Local Government Coalition For Renewable Energy | THE UNITED STATES CONFERENCE OF MAYORS | NLC NATIONAL LEAGUE OF CITIES — CITIES STRONG TOGETHER | NACo NATIONAL ASSOCIATION of COUNTIES

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Via Electronic Mail

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https://www.regulations.gov/docket/EPA-HQ-OAR-2022-0920/document

Dear Mr. Goffman and Ms. Howard:

On behalf of the nation's mayors, cities, counties, and municipal waste services providers, we appreciate the opportunity to submit comments on the U.S. Environmental Protection Agency's (EPA) review of revised Maximum Achievable Control Technology (MACT) standards for Waste-to-Energy (WTE) facilities, specifically EPA's Large Municipal Waste Combustor (LMWC) category under sections 111 and 129 of the Clean Air Act. We (i.e., the Local Government Coalition for Renewable Energy -- the Coalition, the U.S. Conference of Mayors -- USCM, the National League of Cities – NLC, and the National Association of Counties -- NACo) appreciate the Federalism Consultations EPA held for state and local government and related organizations on March 16 and April 17, 2023 and provide these comments pursuant to Executive Order 13132: *Federalism* (further description of each commenter is provided in the Appendix).

WTE is the most environmentally sound means for managing post-recycled Municipal Solid Waste (MSW). WTE's preferability over landfilling was expressly recognized by the Council on Environmental Quality in its recent publication *Priorities for waste management*, p. 44. *See* www.sustainability.gov/pdfs/EO_14057_Implementing_Instructions.pdf, §4.5.4. Furthermore, the World Economic Forum report, *Green Investing – Towards a Clean Energy Infrastructure*, recognizes WTE as one of eight "key renewable energy sectors" and "particularly promising in terms of abatement potential" for carbon emissions. https://www.wtienergy.com/sites/default/files/ERC-2009_GreenInvesting_Jan_Davos_report.pdf

p. 27. Moreover, one of the "targeted measures" for solid waste management advocated by the United Nations in its 2021 report on methane is "no landfill[ing] of organic waste." https://www.unep.org/resources/report/global-methane-assessment-benefits-and-costs-mitigating-methane-emissions (p. 16) In short, WTE is excellent technology, and its expanded use will advance our national wellbeing.

Part I below addresses WTE retrofit cost data and environmental justice, both of which are matters EPA referred to in its March 16 and April 17 presentations. Part II documents WTE's considerable public benefits, and responds to the falsities and misrepresentations that an anti-WTE organization has submitted to EPA in this rulemaking docket (and had previously submitted to the Council on Environmental Quality) to discredit WTE's excellent public benefits.[1]

I. Topics Addressed by EPA's March 16 and April 17 Forums – WTE Retrofit Costs and Environmental Justice

A. Retrofit Costs

These recent presentations provide EPA's preliminary cost estimates for the inventory of 22 WTE facilities owned and/or operated by the municipal entities the agency has identified. *See* Slide 16, "Preliminary List of State or Municipal-Owned Facilities." Those cost estimates are aggregated for the three MACT revision scenarios EPA describes: Option 1 representing what EPA believes to be the statutory floor for MACT improvements; Option 2 representing improvements beyond the MACT floor for the nitrogen oxide (NOx) pollutant grouping; and Option 3 representing improvements beyond the MACT floor for all pollutant groupings.

While we acknowledge the challenge of estimating such costs in advance (and commend EPA's effort in preparing these preliminary figures), a rulemaking founded on uncertain or underestimated costs could have serious negative impacts for the affected WTE facilities, and undermine the viability of WTE as a cleaner, greener alternative to landfilling. That risk is underscored by EPA's own analysis comparing its *ex ante* cost estimates to actual *ex post* costs, in connection with the 1995 rulemaking for LMWCs. *See Ex Ante Costs vs. Ex Post Costs of Large Municipal Waste Combustor Rule*, Cynthia Morgan and Carl A. Pasurka, Jr., U.S. Environmental Protection Agency, National Center for Environmental Economics, Working Paper 21-01, April 2021, *available at* https://www.epa.gov/sites/default/files/2021-04/documents/2021-01.pdf. EPA's analysis indicates that the agency overestimated the cost of installing certain control technologies, *e.g.*, Selective Non-Catalytic Reduction for NOx abatement, while underestimating others (*e.g.*, carbon injection for mercury abatement). *See id.*, pp. 26-27. But even if there had not been systematic underestimation of the costs of these

