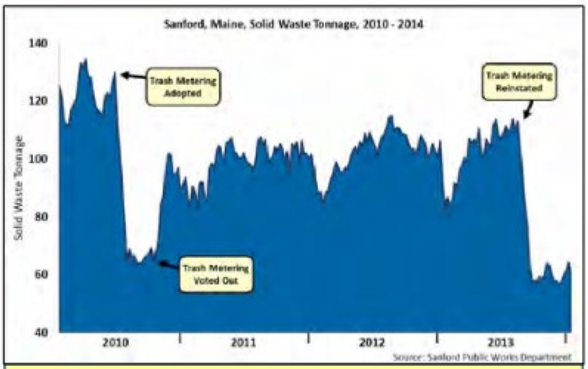
WATERVILLE, MAINE
54% DECLINE IN MSW IN 1 YEAR



MALDEN, MASS.
52% DECLINE IN MSW OVER 5 YEARS



DARTMOUTH, MASS.
59% DECLINE IN MSW



SANFORD, MAINE
POWERFUL MESSAGE

Source: WasteZero

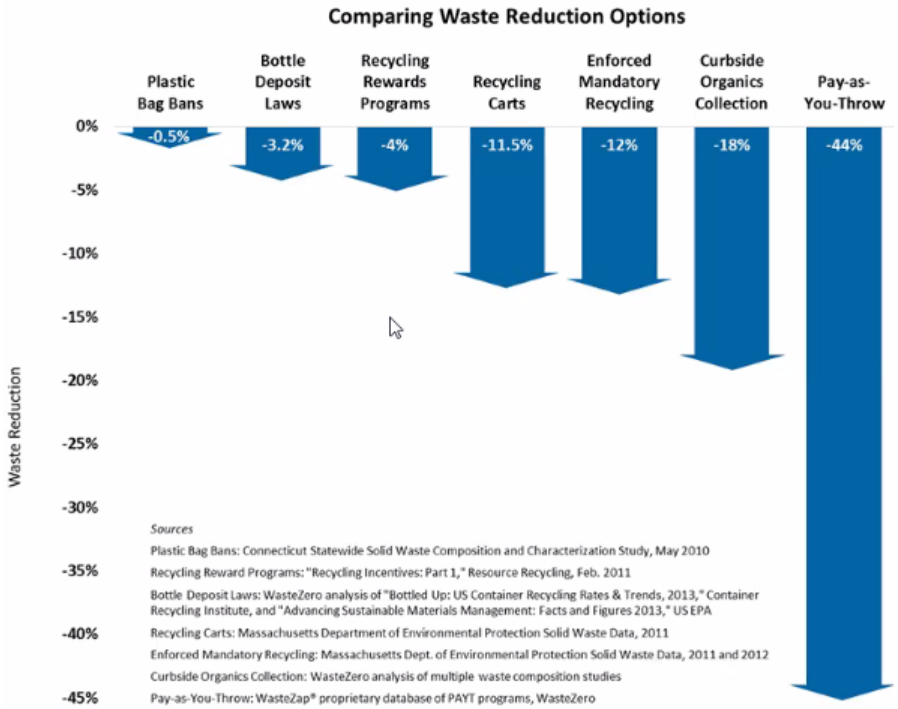
Kristen Brown at Waste Zero and Lisa Skumatz at SERA, Inc. are national experts who can help the city design this program properly.

They can also dispel the common misconceptions that UBP programs discriminate against the poor, increase illegal dumping, or that they have to be perceived as a tax/rate increase. Experience around the country has found that it need not discriminate against low-income or large families so long as the rate is the same per gallon with different bag or bin sizes. Low-income residents benefit by having control over how much they spend, since they can reduce waste and pay less than they pay now. Where concerns about low-income residents have resulted in a certain amount of free bags being made available to people who qualify for other social programs, people tend not to take advantage of it, anyway. Nonetheless, so long as the economic incentive remains to inspire waste reduction, it'll be effective.

As for illegal dumping, experience around the country has not found a significant increase in illegal dumping after implementation of UBP. People don't tend to radically change their habits in reaction to this policy. Illegal dumping is largely construction/demolition waste from contractors, and bulky items that are inconvenient to properly dispose of

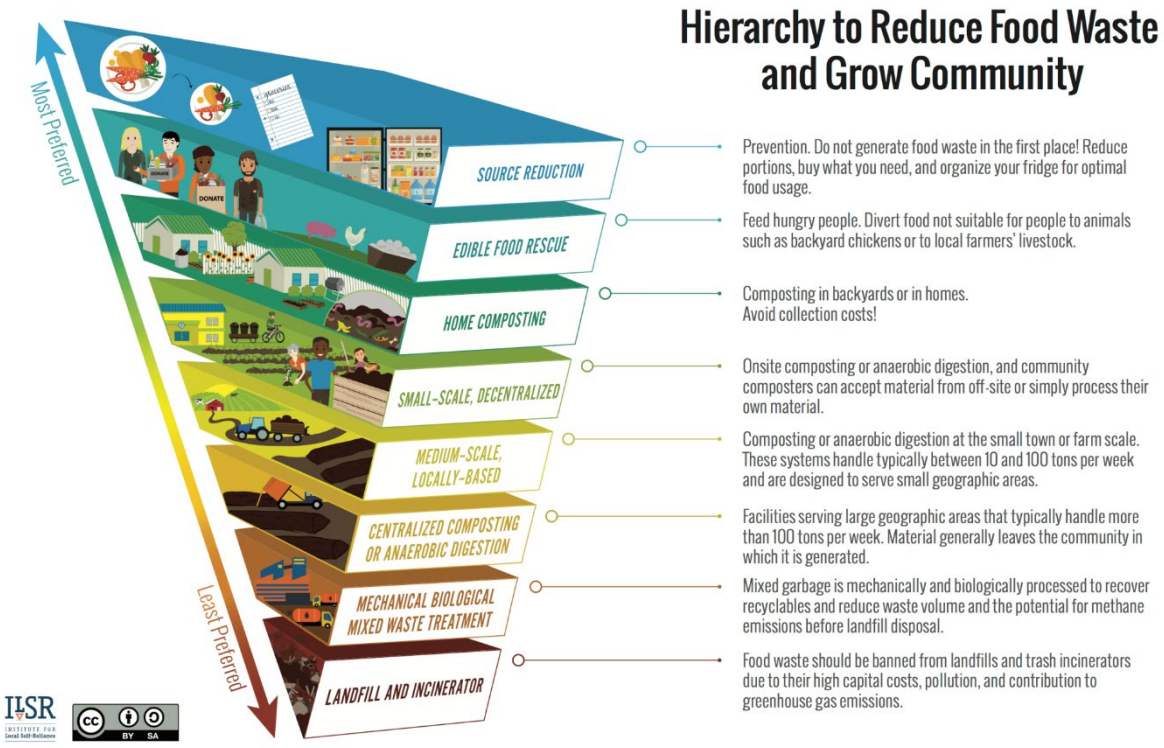
(tires, mattresses…). There are solutions that address these more directly. In the cases where a small uptick has been found in illegal dumping after UBP adoption, setting up cameras at dump sites and doing some basic enforcement has shut that activity down quickly.

As for perception of increased taxes, there are effective ways to roll it out so that people understand that they now have more flexibility in how much they pay for waste, rather than perceive it as if they weren't already paying through taxes and now have a new fee. Making the existing cost visible is key.



5) Implement curbside composting collection

The best advice on composting programs can be found in the Montgomery County, Maryland Zero Waste Plan, which had a team of several of the best composting experts in the nation among the Zero Waste consultants writing the plan. Also, look to the Institute for Local Self-Reliance's Food Waste Hierarchy and related materials for guidance. Not their focus on decentralization. There are also video presentations on composting among the recorded workshops in the Connecticut Coalition for Sustainable Materials Management webinar series. A lively speaker who can consult with the city on engaging residents in composting is Marvin Hayes of the Baltimore Compost Collective, who works with Black youth in Baltimore to make "black gold." Finally, if New York City can make curbside composting collection happen, any place can.