[1] This letter cites to a number of published sources, one of which is *SCIENTIFIC TRUTH ABOUT WASTE-TO-ENERGY*, a recent, comprehensive and peer-reviewed examination of WTE by Professor Marco J. Castaldi, Ph.D., Chemical Engineering Department, City College and City University of New York. *See* https://gwcouncil.org/wp-content/uploads/2021/06/WTE-REPORT_Castaldi_May-2021.pdf. We cite Dr. Castaldi's report several times, and for your convenience a copy is attached.

modifications, the consequence of the unpredictability and uncertainty of EPA's cost estimates was that "numerous planned MWCs were never constructed and many existing plants shutdown between 1995 and 2000." *Id.*, p. 25.[2] The analysis acknowledges the likelihood that the agency's MWC rule played a role in these closures, and serves as a caution regarding the ability of WTE facilities (and the local governments they serve) to withstand significant additional cost increases.

As EPA recognizes, when conducting its periodic review of performance standards and requirements for LMWCs pursuant to Clean Air Act Section 129(a)(5) (42 U.S.C. § 7429(a)(5)), the agency is not required to repeat the statute's MACT-floor determination process. Instead, EPA has "broad discretion" to revise these standards as it deems necessary, led by consideration of measures for protection of public health. EPA has described this process as follows:

> EPA also believes that interpreting section 129(a)(5) as requiring additional floor determinations could effectively convert existing source standards into new source standards. After 5 years, all sources will be performing at least at the existing source MACT level of performance and some sources will be performing at the new source MACT level of performance. As a result, it is likely that the average performance of the best performing 12 percent of sources will be at or near the new source MACT level of performance. This would result in existing sources being subject to new source MACT requirements on a 5-year cycle regardless of whether those sources have undergone a change which would otherwise require compliance with that standard. EPA sees no indication that section 129(a)(5) was intended to have this inexorable downward ratcheting effect. *Rather, we read the provision as requiring EPA to consider developments in pollution control at the sources and to revise the standards based on its evaluation of the costs, non-air quality effects and energy implications of doing so.*

71 Fed. Reg. 27324-01, 27327-28 (May 10, 2006) (emphasis added).[3] The Agency's interpretation of Section 129(a)(5) is grounded in sound policy. Redetermination of the MACT

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2 By EPA's count, nine MWCs closed during this period, and of the 26 MWC construction projects that were either "on hold" or "planned," just one successfully entered active status (and it remained in operation for only one year). *Id.*, p. 25.

3 The Agency has repeatedly advanced this position when performing reviews under CAA Section 129(a)(5):

> The statute provides the Agency with broad discretion to revise MACT standards as we determine necessary, and to account for a wide range of relevant factors, including risk. *EPA does not interpret such technology review requirements to require another analysis of MACT floors for existing and new units, but rather requires us to consider developments in pollution control in the industry and assess the costs of potentially stricter standards reflecting those developments.* Moreover, as a general matter, EPA has stated that *where we determine that existing standards are adequate to protect public health with an ample margin of safety and prevent adverse environmental effects, it is unlikely that EPA would revise MACT standards merely to reflect advances in air pollution control technology*. … We interpret CAA section 129(a)(5)'s technology review requirement as providing us the same degree of discretion in terms of whether to revise MACT standards.

72 Fed. Reg. 5510-01, 5532-33 (Feb. 6, 2007) (internal citations omitted) (emphasis added).

floor for existing units every five years could inadvertently deter voluntary pollution control improvements out of fear that such voluntary measures would be a ratchet – the new mandatory standard for all existing facilities. In that respect, EPA's decision to undertake a Section 129(a)(5) review for LMWCs without the benefit of a residual risk assessment is out of step with the statute's expectations. *See* Clean Air Act §§112(f) and 129 (h); *see also* 72 Fed. Reg. at 5533 (the agency emphasizing the importance "for our [MACT] technology reviews and conclusions to be informed by our residual risk analysis").