There's no need to delay by starting with small pilot programs. Many other cities have already done that. Learn from them. Philly isn't THAT unique that it can't get a good program together by enlisting the right consultants with experience from similar cities. Make sure to have real Zero Waste consultants on the team, though, like Brenda Platt and Ruth Abbe, not just the typical MSW/SCS/HDR/GBB/CDM/Arcadis industry players, as they all are fans of incineration (some even sponsor pro-incinerator lobby groups) and do not understand Zero Waste systems. Their biases could lend them to reinforce misguided ideas like using anaerobic digestion for food scraps, or co-digesting it with sewage sludge, which violates Zero Waste principles and contaminates the compost.

6) Right-size the bins

Trash bins should be the smallest. Recycling should be the largest. Composting should be in the middle. The size of bins should approximate the composition of the waste stream. However, most cities give out small recycling bins while people's trash bins are much larger (whether provided by the city or not).

San Francisco uses a default 64-gallon blue recycling bin size, 32-gallon green composting bins, and 16-gallon black trash bins (with a raised bottom to make them seem larger than they actually are).[46]

[46] https://www.recology.com/recology-san-francisco/san-francisco-service-updates/#/info

When Memphis, Tennessee simply increased the size of their recycling bins, recycling participation shot up. "In the last 12 months Memphis has increased its recycling tonnage by 61 percent, from 32 tons a day before the switch to 90 tons a day now."[47] "We rolled single-stream out in the Cordova and Hickory Hill areas in 2014… And we saw a tremendous increase in volume, literally overnight. Like, one week we had 18-gallon bins, the next week we had 96-gallon carts — 200 percent increase. Just like that. It became apparent that people recycle until the container's full."[48]

7) Dial back trash collection frequency.

Immediately cancel plans to expand twice a week trash pickup to new parts of the city, and cancel existing biweekly collections as soon as UBP and/or composting collection begin. Most places working to move toward Zero Waste – or just trying to save on collection costs – dial back from biweekly trash collection to weekly collection. The extra collection routes can be used for the introduction of composting.

More progressive cities have dialed trash collection back to once every two weeks, while collecting composting weekly and recycling weekly or every other week. [49] This could be adopted once composting participation plateaus and recycling is on track. This boosts composting participation because people initially complain that their trash will stink, then quickly learn that the "smelly stuff" (food scraps) doesn't belong in the trash bin, but in the composting bin. This solution was recommended to Montgomery County, MD by waste consultants in 2019.[50]

8) Reuse Innovation

As Zero Waste pioneers Dan Knapp and Mary Lou Van Deventer documented with their Urban Ore operation in Berkeley, California, reusables are 5% of the discard stream, but represent 50% of the economic value of what we discard. Their large warehouse is like a Home Depot thrift store, where reusables of all sorts are recovered, organized, and sold. Everything from doors, windows, sinks and toilets to clothing, cassette tapes, and jewelry can be bought there at a discount. See https://urbanore.com/about-us/

Diane Cohen, CEO of Finger Lakes Reuse in Ithaca, NY argues that reusables are a much higher percentage of discards, and it's not easily quantified. Dave Bennink, owner of Re-

[47] https://www.waste360.com/source-separation/memphis-tenn-finds-switch-to-single-stream-recycling-paying-off
[48] https://www.memphisflyer.com/the-recycling-crisis
[49] Longmont, CO, Hamilton, MA, Wenham, MA, Portland, OR, Renton, WA, Sultan, WA, Toronto, Canada, 11 cities in British Columbia, and Edmonton, Alberta have bi-weekly trash collection. On Edmonton, see: "Edmonton to have full source-separated waste collection by August, new carts begin rolling out to homes in March," Jan 6, 2021. www.edmontonjournal.com/news/local-news/new-year-new-waste-disposal-program
[50] HDR, "Montgomery County, Maryland Aiming for Zero Waste – Task 5: Considered Enhancements/Expansions to the Current Diversion/Recycling System, Technical Memorandum #3 – Summary Report," April 2019. Table 7, pp. 21-23. https://web.archive.org/web/20240127185418/https:/www.montgomerycountymd.gov/SWS/Resources/Files/master-plan/task-five-summary-report-proposed-improvements-expansions-current-diversion-recycling-system.pdf

Use Consulting and Director of the Building Deconstruction Institute, is working with Ulster County, NY to develop a Reuse Innovation Center to maximize reuse, and divert materials from the county's waste stream.

In the City of Surrey, British Columbia (suburb of Vancouver), the City was spending about $3,000,000 a year on "spring cleanup days" for large household item pickup and they observed a lot of perfectly good reusable items out at curbside. They decided to take a different approach and, through the Recycling Council of British Columbia, contracted for https://surreyreuses.com. The Mayor and Council then advertised that spring cleanup days were no more, but that the service still existed in a different form. To have the city come out and pick up your large bulky household item, you first had to show that you had advertised it to give away on Surreyreuses.com and if there were no takers, the city would pick the item up. As far as we know, the city has not returned to "spring pickup days." They continue to save a lot of money each year, and surreyreuses.com is still busy. Since then, Facebook Marketplace has arrived and many people now use it for the same purposes. Many other online websites and apps exist that could be promoted as well, e.g. Craigslist and OfferUp.

These are some of the innovators who can help work with local reuse economies, such as thrift stores, and with the city to expand Philly's capacity to recover and reuse materials.

9) Deconstruction

Construction and demolition (C&D) waste is a large portion of the waste stream. Although its disposal is not directly managed by the city, the city's building permit and licensing systems can do much to reduce this waste while creating many jobs for hard-to-employ people and reducing neighborhood pollution from demolition projects.

Much has been written on the topic, and we've compiled these resources into this website: http://www.energyjustice.net/waste/cd

Please spend time there to find reports from San Antonio, TX and Charlotte, NC, links to supporting organizations like Build Reuse, a book by expert Sara Badiali, links to states, cities and counties with good policies, and links to some of the companies in the deconstruction field. Sadly, some of the main companies doing building material reuse in Philadelphia have closed their doors in recent years. Perhaps solid policies requiring deconstruction instead of demolition, and requiring an increasing percentage over the years of reused and recycled building material in new construction and renovation, would bring the local industry back to life. Tapping those who used to run companies here for their experience would be helpful.

10) CHARM

A center for hard-to-recycle materials (CHARM) is a location where recyclables that are not collected curbside can be dropped off for proper recycling. Rabbit Recycling, a subscription collection service, may be the closest thing to a Philadelphia-based facility that accepts hard-to-recycle materials to market. Recycling Services, Inc. in Pottstown operates a similar operation, as a drop-off center. Philadelphia would benefit from a distributed network of places throughout the city where such materials can be dropped off for recycling, and perhaps reuse.

11) Mattress Recycling

The closest place for recycling mattresses and boxsprings is TurboHaul in Baltimore. Philadelphia needs such a facility, as well as a bulk collection system that delivers to it – ideally without wasteful plastic wrapping of the mattress required by the city.

12) Electronic Waste Recycling

The city is to be commended for using an *e*-Stewards certified company, which avoids the use of prison labor and dumping on developing nations. However, Reworld is the largest industrial air polluter in the Philadelphia area and should not be supported, even if none of the electronic waste ends up incinerated. A new contract should require *e*-Stewards certification, but have criteria that makes companies ineligible if they are among the top five industrial air polluters in the southeast region of PA DEP, or perhaps based on the company-wide compliance history (Reworld has an extensive history of violations[51]).

13) Material Recovery and Biological Treatment (MRBT) to Landfill

After eliminating incineration, then focusing on upstream parts of the Zero Waste Hierarchy, there are steps that can be taken to get closer to zero while minimizing impacts to landfill communities.

As a life cycle analysis has demonstrated, the best thing to do with the "leftovers" on the path to zero waste is called material recovery and biological treatment (MRBT) to landfill.[52] This is what the back end of the Zero Waste Hierarchy is talking about with material recovery and biological stabilization prior to landfilling. It follows what is widely done in Europe, and there are a few similar plants in California and one related operation in Halifax, Nova Scotia, Canada.

Material recovery (MR) is where machines and workers pull extra recyclables out of the

[51] See: https://www.energyjustice.net/incineration/covanta/violations2006.pdf, https://www.energyjustice.net/incineration/covanta/violations2018.pdf, and https://www.energyjustice.net/incineration/covanta/violations2024.pdf

[52] https://ecocycle.org/content/uploads/2023/02/Report-Zero-Waste-System-Leftovers.pdf

waste that accidentally ended up in the trash. This uses technology that is essentially the same as "mixed waste processing," but it is used on the trash stream *after* source separation of recycling. Biological treatment (BT) is where the organic fraction of municipal waste is digested in order to get the methane generating potential out of it before landfilling the residual. This reduces the water weight and volume for hauling the waste to a landfill, and ensures that the landfill will not be so gassy, stinky and leaky.

There are three ways that this is commonly screwed up:

1) No source separation. All trash, recycling, and composting is thrown together and a mixed waste processing facility is expected to sort it all out. This allows maximum laziness, but violates the state recycling law (Act 101 of 1988) and results in much less marketable recyclable material.

2) Incinerating the residual. Common in Europe, and in some proposals in the U.S., the residual is marketed to incinerators or cement kilns as fuel, maximizing pollution.

3) Using the organic residuals as soil amendment. This is common in U.S. proposals and in the projects in California where, to make the technology more profitable, they save on landfill fees and market the waste as if it's clean enough to be put back on the land as soil amendment or fertilizer. It will be full of PFAS, microplastics, and other chemicals and belongs in a landfill. The digestion process is to make it stable in a landfill, not to pretend that it's clean material coming out.

Montgomery County, Maryland is working to close their county-owned trash incinerator, a Reworld-operated facility that is the county's largest industrial air polluter. As they move away from incineration, they are exploring the development of an MRBT system to do the most responsible thing with their waste, since they'll be exporting trash to landfills in PA or VA and want to minimize the harm as they work to reduce that waste through Zero Waste strategies.

Trilogy Financial Group is seeking to build an anaerobic digester in Fleetwood, PA (Berks County) to develop a system that would come closer to the MRBT-to-landfill Zero Waste strategy. They are seeking waste commitments to proceed in developing it.

14) Incentivizing Better Landfill Management

After moving past incineration, the city can be a leader in encouraging better landfill management through future contract requirements. As a large waste generator, big waste companies might be open to revising how their landfills are operated in order to win a contract. This might be something that starts with just one landfill cell at a time. There are many nuances to how to better manage landfills. These are outlined in the back end of the Zero Waste Hierarchy, most notably our version here:

www.energyjustice.net/zerowaste/hierarchy. There is also the official Zero Waste International Alliance's version, with its own details, at www.zwia.org/zwh. These two hierarchy versions will eventually be merged.

Section 4: Other

3.4.1 Please use this section to include information or recommendations that have not been addressed elsewhere in your response.

Please note that questions 5, 6, 7, and 8 that we submitted on this RFI were NOT meant to inform the RFP, but to inform the RFI. It is too late for that now. Please follow the recommendations in section 3.1.1. in this RFI response instead of looking to those questions as guidance.

Also, please review the attachments. It is important to understand how small transportation emissions are relative to those from landfills and incinerators, as the LCA summary slides on pages 7 and 10 demonstrate. Sanitation Department Environmental Planning Director, Scott McGrath, voiced a common misconception that truck transportation emissions are significant, as if hauling to a more distant landfill might be worse than using nearby trash incinerators. This has been proven untrue in multiple LCA studies, including the one from Delaware County (p.10). The chart from the Montgomery County, MD study is also a stark demonstration of this (p.7).

Finally, if there are any statements of fact in this submission that are not cited, please feel free to reach out and ask for our documentation.

Sincerely,

Mike Ewall, Esq.
Executive Director
Energy Justice Network
215-436-9511
mike@energyjustice.net
www.energyjustice.net

ATTACHMENTS:

1) **Frequently Asked Questions about Philadelphia's use of Waste Incineration**
   https://phillyzerowaste.org/ContractFAQ.pdf
2) **Covanta Trash Incinerator & Environmental Racism in Chester** (2nd page has emissions data)
   https://delcoej.org/wp-content/uploads/CovantaEmissions.pdf
3) **Waste Contracting for Clean Air Act**
   https://docs.google.com/document/d/1HQOvsP6JyskhexyIOqmCtai2WkHq1X-B/
4) **Dr. Jeffrey Morris' CV** (MEBCalc life cycle assessment tool author, and author of Attach. 5)
5) **Life Cycle Assessment (LCA) and Monetization for Nine Human and Environmental Health Impacts from Delaware County, Pennsylvania MSW Diversion & Disposal 2020 Baseline and Recommended Zero Waste Plan** (full plan starts on page 10 following summary)
   https://energyjustice.net/incineration/DelcoLCA.pdf
6) **Beyond Incineration: Best Waste Management Strategies for Montgomery County, MD** (includes a life cycle analysis of incineration vs. landfilling and transportation impacts)
   https://www.energyjustice.net/md/beyond.pdf
7) **It's Not Green: New Trash Incinerators in Palm Beach County are Expensive Major Air Polluters**
   https://energyjustice.net/fl/pbcincin.pdf

[The first four attachments are included in this file. The last three are larger reports and are provided as separate attachments.]

ATTACHMENT 1

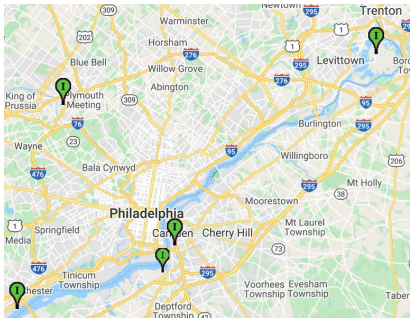
Frequently Asked Questions about Philadelphia's use of Waste Incineration

https://phillyzerowaste.org/ContractFAQ.pdf

Frequently Asked Questions about Philadelphia's use of Waste Incineration

Philadelphia, the poorest big city in the nation,[1] is surrounded by five trash incinerators, the worst cluster of trash burners in the U.S.[2] These incinerators are five of the top seven industrial air polluters in Philly and its surrounding counties, according to EPA emissions data.[3]

Trash Incinerators in Philly Area



37% of Philly's trash is burned,[4] mostly in the nearby City of Chester in Delaware County, a famous case of environmental racism.[5] The Reworld (Covanta) trash incinerator in Chester is the largest in the U.S.[6] and is missing key pollution controls that limit toxic pollution.[7] It burns up to 3,500 tons of trash and industrial waste per day and is the #1 industrial air polluter in the region, contributing to Philly's high asthma and cancer rates.[8,9,10] Over 2,400 tons of scrap tires that are "recycled" in Philly get incinerated in Chester annually, with more also being burned at Covanta's incinerator in Plymouth Township, Montgomery County (by I-476 and Ikea).[11]

Is incineration preferred over landfilling? No. Incineration turns trash into harmful air pollution and toxic ash, which is landfilled. While landfilling threatens groundwater and air pollution, toxic chemicals are more contained and impacts are less wide-spread. Although methane rises from landfills (which can be reduced by diverting compostables), the climate impacts of incineration are greater and more immediate. Until we find ways to eliminate most waste, the better place for it is in a landfill, not in our atmosphere. The life cycle assessment conducted for Delaware County documents how burning trash in Chester and landfilling its toxic ash is 2.3 times more harmful for the environment and human health than going directly to their landfill with unburned trash.[12] The internationally peer-reviewed definition of Zero Waste and the Zero Waste Hierarchy, codified by the Zero Waste International Alliance, are used for certification around the world and explicitly prohibit incineration in all forms.[13] Landfilling is the back stop after many upstream steps.