If the present rulemaking has the unintended effect of bringing about the closure of WTE facilities, the foreseeable consequence would be diversion to landfills of MSW currently combusted as WTE fuel. Diverting MSW to landfills would lead to significant net increases in greenhouse gas (GHG) emissions from both the long-distance transport of MSW to landfills and, even more significantly, the release of fugitive methane from landfills themselves, which together would significantly undermine many of EPA's leading policy objectives with respect to climate change.[4] Diverting MSW to landfills would also generate emissions of other pollutants, the volume and scope of which are likely not accounted for in EPA's emission reduction estimates. Recognizing that increased landfill disposal of MSW is not, of course, an EPA goal in this rulemaking, it is nevertheless a potential consequence that heightens the importance of accurate *ex ante* cost estimates in the rulemaking. We thus provide the following data with the hope that it helps EPA to test, confirm or refine the accuracy of its estimates.[5]

1. Nitrogen Oxide

Modifications to NOx control technology are a leading driver of EPA's cost estimates (especially capital costs) for Options 1 and 2. Based on available data relating to the actual cost of recent retrofits to control NOx emissions, as well as recent cost estimates obtained for purposes of possible retrofits, we are concerned that EPA's Option 1 estimates might be too low.

Of the 22 facilities (comprising 61 LMWC units) included in EPA's cost estimates, one is already equipped with Selective Catalytic Reduction (SCR) technology, and a number have installed Selective Non-Catalytic Reduction (SNCR) technology, but none have installed ASNCR (Advanced Selective Non-Catalytic Reduction).

Based on EPA guidance regarding Slides 20 and 22 of the March 16 and April 17 presentations, we understand that EPA's cost projections for NOx are based on (i) the addition of ASNCR or other low-NOx technology (unspecified, but likely Covanta's proprietary low-NOx technology) at Covanta-designed facilities that have neither SCR or SNCR, and (ii) ASNCR retrofits for facilities that currently employ SNCR technology. EPA has clarified that its estimates are aggregate figures that combine the expected costs across all of the 22 facilities

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4 These impacts are further discussed below, pp. 8-11.

5 We note that some of the cost data provided is confidential at this time pending contract approval with vendors or similar circumstances. If redacted copies of that data would be helpful, please email scott.duboff@foster.com or malcolm.seymour@foster.com.

listed on the Slide 16 inventory, but EPA has indicated that at this time it will not be providing further detail concerning the precise modifications contemplated for any of these facilities.

While the lack of information regarding EPA's estimates requires us to make educated guesses at the comparators most germane to EPA's analysis, the data we have gathered (from publicly available sources and affected local governments directly) suggests that the agency's estimates would likely be low, even under the most favorable conditions.[6] For instance, one local government reports that it has budgeted $6 million to retrofit three SNCR-equipped units with Covanta's proprietary low-NOx technology over the next 2-3 years, and is forecasting $10 million of additional capital and operating costs over years 4-7, bringing the total cost of this installation to $16 million over 7 years for just this one facility alone. It seems unlikely that the 22 facilities that comprise the Slide 16 inventory (or even 88% of these facilities) could collectively implement similar retrofits for the $31 million capital outlay projected by EPA. It is equally unlikely that these 22 facilities would experience a combined increase of only $6.6 million in their annual operating costs (as estimated in Option 1).

Aside from retrofit costs for the proprietary technology described above, studies for other ANSCR retrofit technology indicate that their costs would be even greater. A recent feasibility assessment of NOx control costs for Baltimore's WTE facility, which also has three units currently equipped with SNCR, projected capital costs of $8.6 million to retrofit the facility's SNCR units with ASNCR, and increased operating costs of nearly $1 million per year thereafter. *See Municipal Waste Combustor Workgroup Report*, p. 22, Ozone Transport Commission Stationary and Area Sources Committee, April 2022, https://otcair.org/upload/Documents/Reports/MWC%20Report_revised%2020220425.pdf. While the report identifies lower cost solutions like "optimized SNCR" and flue gas recirculation (FGR)-SNCR (we assume EPA may consider such alternatives under the umbrella of "other low-NOx technology"), even these solutions would cost substantially more than EPA's estimates imply: installation of FGR-SNCR would entail capital costs of over $5.8 million for a single

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[6] For instance, EPA's cost estimates would appear to be low if many of the subject LMWC units are among the best performing 12 percent of units in their category. EPA's current facility list includes 152 LMWC units, so the best performing 18 units in each pollutant grouping should represent the MACT floor for that grouping. But even if *all* 18 of the best performing units for NOx were located at the 22 facilities on Slide 16, there would still be 43 units in need of modification. Our data indicates that EPA's estimates would still be low even if only 43 units required modification.