[1] Of the 10 largest U.S. cities: https://www.inquirer.com/politics/philadelphia/philadelphia-poverty-rate-decline-household-income-20240912.html
[2] https://ejmap.org/jtiny=5048 (analysis includes clustering, as displayed on this map, as well as factoring in the amounts of waste burned)
[3] 2000 U.S. Environmental Protection Agency National Emissions Inventory. https://www.epa.gov/air-emissions-inventories/national-emissions-inventory-nei
[4] 2024 data from PA DEP Waste Database. http://cedatareporting.pa.gov/reports/powerbi/Public/DEP/WM/PBI/Solid_Waste_Disposal_Information
[5] See http://www.delcoej.org and for environmental racism generally, http://www.ejnet.org/ej
[6] Operating U.S. Trash Incinerators ranked by size. https://energyjustice.net/incineration/usplants/
[7] Out of 62 operating trash incinerators in the U.S., this is one of four that have no carbon injection system to capture and move highly toxic dioxins and mercury from the air to the ash. (Energy Information Administration Form 860 data.) The incinerator has also been missing any controls for nitrogen oxides that trigger asthma attacks until finally installing them in 2025 after 34 years of operation, which will reduce these emissions by only 18%.
[8] Their status as #1 industrial air polluter is based on EPA data (see footnote 3).
[9] In 2024, Philadelphia was ranked as the 5th worst "asthma capital" in the nation by the Asthma and Allergy Foundation of America. The city is consistently in the top ten each year. See: https://aafa.org/wp-content/uploads/2024/09/aafa-2024-asthma-capitals-report.pdf
[10] Philadelphia has the 2nd worst cancer incidence among the counties hosting the ten largest cities in the U.S., based on 2017-2021 data from the National Cancer Institute. https://www.statecancerprofiles.cancer.gov/incidencerates/
[11] Covanta Delaware Valley 2023 Listing of Quarterly Residual Waste Generators, PA Department of Environmental Protection.
[12] Dr. Jeffrey Morris, Sound Resource Management Group, Inc. "Life Cycle Assessment (LCA) and Monetization for Nine Human and Environmental Health Impacts from Delaware County, Pennsylvania MSW Diversion & Disposal 2020 Baseline and Recommended Zero Waste Plan," June 2023. http://www.energyjustice.net/incineration/DelcoLCA.pdf
[13] Zero Waste International Alliance, Zero Waste Definition: https://zwia.org/zero-waste-definition/; Zero Waste Hierarchy: https://zwia.org/zwh

But EPA says incineration is preferred, and they're the experts, right? Actually, no. EPA has long had a waste management hierarchy (which is not the Zero Waste Hierarchy above) that places incineration (which they describe as "energy recovery") over landfilling (described as "disposal," as if incineration is not also a form of disposal).[14] However, in our February 2022 meeting with top staff in EPA's Office of Land and Emergency Management, which is responsible for waste programs, they admitted that they have no documentation to support their placement of incineration above landfilling in their hierarchy. So, since July 2022, EPA has had a disclaimer on their hierarchy stating that they are revisiting it.[15] This is taking a while because they also have to revisit a flawed climate model that they use called WARM, which was never peer reviewed until 2023 after we asked for such a review. EPA also opened a comment period,[16] but has not yet incorporated that feedback into the model, and it may be a few more years before that can happen.

Where will the waste go if we don't burn it; aren't we running out of landfill space? Pennsylvania has 43 landfills and six incinerators.[17] The state has such a glut of disposal capacity that it has taken waste from 44 states, plus DC, some U.S. territories, and other countries, and has been the largest importer of waste for nearly 35 years.[18] It may seem as if we're running out of landfill space because landfills are given limited capacity permits, but the PA DEP constantly grants new permits for expansions.[19]

Will it cost more? Not necessarily. For Philadelphia, the costs are comparable. The city has two contracts, one with Waste Management (now just "WM") for two-thirds of the city's trash, and the other with Covanta (now "Reworld") for the other third. Most of the incineration is under the Reworld contract, though a small portion of the waste hauled by WM ends up at incinerators as well. As shown below, the contract prices are similar at around $65 per ton. Both contracts started 7/1/2019 and are four-year contracts plus three one-year renewal options that were all exercised, expiring 6/30/2026.

The per-ton 2019 prices in the current contracts are as follows:


Reworld Delaware Valley incinerator in Chester

Covanta (Reworld):[20]

58th St Transfer Station:	$65.50 for first 120,000 tons per year, then $64
Chester Incinerator:	$58.50 by transfer trailer; $57 by compactor truck
Plymouth Incinerator:	$63.50 by transfer trailer; $59 by compactor truck
Residual waste:	$65.50

Waste Management (WM):[21] $65.25

Same prices for delivery to the two transfer stations in the city (Philadelphia Transfer Facility and Recycling Center and the Forge Transfer Facility) or directly to Fairless Landfill or the Wheelabrator Falls Incinerator, both of which are in Falls Township, Bucks County.

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[14] EPA Waste Hierarchy. https://www.epa.gov/smm/sustainable-materials-management-non-hazardous-materials-and-waste-management-hierarchy

[15] *Id.* The disclaimer states: "EPA is now in the process of reviewing the waste hierarchy to determine if potential changes should be made based on the latest available data and information."

[16] See comments in docket here: https://www.regulations.gov/docket/EPA-HQ-OLEM-2023-0451, including extensive comments by Energy Justice Network and other experts here: https://www.regulations.gov/comment/EPA-HQ-OLEM-2023-0451-0112 and here: https://www.regulations.gov/comment/EPA-HQ-OLEM-2023-0451-0084

[17] PA Department of Environmental Protection, Municipal Waste Landfills and Resource Recovery Facilities. https://www.pa.gov/agencies/dep/programs-and-services/business/municipal-waste-permitting/mw-landfills-and-resource-recovery-facilities.html

[18] Find copies of Congressional Research Service reports on Interstate Shipment of Municipal Solid Waste dating back to the 1990s here: https://actionpa.org/waste/

[19] The PA Department of Environmental Protection will not accept a landfill expansion permit from a landfill unless it has under five years of projected capacity remaining. This helps ensure that there is an ongoing perception of "running out of space" for decades, yet expansion permits are routinely granted. See: 25 Pa. Code § 271.202.(f) https://www.pacodeandbulletin.gov/Display/pacode?file=/secure/pacode/data/025/chapter271/s271.202.html

[20] Current Philadelphia City waste disposal contract with Covanta (2019-2026): https://phillyzerowaste.org/contract/2019CovantaContract.pdf

[21] Current Philadelphia City waste disposal contract with Waste Management (2019-2026): https://phillyzerowaste.org/contract/2019WMContract.pdf

Isn't cheaper best? In addition to the contract prices, there are externalized health and environmental costs that show up in medical bills, and social costs like flooding and heat deaths. The calculated value of that damage is another $144/ton for landfill and $337/ton for incineration.[22]

Doesn't methane from landfills make them worse? No. In the worst-case scenario for landfills, where gas is not even captured, the overall health and environmental impacts of incineration are still worse than landfilling.[23] Incinerating immediately releases all of the carbon (including from plastics and wood) into the atmosphere that, in landfills, is mostly sequestered. Composting food scraps and yard waste to prevent most landfill methane emissions is a better solution than burning the entire trash stream.

But if we have to truck it further to reach landfills, won't the diesel truck emissions make it worse? No. Transportation impacts are so small relative to landfilling or incineration that one would have to drive a diesel truck to California and back to *almost* close the gap on how much worse incineration is compared to landfilling. This is documented in the life cycle assessments done for Delaware County, PA[24] and even better illustrated in one done for Montgomery County, MD.[25]

Doesn't switching the 37% we burn to landfills mean harming environmental justice communities? No. Landfills in PA are very much in rural, predominantly white communities, or in communities like Falls Township, Bucks County (where over half of Philly's waste is landfilled) where no one lives within about two miles. It is the incinerator industry that has major environmental justice impacts, most disproportionately impacting African-Americans, such as the incinerator in Chester where over 17,000 people live within two miles and two-thirds are African-American, most of whom are low-income.[26]

Do Chester City residents want Philly's trash? No. Residents of Chester have expressed their opposition many times over the years. However, two letters were used to justify the current contract with Covanta.[27] One was from former Chester City Mayor Thaddeus Kirkland, who signed a letter clearly written by Covanta.[28] Mayor Kirkland, after running the city into bankruptcy, is no longer in office. Current Mayor Stefan Roots is outspoken in opposition to the incinerator, and has publicly expressed that he'd like to see it gone.[29] The second letter was from Chester Environmental Partnership (CEP), an outfit run by a suburban reverend who does not even live in Chester and who has a signed agreement to take money from Covanta annually since 2006.[30] CEP regularly gives praise and awards to Covanta.