Relatedly, we are concerned that EPA's cost estimates (and expected reductions in emissions) might consider performance of these technologies in isolation, especially in light of EPA's statement that it has identified the MACT floors for different pollutant groupings by looking at the best performing units for each such grouping independent of other groupings. If this is the case, EPA's estimates could prove inaccurate if certain best-case assumptions do not hold true. For instance, if all LMWC units are not equally compatible with a certain control technology (*e.g.*, ASNCR), incompatible facilities might need to spend more to achieve the same results as the compatible facilities in the top-performing 12 percent, and cost estimates based on those top-performing facilities could be misleading. Similarly, unless EPA has based its MACT floors on one or more facilities currently capable of simultaneously meeting certain prospective revisions to LWMC emission standards for all pollutant groupings, the agency may be incorrectly assuming that (i) the underlying control technologies are compatible with one another and (ii) the use of these controls in combination will yield the anticipated emission reductions.

facility, with increased annual operating costs of $815,000; and while optimized SNCR would cost less to install ($85,200), it would still increase annual operating costs by $695,000. *Id.* Insofar as the "other low NOx technology" discussed on Slide 20 of EPA's recent presentations refers to installation of SNCR, actual cost data shows capital costs of roughly $3 million to install this technology at a facility operating three LMWC units, and increased annual operating costs of $895,000. Accordingly, even if EPA's cost estimates for Option 1 were based on the least expensive of all available options, its estimate for annual operating costs strikes us as being too low, by a margin of 50 to 75 percent. In sum, we have doubts regarding the reliability of the cost assumptions EPA has made and concerns regarding the affected WTE facilities' ability to absorb the very considerable costs anticipated by Options 2 and 3, and potentially by Option 1, if EPA's estimates do not account for the foregoing studies. We believe these scenarios would be cost-prohibitive (unless the federal government were to provide the requisite funds).[7]

2. Other Costs – Other Pollutants

We would also note that the cost increases associated with revised MACT standards will not be limited to capital costs for new technology, but could include capital expenditures associated with existing technology. For example, to the extent EPA's cost estimates under any of the options are based on increased consumption of urea in existing SNCR systems, those estimates should include the costs for additional chemical storage capacity, which is a growing concern for municipal WTE facilities in light of recent supply-chain constraints that have reduced the frequency of urea deliveries (in some cases by as much as half), doubling the need for on-site storage.

Moreover, the cost increases confronting public sector WTE facilities are not limited to capital expenditures, and also include non-trivial operating cost increases for control of particulates, mercury, dioxins/furans and acid gases. The agency's cost breakdown suggests that EPA's estimates are based on "different use of existing technologies" rather than "installation of new technologies," which we assume means increased injection of carbon, lime and/or urea. If that is the case, input from local government WTE owners suggests that further scrutiny of the agency's estimates may be warranted, especially if they are based on pre-2023 cost data. More specifically, the price of carbon (material and transportation costs) has increased 37% since 2021; the combined material and transportation cost of lime has increased by 21% since 2021; and the combined material and transportation cost of urea has increased 16%. Chemical manufacturers significantly increased their per-unit prices in 2022, and also began a practice of passing on increased "transportation charges" related to supply chain issues, fuel costs and truck driver shortages. While per-unit material costs have declined slightly in 2023, aggregate per-unit

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7 Given EPA's statement that the proposed rulemaking is not intended to force closures of affected WTE facilities, we surmise that EPA's estimates for "Associated Emission Reductions" under each of the three options on Slide 22 assumes that no such closures would occur, *i.e.*, each affected facility would be able to raise sufficient capital and generate sufficient operating revenues to sustainably implement any new requirements. As such, we surmise that EPA's estimates for Associated Emission Reductions do not account for the emissions, including NOx emissions from long-haul trucking, that would result if MSW presently combusted as WTE fuel was instead diverted to landfill disposal.