Delaware County does not want incineration, either. The county has relied on burning nearly all of their trash in Chester for many years, but since Democrats took control of the county, they changed over the Delaware County Solid Waste Authority board, and adopted a Sustainability Plan and a county Zero Waste Plan that actually follow the definition of Zero Waste by ending incineration.[31] The county's goal is to end its use of incineration once they rebuild their two transfer stations. They have already started diverting 15% of their waste from the incinerator since 2023.

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[22] See footnote 12.
[23] See this chart: https://www.energyjustice.net/incineration/LCA.pdf#page=7; see footnote 12 for the full study, a very detailed life cycle assessment conducted for Delaware County, which assumes the worst global warming potential for methane (86x that of CO_2 over 20 years).
[24] *Id.*
[25] Life Cycle Assessment summary chart from "Beyond Incineration: Best Waste Management Strategies for Montgomery County, Maryland," March 2021. https://www.energyjustice.net/incineration/LCA.pdf#page=3
[26] Analyses from https://www.ejmap.org, https://www.ejmap.org/justice/, https://www.energyjustice.net/incineration/ej, and EJ Analyzer Tool
[27] Philadelphia City Council Streets Committee Hearing Transcript, 6/5/2019. https://phillyzerowaste.org/contract/2019-06-05transcript.pdf#page=20
[28] Letter from Chester City Mayor Kirkland to Philadelphia Councilmember Squilla, 5/31/2019. https://phillyzerowaste.org/contract/KirklandLetter.pdf
[29] https://www.delcotimes.com/2021/04/24/guest-column-using-covanta-for-your-political-disadvantage/; https://delawarevalleyjournal.com/what-would-losing-covanta-mean-for-city-of-chester-delaware-county/
[30] https://delcoej.org/pdf/2019-CEP-Philly-Letter.pdf See Covanta's history with CEP and funding agreement at: https://delcoej.org/cep
[31] "By adopting the Zero Waste approach, the [Sustainability] Plan seeks to move away from incineration and other harmful practices that threaten the environment or public health." https://delcodev.ntc-us.com/news/delaware-county-commits-greener-future-release-its-5-year-sustainability-plan

Do Philadelphia residents want to burn our trash? In 2019, 41 groups opposed the incineration contract, but were ignored.[32] All 11 people who gave public comment before city council that year in the hearing on the contract were opposed to the incinerator contract. In October 2023, the city council held its first hearing on whether the city should incinerate our waste.[33] Almost everyone who testified was a Philadelphia resident opposed to the contract and many specifically called for city council to pass the Waste Contracting for Clean Air Act, which would ban city contracts to burn waste or recyclables.[34] Only one resident who lives in Chester spoke and she was in favor because Covanta gives donations to her nonprofit. Every other person who spoke, including a Montgomery County resident who lives near the malfunctioning Covanta Plymouth incinerator, were opposed to the incineration contract.

The Streets Department had testified to City Council in 2019 that the Philadelphia Office of Sustainability and the (now abolished) Zero Waste and Litter Cabinet "concluded that waste-to-energy is preferable over landfill for waste disposal."[35] This was supposedly based on these offices having been named on a city waste plan where the EPA hierarchy was followed.[36] However, since this 2019 statement to City Council by the Streets Department, the Office of Sustainability has repeatedly denied having expressed support for incineration over landfilling.[37]

Do environmentalists favor incineration over landfilling? No. Groups that have evaluated the issue and expressed any opinion on it are opposed to incineration. Sierra Club[38] is probably the biggest name in this category, but there are many others as well.[39] There are some rare examples of environmental or liberal think tank groups who support incineration while taking repeated donations from Covanta.[40] Similarly, there is a City College of New York organization that publishes pro-incinerator research while taking money for many years from Reworld/Covanta and other incinerator companies.[41]

Is it legal for the city to ban incineration contracts? Yes. The city has the freedom to contract as a market participant and already uses that power to prohibit other sorts of contracts.

Does Philly have a legal obligation to end incineration? Yes. The PA Environmental Right Amendment[42], the duty to look after the health, safety and welfare of our residents, and Title VI of the Civil Right Act, which prohibits recipients of federal funds, such as the City of Philadelphia, to take actions which have a discriminatory impact (regardless of intent) on protected classes of people such as racial minorities living in the City of Chester.[43]

For more information, please contact Mike Ewall, Esq., 215-436-9511 or mike@energyjustice.net

[32] 40 Organizations call on Mayor Kenney to Stop Burning Philly's Trash (plus separate letter from American Sustainable Business Council). https://phillyzerowaste.org/contract/

[33] Philadelphia City Council Committee on the Environment Hearing 10/25/2023. https://youtu.be/5Aw2Xfk7fQA?feature=shared&t=1622

[34] Waste Contracting for Clean Air Act. https://docs.google.com/document/d/1HQOvsP6JyskhexyIOqmCtai2WkHq1X-B/

[35] Philadelphia City Council Streets Committee Hearing Transcript, 6/5/2019. https://phillyzerowaste.org/contract/2019-06-05transcript.pdf#page=8

[36] Philadelphia Zero Waste and Litter Action Plan. https://www.phila.gov/media/20190821131753/Zero-Waste-Litter-Action-Plan-2017.pdf#page=6; Our appeal of our Right-to-Know Law request established that this plan is the source of then-Streets Commissioner Carlton Williams' statement representing to City Council the positions of other city offices as if they had researched and taken a position that they had not taken.

[37] Personal communications with then-director of the Office of Sustainability, Christine Knapp.

[38] "Sierra Club Zero Waste Policy opposes any form of combustion of wastes, and the definition of incineration in the policy lists included technologies." https://www.sierraclub.org/zero-waste-guidance-destructive-disposal

[39] 274 organizations write to Biden White House to oppose EPA preferences for incineration: https://energyjustice.net/incineration/2022CEQletter.pdf

[40] Center for American Progress (CAP) was cited by the Streets Department as a source justifying the city's support of incineration. CAP accepted $50K to $100K in annual donations from Covanta from 2013-2021 after publishing this 2013 report supporting incineration: https://www.americanprogress.org/article/energy-from-waste-can-help-curb-greenhouse-gas-emissions/

[41] Waste-to-Energy Research and Technology Council. "WtERT's Global Memberships and Affiliations." http://www.wtert.org/partners/

[42] Article 1, Section 27 of the Pennsylvania Constitution provided the people a constitutional right to clean air, which every Pennsylvania municipality is obligated to maintain for the benefit of all the people. https://www.legis.state.pa.us/WU01/LI/LI/CT/HTM/00/00.001.027.000..HTM. Read the Pennsylvania Supreme Court case that spelled out these rights and municipal obligations here: https://johndernbach.com/wp-content/uploads/2017/07/83_A.3d_901.pdf

[43] Ewall, M. "Legal Tools for Environmental Equity vs. Environmental Justice." https://www.ejnet.org/ej/SDLP_Ewall_Article.pdf

ATTACHMENT 2

Covanta Trash Incinerator & Environmental Racism in Chester

(2nd page has emissions data)

https://delcoej.org/wp-content/uploads/CovantaEmissions.pdf

Reworld (Covanta) Trash Incinerator & Environmental Racism in Chester

Chester area residents suffer from high rates of health problems – problems that are caused and made worse by high levels of industrial air pollution.

Chester's #1 air polluter – and #1 environmental law violator – is Covanta Delaware Valley (recently rebranded as "Reworld"), the nation's largest waste incinerator, burning around 3,500 tons of waste every day. This trash comes from throughout Delaware County, Philadelphia, New York City, New Jersey, and beyond. Only about 1.6% of the trash burned at Covanta is from the City of Chester.

Burning trash does not turn it into energy. Every ton burned turns into toxic ash and air emissions. Covanta is missing two of the four pollution control systems that most incinerators have. They have no controls for the nitrogen oxides (NOx) that triggers asthma attacks, and no controls for the highly toxic dioxins and mercury they release. After 34 years of operation, Covanta is finally working on installing the missing controls for NOx, which will only reduce their emissions of this one pollutant by about 18%. If they were required to meet modern standards, they'd have to reduce this asthma-triggering pollution by 70-80%. In a few years, once they install these controls, they'll still be the city's #1 air polluter.

Environmental racism – Toxic industries like trash incinerators disproportionately impact people of color. Of the 20 largest trash incinerators in the United States, 70% of them are in communities of color.[1]

The most polluting option – Covanta's toxic ash is dumped in Delaware County's Rolling Hills Landfill in a rural community an hour north of Chester. This ash is more dangerous in a landfill than putting trash in the landfill directly. Incineration (and landfilling ash) is more harmful to people's health than simply landfilling it. Incineration is also far dirtier than burning coal, which everyone knows is a filthy fuel.[2]

What is the alternative? – Redesigning products, reducing consumption and packaging, reusing things, recycling, and composting (collectively known as "zero waste") is the ultimate answer, and employs more people with safer, green jobs. As we work to build these solutions, it's urgent that we end incineration and go directly to landfilling instead of burning waste first and landfilling ash, which is far more harmful for all.

In 2023, as a result of our collective advocacy, the Delaware County Solid Waste Authority started diverting trash away from the incinerator. 13% of Delco's trash now skips the incinerator on its way to the landfill. However, 26% of the trash they burn in Chester still comes from Delco, which is unacceptable. These 300,000 tons/year of Delco trash need to be reduced to zero as soon as possible, by actually reducing waste, but also by skipping the incinerator as fast as possible. Energy Justice Network has been working to stop Covanta and all incinerators since the 1990s, and is the nation's leading group providing support to communities to end incineration. We're making progress to end incineration in Delco. You can help speed up the transition from this outdated practice to a reuse, recycling and composting economy. Join us! www.energyjustice.net/join

[1] www.energyjustice.net/incineration/ej
[2] www.energyjustice.net/incineration/

How polluting is the Covanta/Reworld trash incinerator in Chester?

The "Reworld Delaware Valley" incinerator in the City of Chester, PA is the largest waste incinerator in the United States, operating with the fewest pollution control devices. Based on data reported to the PA Department of Environmental Protection, the incinerator is the #1 industrial air polluter in Delaware County, releasing more pounds of health-damaging air pollution than any other facility.

Pollutant (in pounds except CO2e)	**2022 Emissions**	**Rank in DelCo**	**Health Effects**
Global Warming Pollution (in tons of CO_2 equivalents)	11,669,625	4	Extreme weather, disease, crop damage, species extinction
Nitrogen Oxides	2,320,920	1	triggers asthma attacks, chronic respiratory disease and stroke
Carbon Monoxide	673,400	1	headaches and dizziness; increases lifetime risk of heart disease
Sulfur Oxides	392,820	1	triggers asthma attacks; chronic respiratory and heart diseases; stroke
Particulate Matter	126,080	4	heart attacks, stroke, irregular heartbeat, aggravated asthma, decreased lung function, difficulty breathing
Hydrochloric Acid	37,740	1	irritates eyes, skin, and nose, damages lungs
Fine Particulate Matter	15,140	5	same as above, but worse, gets deep into lungs and into blood stream
Volatile Organic Compounds	13,700	15	eye, nose and throat irritation, headaches, loss of coordination and nausea, liver, kidney and central nervous system damage, cancer
Mercury	51	1	damage to nervous, digestive, and immune systems, lowers IQ
Nickel	20	3	allergy, cardiovascular and kidney diseases, lung fibrosis, lung and nasal cancer
Lead	17	2	damages nervous system and kidneys, lowers IQ, increases likelihood of antisocial behavior

To put the smaller numbers in perspective, mercury is one of the toxic pollutants for which there is no known safe level of exposure. Lead and dioxins also have no "safe" level. Dioxins are the most toxic chemicals known to science – 140,000 times more toxic than mercury – and incinerators are a major source (but good data is lacking). Since it started operating in 1991, the incinerator has never had the pollution controls that remove dioxins and mercury from the air pollution by transferring it to the ash. Most incinerators use a carbon injection system that sprays activated carbon (like Brita filter material) into the exhaust to prevent this from getting into the air – but not in Chester.

The incinerator reported releasing 51.4 pounds of mercury into the air in 2022, not counting that which gets into the air and water via the ash. A highly cited Minnesota study found that if approximately one gram of mercury (the amount in a single fever thermometer) is deposited to a 20-acre lake each year from the atmosphere, this small amount, over time, can contaminate the fish in that lake to the point where they should not be eaten. 51.4 pounds of mercury equals 23,315 grams. That means the incinerator, in a typical year, is releasing enough mercury sufficient to keep over 23,000 20-acre lakes so contaminated that the fish are not safe to eat. The state advises to limit fish consumption from the Delaware River due to mercury contamination.

But what about buildings and mobile sources? Aren't they a bigger source of pollution to worry about?

Yes, for some pollutants, the fossil fuels burned to heat buildings or move vehicles are the largest share of pollution compared to industry. However, Covanta is the largest polluter of all industrial sources, and is a big share of the total even when compared to everything (vehicles, buildings, etc.). Covanta prefers to compare themselves to mobile and other sources only on pollutants where that makes them look like a smaller contributor. However, for the most toxic pollutants (dioxins, acid gases, and toxic metals), these other sources do not contribute in a significant way, and Covanta's role is still huge. For example, Covanta emitted 95% of the hydrochloric acid and 63% of the mercury released in the county in 2022.

Energy Justice Network

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ATTACHMENT 3

Waste Contracting for Clean Air Act

https://docs.google.com/document/d/1HQOvsP6JyskhexyIOqmCtai2WkHq1X-B/

City of Philadelphia

BILL NO. _____
Introduced _____, 2025

Councilmember _____

_____

Referred to the Committee
on _____

_____

AN ORDINANCE

Amending Title 17 of The Philadelphia Code, entitled "Contracts and Procurement," by adding language to bar the City from contracting with companies that cause the city's municipal solid waste or recyclables to be incinerated; all under certain terms and conditions.

Waste Contracting for Clean Air Act

THE COUNCIL OF THE CITY OF PHILADELPHIA HEREBY ORDAINS:

SECTION 1. Title 17 of The Philadelphia Code is hereby amended to read as follows:

TITLE 17. CONTRACTS AND PROCUREMENT.

* * *

CHAPTER 17-100. PROCUREMENT CONTRACTS.

* * *

§ 17-113. Waste and Recycling Contracts.

(1) Definitions. For the purpose of this subsection, the following definitions shall apply:

(a) Business Entity. Any individual, domestic corporation, foreign corporation, association, syndicate, joint stock company, partnership, joint venture, or unincorporated association, including any parent company, subsidiary, exclusive distributor or company affiliated therewith, engaged in a business or commercial enterprise.

(b) City, or City Agency. The City of Philadelphia, its departments, boards and commissions, and any City-related Agency.

(c) City-related Agency. All authorities, government agencies and quasi-public corporations which:

(.1) receive appropriations from the City;

(.2) have entered into continuing contractual or cooperative relationships with the City, including any agreement whereby the City funds an agency's debt service; or

(.3) operate under legal authority granted to them by City ordinance.

(d) Construction and Demolition Waste. "Construction / demolition waste" as defined in 25 Pa. Code § 271.1.