costs have still increased dramatically over the last two years. Inflation and rapid change in chemical distribution markets underscore the importance of current data on costs for these commodities.[8]

B. WTE Does Not Compromise Environmental Justice Objectives and Helps Mitigate a Most Pressing Environmental Justice Concern – Climate Change

1. Environmental Justice and WTE Emissions

Slide 15 of the March 16 and April 17 presentations, as echoed in John Lucey's introductory remarks, states that "Most facilities are located in urban areas with significant population exposure and environmental justice concerns." While we understand that certain groups have raised environmental justice concerns in communications to EPA in this docket (*see, e.g.*, EPA-HQ-OAR-2022-0920-0002, which appends an October 4, 2022 letter to the Council on Environmental Quality from the Environmental Justice Network (EJN)), even these groups acknowledge that "67% of the nation's 68 remaining [WTE facilities] are located in majority white communities." (*Id.*, p. 4, fn. 16). While these same groups accuse WTE facilities of "environmental racism" because "[f]ifteen of the 20 largest [WTE facilities] (75%) are located in [BIPOC] communities," this statistic is both contrived and misleading.

The October 2022 letter, *supra*, misleads by distorting statistics. For example, recognizing that 67% of WTE facilities are located in "majority white communities," the letter proceeds to acknowledge that WTE "does not have a disproportionate impact by economic class." *Id.*, p. 4, n. 16 (the WTE facilities to which the letter refers are located in rural areas with low population density as well as low industrial activity). Despite acknowledging "no disproportionate impact by economic class," EJN nevertheless claims that WTE is anti-environmental justice, implicitly contradicting the Biden Administration's recognition of the strong correlation between economic class and environmental justice. *See* Executive Order 14096, April 21, 2023, 88 Fed. Reg. 25251 (noting that "such [environmental justice] communities are found in geographic locations that have a significant proportion of people who have low incomes or are otherwise adversely affected by persistent poverty or inequality").

EJN digresses momentarily from its "environmental racism" argument to claim that several rural-location WTE facilities "are among the top three industrial polluters in their counties," an unsurprising result given the low level of industrial activity in these rural counties. Then, shifting gears back to "environmental racism," EJN turns to major urban areas which often have larger WTE facilities with larger emissions, and which, like major urban areas in the U.S.

[8] We should note a related point concerning the mercury and dioxins/furans emission reductions to which EPA refers on Slide 22 of its recent presentation. Local government WTE facilities have experimented extensively with increased carbon injection, and they have not experienced linear reductions in emissions at increased rates of carbon injection. Tests at various injection rates indicate that the optimal injection rate is neither the highest injection rate nor the lowest, and increased carbon injection may be ineffective to reduce emissions below a certain level. To the extent EPA's estimates of associated emissions reductions do not account for the likelihood of such diminishing returns, we encourage a dialog to assist the agency with additional data to identify the "sweet spot" for carbon injection.

generally, have larger non-white populations. If there is a valid correlation to be made on this subject, it is simply this: (i) WTE facilities are located where significant quantities of post-recycled waste require further management; (ii) WTE is the clearly preferred alternative given the increasing unacceptability of landfilling; and (iii) the greater the volume of such waste, the larger the WTE facility. Conspicuously absent from the October letter is any claim that these larger urban WTE facilities "are among the top three industrial air polluters in their counties." *Id.* at 2.[9]

2. Climate Change

While the matters addressed in the immediately preceding paragraphs focused on conventional pollutants, an *equally or more important* environmental justice concern is the adverse impact of GHG emissions on climate change and communities of color, not only in the United States, but also, as EPA has itself emphasized, across the globe. *See* https://www.epa.gov/newsreleases/epa-report-shows-disproportionate-impacts-climate-change-socially-vulnerable. In that regard, EPA describes its recent report, *Climate Change and Social Vulnerability in the United States: A Focus on Six Impact Sectors*, as "one of the most advanced environmental justice studies to date that looks at how projected climate change impacts may be distributed across the American public." EPA explains that its "analysis indicates that racial and ethnic minority communities are particularly vulnerable to the greatest impacts of climate change," adding that "[i]n the cities analyzed, minorities and those with low income are more likely than non-minorities and those with higher income to currently live in areas with the highest projected increases in temperature mortality from climate-driven changes in extreme temperatures," with "Black and African American individuals . . . 40-59% more likely than non-Black and non-African American individuals to currently live in high-impact areas." *Id.*, p. 35. As Administrator Regan emphasized, this EPA report "punctuates the urgency of equitable action on climate change." https://www.epa.gov/newsreleases/epa-report-shows-disproportionate-impacts-climate-change-socially-vulnerable

Given this context, it is particularly important to recognize WTE's role in mitigating climate change and reducing greenhouse gases, in particular methane, by avoiding landfill disposal of MSW. This important benefit of WTE is widely acknowledged, including by EPA. Thus, as EPA has noted, "because of its potency as a GHG and its atmospheric life, reducing methane emissions is one of the best ways to achieve a near-term beneficial impact in mitigating global climate change." *Emission Guidelines, and Compliance Times, and Standards of Performance for Municipal Solid Waste Landfills; Advance Notice of Proposed Rulemaking (ANPRM)*, 79 Fed. Reg. 41772, 41774/1 (July 17, 2014).

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9 Alongside this discussion of environmental justice, the October letter makes the equally erroneous claim (p. 2) that WTE facilities "are more polluting than burning coal." To the contrary, analysis of current eGRID data for all 68 of the nation's current WTE facilities paints a very different picture: when measured by emissions per unit of energy generated, modern WTE outperforms coal for all but one major airborne pollutant. *See* n. 15, *infra*.

The conclusions in EPA's solid waste planning methodology are directly on point. More specifically, EPA concludes that WTE reduces GHG emissions in three ways by (i) generating electricity and/or steam without having to use fossil fuels, (ii) avoiding the potential methane emissions that would result if the same waste was landfilled, and (iii) recovering ferrous and nonferrous metals, which avoids the additional energy consumption that would be required to produce the same metals from virgin ores. *Is it Better to Burn or Bury for Clean Electricity Generation?*, pp. 1711-14 (hereafter "*Better to Burn or Bury*") , http://pubs.acs.org-/doi/pdf/10.1021/es802395e; *see also Life After Fresh Kills*, Part B, Summary and pp. B-23 to B-32 (copy on file with the authors). In fact, use of EPA's model for determining the lifecycle GHG emissions from alternative MSW management methods, *i.e.*, WTE vs. landfilling, shows that for every ton of MSW that is directed to WTE rather than landfilled, between 1.62 and 4.1 tons of GHG emissions are avoided.

Similarly, a recent article by faculty of the Department of Environmental Engineering Science at the University Florida, *Life cycle GHG emissions of MSW landfilling versus Incineration: Expected outcomes based on US landfill gas collection regulations*, Feb. 2022, explains (at p. 53) the importance of landfill gas collection efficiency in describing WTE's superiority over landfilling. After noting that landfill gas collection efficiencies are well below the levels that would be required for landfilling to be preferable to WTE, the article concludes that "only extremely optimistic assumptions on LFG [landfill gas] collection efficiency would result in MSWI [WTE] not being the emissions favorable approach." [10] Also consistent with EPA's analysis is a report by the Intergovernmental Panel on Climate Change, a leading forum of independent scientific experts on climate change; the report emphasizes WTE's dual benefits of (i) offsetting fossil fuel combustion and (ii) avoided landfill methane emissions. *Mitigation of Climate Change*, p. 601, https://archive.ipcc.ch/pdf/assessment-report/ar4/wg3/ar4-wg3-chapter10.pdf. Similarly, the Kyoto Protocol's Clean Development Mechanism approves WTE as a source of tradeable GHG emission reduction credits that displaces electricity from fossil fuels and avoids landfill methane emissions. *Approved Baseline and Monitoring Methodology AM0025*, pp. 1-3, https://cdm.unfccc.int/UserManagement/FileStorage/-9WVIN7Z06A8UGLFPO4Y51BDMJ23QXT. Joining this consensus, the United Nations' November 2011 report, *Bridging the Emissions Gap*, concludes that waste sector GHG emissions can be reduced by 80% if there is significant diversion of currently landfilled waste to WTE, *see* http://www.unep.org/pdf/bridginggap.pdf, pp. 37-38, and the World Economic Forum recommends expanded use of WTE by phasing out use of landfills, emphasizing that burying waste in landfills is "increasingly considered environmentally unacceptable." *Policy Mechanisms to Bridge the Financing Gap*, January 2010 (copy on file with the author).