(e) Discarded Materials. Municipal Waste, Residual Waste, Construction and Demolition Waste, Source Separated Organics, or Source Separated Recyclables generated in the City and contracted by the City for collection, including non-recyclable material mixed in with Source Separated Recyclables.

(f) Disposal. This disposition of Discarded Materials in any landfill, Incinerator, or Waste-to-Fuel Facility.

(g) Incinerator. Any facility that meets the definition of a "municipal waste combustor" per 40 CFR 60.51a. In addition, the term "incinerator" shall include cement kilns, power plants, industrial boilers, or any facility which uses plasma arc, gasification, pyrolysis, or similar technology where such Discarded Materials are used primarily for their energy value, and not for use as a raw material to be reused, Recycled or composted.

(h) Municipal Waste. "Municipal Solid Waste" as defined in 25 Pa. Code § 271.1.

(i) Processing. "Processing" as defined in 25 Pa. Code § 271.1, including the use of any Waste-to-Fuel facility.

(j) Recycling. "Recycling" as defined in 25 Pa. Code § 271.1, except that the term "Recycling" does not include use of an Incinerator or Waste-to-Fuel Facility.

(k) Source Separated Organics. Food scraps, soiled paper, and/or yard waste kept separate from municipal waste at the point of origin for the purpose of composting. Source Separated Organics does not include compostable plastics.

(l) Source Separated Recyclables. Materials that are kept separate from municipal waste at the point of origin for the purpose of Recycling. The term includes any material collected in a Recycling program, including, but not limited to, clear glass, colored glass, aluminum, steel and bimetallic cans, high-grade office paper, newsprint, corrugated paper, other marketable grades of paper, and plastics.

(m) Waste-to-Fuel Facility. Any facility that markets, packages, Processes or converts Discarded Materials to be provided or sold as burnable fuels for the purpose of being combusted for energy (electricity, heat, or transportation fuel). The term "Waste-to-Fuel Facility" does not include a landfill or an anaerobic digester.

(2) Prohibited Contracts.

(a) In the procurement of services for the transfer, transportation, Processing, Recycling, or Disposal of Discarded Materials, no City Agency may enter into an original or renewal contract with any Business Entity to convey Discarded Materials to an Incinerator or a Waste-to-Fuel facility, or to a transfer station where such Discarded Materials would be subsequently conveyed to an Incinerator or a Waste-to-Fuel facility.

(b) Contract Requirements.

(.1) *Each City contract for transfer, transportation, Processing, or Disposal of Discarded Materials must contain a clause stating that the Business Entity will not convey Discarded Materials to any Incinerator or a Waste-to-Fuel facility, or to a transfer station where such Discarded Materials would be subsequently conveyed to an Incinerator or a Waste-to-Fuel facility. Any such contract entered into by the City shall contain a provision requiring the City, in the procurement of services purchased pursuant to such contract, to abide by the provisions of this subsection.*

(.2) The false execution of a bid or contract in accordance with subsections 17-113(2)(b)(.1) shall result in the following:

(i) A prospective bidder shall be liable to the City in the amount of the bid surety provided by the bidder, as liquidated damages;

(ii) A contractor shall be deemed to be in breach of its contract, for which the remedy shall be the cancellation or termination of the contract and the withholding of voucher payments due and owing under the contract; and

(iii) Business Entities that falsely execute a bid or contract shall be ineligible to bid on City contracts or subcontracts for a period of up to five (5) years.

(.3) The false execution of a bid or contract in accordance with subsections 17-113(2)(b)(.1) shall result in the following:

(c) Notice. All invitations to bid, bid specifications, and contracts relating to the transfer, transportation, Processing, Recycling, or Disposal of Discarded Materials shall contain an appropriate notice and description of the duties, obligations, responsibilities, requirements, penalties, and sanctions imposed by this subsection.

* * *

SECTION 2. Effective date. This Ordinance shall take effect immediately.

Explanation:
Italics indicate new matter added. [Brackets] indicate matter deleted.

ATTACHMENT 4

Dr. Jeffrey Morris' CV

(MEBCalc life cycle assessment tool author, and author of Attachment 5)

JEFFREY MORRIS

Ph.D. Economist

Current research interests – Life cycle assessment (LCA), economic cost/benefit valuation of pollutant emissions and nonmarket services, life cycle economics & environmental impacts of products and materials production and their end-of-life management, recycling market price fluctuation causes, and rate design impacts on utility system revenues and costs.

Teaching experience includes introductory economics, microeconomics, economic statistics, econometrics, input-output economics & environmental impacts, life cycle analysis, environmental economics, and ecological & social sustainability.

Examples of consulting clients: US Department of Justice, CA Department of Resources Recycling and Recovery, WA Department of Ecology, WA Clean Washington Center, MA Department of Environmental Protection, MA Executive Office of Environmental Affairs, Alberta Ministry of the Environment, Ontario Ministry of the Environment, OR Department of Environmental Quality, Oregon Metro, King County (WA), San Luis Obispo County (CA), Seattle Public Utilities, Auburn (WA), Bellevue (WA), Kirkland (WA), New York City, Renton (WA), San Francisco, Toronto (ON), Vancouver (BC), Halifax (NS), Eco-Cycle (Boulder, CO), Sierra Club (Phoenix, AZ), MA Public Interest Research Group, RI Clean Water Fund, Pollution Probe (Toronto), and Belkorp Environmental Services, Inc. (Vancouver, BC).

Employment History

Principal, Sound Resource Management Group, Inc. (SRMG), Seattle, WA & Carbondale, CO (35 years)
Visiting Faculty, The Evergreen State College, Master of Environmental Studies Program (1 year)
Chief forecaster; Seattle FilmWorks (12 years), including chief adviser on capitalization of marketing expenditures for IPO hearing before US Securities and Exchange Commission
Assistant Professor of Economics, University of Colorado – Denver (2 years)
Assistant Professor of Economics, University of Washington – Seattle (3 years)
Financial Analyst, Ford Motor Company Corporate Finance Staff, Dearborn, MI (2 years)

Community Service

Peer reviewer: *Environmental Science & Technology*, *Journal of Industrial Ecology*, *International Journal of Life Cycle Assessment*, *Waste Management*, and *Journal of the American Statistical Association*
Washington Toxics Coalition, member and treasurer Board of Directors, Seattle, WA (10 years)
Progressive Animal Welfare Society (PAWS), member, treasurer and president Board of Directors, Lynnwood, WA (10 years)

Education

Ph.D., Economics, University of California – Berkeley
M.A., Mathematical Statistics, University of California – Berkeley
M.B.A., Finance & Operations Research, Northwestern University, Chicago, IL
B.S.B.A., General Business, Northwestern University, Evanston, IL

Contact Information

Sound Resource Management Group, Inc., 396 Golden Stone Drive, Carbondale, CO 81623
Tel. 360-489-4595 jeff@srmginc.com www.srmginc.com

Peer-Reviewed Journal Articles

Recycle, bury or burn wood waste biomass? – LCA answer depends on carbon accounting, emissions controls, displaced fuels & impact costs, *Journal of Industrial Ecology*, 21(4) 844-856, August 2017

LCA harmonization and soil science rankings results on food waste management methods, with co-authors S. Brown, H. S. Matthews and Matthew Cotton, *Environmental Science &Technology*, 51(10) 5360-5367, May 2017

Review and meta-analysis of 82 Studies on end-of-life management methods for source separated organics, with co-authors H. S. Matthews and C. Morawski, *Waste Management*, 33(3) 545-551, Mar 2013

Bury or burn North American MSW? LCAs provide answers for climate impacts & carbon neutral power potential, *Environmental Science & Technology*, 44(20) 7944-7949, Oct 2010

Development of a consumer environmental index (CEI) & results for Washington State consumers, with co-author H. S. Matthews, *Journal of Industrial Ecology*, 14(3) 399-421, Jun 2010

Measuring environmental value for natural lawn and garden care practices, with co-author J. Bagby, *International Journal of Life Cycle Assessmen*t, 13(3) 226-234, May 2008