[10] *Available at* https://www.sciencedirect.com/science/article/pii/S0956053X22000496. We should also note the UN's recent concern that landfill methane monitoring results "have shown that many bottom-up estimates are incorrect. Measurements in California, for example, revealed that multiple landfills that had reported emission rates in the range of 400–800 kilograms (kg) methane per hour in fact had emission rates of ~1 200–2 200 kg methane per hour (Duren *et al*. 2019)." *See Global Methane Assessment*, p. 34.

The United Nations recently doubled down on this conclusion in its 2021 report, *supra Global Methane Assessment: Benefits and Costs of Mitigating Methane Emissions*. That report observes that waste is one of the three largest anthropogenic sources of methane (responsible for 20% of global anthropogenic methane emissions), caused primarily by landfilling and sewage. *Id.,* p. 9. The report concludes that abatement of methane emissions caused by landfilling is one of the three most important steps for reducing methane emissions to levels consistent with international targets for limiting global temperature increases. *Id.*, p. 8. It further concludes that reduction of waste-generated methane could reduce annual ozone-related deaths by 45,000, and annual asthma-related emergency room visits by 135,000. *Id.* Of equal importance to these climate targets is the reduction of methane emissions due to fossil fuel combustion, which WTE avoids in multiple ways, *see, e.g.*, p. 9, *supra*, which includes avoidance of GHG emissions attributable to long-distance transport of MSW to landfills.

The benefits of WTE with regard to climate change also extend to the fact that GHG emissions from WTE facilities are primarily (63%) of biogenic origin, *Better to Burn or Bury, supra*, p. 1716, which means those emissions are already part of the natural carbon cycle. The biogenic carbon that comprises paper, food and other biomass in municipal waste is rapidly removed from the atmosphere as part of the plant growth-natural carbon cycle, curbing its warming effects.[11] In addition, and with automobile emissions as our vantage point, if the U.S. could increase its usage of WTE from the current 7.6% to the average WTE usage rate of the European Union, which is approximately 27%,[12] the additional reduction in annual carbon

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[11] Although the remaining content of MSW (approximately one-third) is petrochemical-based, relegating that material to landfilling means the loss of a vast amount of valuable energy – WTE recovers the energy equivalent of one barrel of oil from each ton of MSW.

EJN's October 2022 letter (p. 5, n. 18) faults EPA's WARM model for discounting biogenic CO_2 emissions from the CO_2-equivalent emissions of WTE, landfills and other waste disposal methods, claiming that "climate scientists" consider this "double counting because climate models already account for plant regrowth." EJN does not cite a statement by any climate scientist to support this claim, nor could it. Biogenic CO_2 emissions are appropriately deducted from total CO_2-equivalent emissions because they have a negligible warming effect as long as there is sufficient vegetation to reabsorb them. Moreover, contrary to EJN's claim that WARM somehow discriminates between landfills and WTE in its treatment of biogenic CO_2, WARM's rationale for elevating WTE above landfilling in its waste management hierarchy is sound and has nothing to do with the biogenic CO_2 emissions of either. As previously noted, WARM recognizes that WTE has three significant carbon-footprint advantages over landfilling: (i) WTE greatly curtails emissions of methane, a highly potent GHG that is not amenable to reabsorption in the natural carbon cycle; (ii) unlike landfilling, WTE creates significant energy, a substantial portion of which would otherwise need to be procured from fossil fuels; and (iii) WTE enables reclamation of metals and minerals, avoiding the energy consumption from mining these materials anew. WARM explicitly discounts biogenic CO_2 (but not biogenic methane) emitted from landfills, just as it does for WTE. *See* https://www.epa.gov/sites/default/files/2019-10/documents/warm_v15_management_practices_updated_10-08-2019.pdf , § 6-1.