Comparative LCAs for curbside recycling versus either landfilling or incineration with energy recovery, *International Journal of Life Cycle Assessment*, 10(4) 273-284, Jul 2005

Recycling versus incineration: An energy conservation analysis, *Journal of Hazardous Materials*, 47(1-3) 277-293, Special Issue on Energy-from-Waste, May 1996

Inside the Standard Industrial Classification codes: How many paper mills are there in Washington? with co-author F. Ackerman, *Structural Change and Economic Dynamics,* 4(2) 385-392, Dec 1993

Source separation vs. centralized processing: An avoided-cost optimization model provides some intriguing answers**,** *Journal of Resource Management and Technology,* 19(1) 37-46, Mar 1991

Some simple tests of the direct effect of education on preferences and nonmarket productivity**,** *The Review of Economics and Statistics,* LVIII (1) 112-117, Feb 1976

Selected Reviewed Studies & Articles

Big Garbage Cart vs. Small Garbage Cart? – More Waste, Less Recycling, More Health & Ecosystem Impacts, SRMG Working Paper, July 2025

Life Cycle Assessment (LCA) and Monetization for Nine Human and Environmental Health Impacts from Niagara Region (Ontario, Canada) MSW Diversion and Disposal – Waste Management Strategic Plan LCA Baseline from 2022 Actual results. Prepared for Niagara Region Public Works, November 2024

Life Cycle Assessment (LCA) and Monetization for Nine Human and Environmental Health Impacts from Delaware County, Pennsylvania MSW Diversion & Disposal – 2020 Baseline and Recommended Zero Waste Plan, Prepared for Delaware County and Zero Waste Associates, June 2023

MEBCalc (Measuring Environmental Benefits Calculator) LCA & Monetization Methodology for Nine Human and Environmental Health Impacts and Results for Hawai'i Waste Management Options Analysis – recycle, landfill or waste-to-energy incineration of 6 material wastes (office paper, mixed paper, cardboard, HDPE food and product containers, PP food and product containers, and mixed metal) generated on the Big Island (Hawai'i), December 2022

Environmental economics dollars and sense of composting in San Diego County (CA), with co-authors Rich Flammer & Tyla Montgomery Soylu, *BioCycle Connect*, January 2022

Environmental economics dollars and sense of composting in San Diego County (CA), prepared for City of Chula Vista Economic Development Department Sustainability Office, June 2021

Economic damage costs for nine human health and environmental impacts, prepared for Oregon Department of Environmental Quality and Oregon Metro, July 2020

A triple win: Decreased trash generation, reduced costs & lower environmental impacts for Seattle, Re*source Recycling*, April 2020

Seattle's winning strategy for managing organics, *BioCycle Connect*, April 2020

Plastic & Climate – The Hidden Costs of a Plastic Planet, Chapter 6: Plastic Waste Management, with co-author Doun Moon, prepared for Center for International Environmental Law (CIEL), May 2019

Selected Reviewed Studies & Articles(continued)

GHG footprints for three packaging materials used in California, with co-author David Stizhal, prepared for U.S. Environmental Protection Agency Region 9, June 2018

Rhythms and reasons in pricing, with co-author P. Pasterz, *Resource Recycling*, May 2017

Does burning garbage for electricity make sense? *Wall Street Journal – Journal Report, Big Issues-Energy*, November 16, 2015

Tracking and understanding Seattle's road to zero waste, with co-author L. Hillon, *Resource Recycling*, November 2015

Evaluation of climate, energy, and soils impact of selected food discards management systems, with co-authors S. Brown, H. S. Matthews, and M. Cotton, prepared for Oregon Department of Environmental Quality, October 2014

Environmental costs, externalities and the prices of products and waste disposal, prepared for Oregon Department of Environmental Quality, December 2013

What is the best disposal option for the "Leftovers" on the way to Zero Waste? with co-authors E. Favoino, E. Lombardi, and K. Bailey, prepared for Eco-Cycle, May 2013

Life cycle assessment of federal procurement – economic input/output and process life cycle analysis of federal procurement with environmental and other impacts, prepared by Facilities Solution Group with the assistance of H. S. Matthews, *et al*, prepared for U.S. General Services Administration, December 2011

Returning to work: Understanding the domestic jobs impacts from different methods of recycling beverage containers, with co-author C. Morawski, prepared for the Container Recycling Institute, December 2011

More jobs, less pollution: Growing the recycling economy in the U.S., prepared with Tellus Institute for BlueGreen Alliance, Teamsters, SEIU, NRDC, Recycling Works!, and GAIA, November 2011

Review of LCAs on organics management methods and development of an environmental hierarchy, prepared for Alberta Ministry of the Environment, February 2011

Environmental life cycle assessment of waste management strategies with a zero waste objective: Study of the solid waste management system in Metro Vancouver, British Columbia, prepared for Belkorp Environmental Services, June 2009

The Washington state consumer environmental index (CEI) – A summary of the development of a tool to understand and support consumer choices that have preferable environmental outcomes, prepared for The Washington State Department of Ecology, July 2007

Pathways to sustainability: A comprehensive strategic planning model for achieving environmental sustainability – Developed at the Washington State Department of Ecology for use in public and private organizations, prepared with the Washington State Department of Ecology, 2003

Understanding beverage container recycling: A value chain assessment prepared for the Multi-Stakeholder Recovery Project, with RW Beck, Boisson & Associates, Franklin Associates, and Tellus Institute, prepared for Global Green – Businesses and Environmentalists Allied for Recycling, 2002

Selected Conference & Webinar Presentations

LCA Focused on Local Community Human and Environmental Health Impacts & Their Economic Costs, National Zero Waste Conference, October 2023

Plastics and Climate Change, United Nations Development Program COP Chat Series "Let's Talk Plastics", Session 12, June 2021

Recycling Markets & Carbon Accounting-Two Topics Important for Economic and Environmental Impacts of MSW, King County Solid Waste Division, April 2019

Environmental, Economic & Energy Trade-Offs in Managing Wastes for Sustainability and Resiliency. Seattle Economics Council, February 2019

Energy, Environment & Economy: Trade-Offs When Managing Wastes for Sustainability & Resiliency. Pacific Northwest Regional Economic Conference (PNREC 2018), May 2018

Managing Biogenic Materials: Store or Burn Carbon, or Both? BioCycle Renewable Energy from Organics Recycling 2017 Conference (REFOR17), October 2017

Selected Conference & Webinar Presentations(continued)

Life Cycle Assessment (LCA): More than Just Trucks, MRFs & Climate Change. National Recycling Coalition Sustainable Materials Management Webinar, April 2015

Recycle, Bury or Burn Clean Wood Waste. Solid Waste Association of North America Northwest Chapter Materials Management Seminar, February 2015

Is Waste a Good Source of Energy? Dallas Sierra Club Earth, Wind & Fire Energy Summit, Oct 2014

Zero Waste Composting. BioCycle REFOR13 Conference, October 2013

Returning to Work: The Role of Beverage Container Recycling in Jobs Creation. 3 webinars January-May 2012

Recycling's role in mitigating global warming. Plenary session presentation at Resource Recycling Conference, 2010

Biomass management: Ranking management options for wood, yard debris & food scraps. Life Cycle Assessment VIII, 2008

Lessons learned on LCA impact assessments from analysis of wood & carpet discards management. Special session on Industrial Ecology at Life Cycle Assessment VIII, 2008

Developing indicators to measure environmental progress that are as comprehensive and robust as are our economic indicators. Pacific Northwest Region Economic Conference, 2008

CEI: A consumer environmental index for Washington State. National Environmental Partnership Summit, 2008

Discarded resources management: An environmental & economic comparison of recycling, composting, and disposal (with energy recovery). Keynote address to conference on the environmental and economic impacts of waste management, sponsored by the Quebec (Canada) Ministry of the Environment and the Quebec Recycling Authority, 2008

Zero waste & waste management in Italy. Conference on local, national and international strategies, sponsored by Comune di Capannori (Italy), 2008