[12] http://www.cewep.eu/wp-content/uploads/2017/08/Graph-3-treatments.pdf. A portion of the 27% figure (between 0 and 5 percentage points) represents older MSW combustion facilities for which the original design did not include energy recovery. In recent years, a number of older EU facilities have been retrofitted for energy recovery (and even non-retrofitted facilities provide two of the three GHG reduction benefits that WTE facilities provide – avoided emissions of landfill methane and recovery of ferrous and nonferrous metals from post-combustion waste, i.e., avoiding the additional energy consumption that would be required to produce the same metals from virgin ores).

dioxide (CO2)-equivalent emissions in the U.S. would be between 122 million and 309 million tons. That equates to removing 23,600,000 to 59,700,000 passenger cars from the nation's roads (the range reflects the difference between a calculation based on a Global Warming Potential (GWP) for methane of 34 [100- year timescale] vs. a methane GWP of 86 [20-year timescale]).[13]

II. Modern WTE Facilities Are True "Green" Technology

In addition to its benefits in reducing GHGs, WTE's status as a clean and efficient energy source is also evident on a number of other bases.

A. WTE Emission Reductions and Public Health

WTE emissions have decreased dramatically since the late 1980's, reflecting state and federal requirements for advanced emissions control technology. As EPA has emphasized, the level of emissions control achieved by modern WTE facilities "has been outstanding," with emission reductions for various pollutants in the 96-99% range subsequent to implementation of MACT standards in the early 1990's, together with subsequent increases in the stringency of those MACT standards. *See* https://www.regulations.gov/document/EPA-HQ-OAR-2005-0117-0164 (the quoted EPA statement was previously available at this URL). Moreover, WTE emissions are lower than landfill emissions for 9 of 10 major pollutant groupings. *Life After Fresh Kills, supra*, p. B-30 (nitrogen oxides -- "NOx" – are the only exception, *see* n. 15, *infra*).

Consistent compliance with federal and state emission limits requires all WTE facilities to be well maintained and well operated to meet applicable standards, and EPA's emission limits for WTE are more stringent than the emission limits in many other countries. Furthermore, even where EPA emission limits are not as stringent as other countries (e.g., the EU), actual emissions by WTE facilities in the U.S. are well within the EU limits.[14] Moreover, a 2013 report by the

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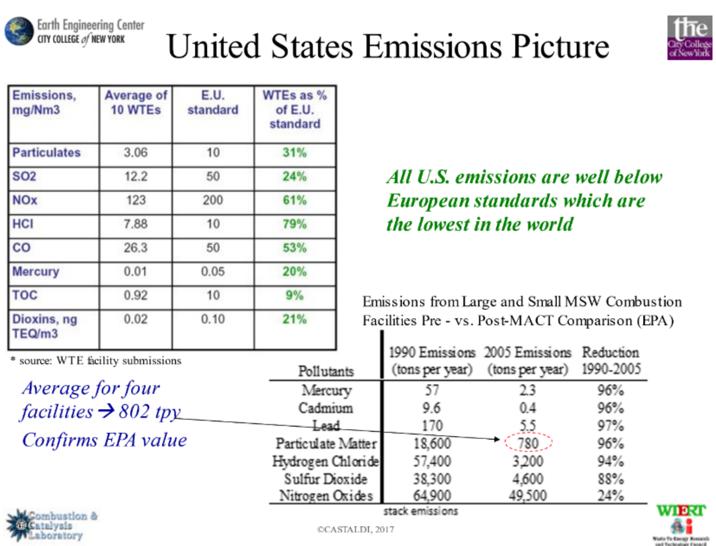
[13] The calculation is based on the United States' 2011 MSW landfill disposal volume of 247 million tons shown at https://gwcouncil.org/wp-content/uploads/2020/10/DollyShinThesis.pdf, p. 19, *supra*, and EPA's then-contemporaneous estimate for annual CO_2-equivalent emissions per passenger car (5.18 tons).

[14] This point is demonstrated by the following chart:


United States Emissions Picture

Emissions, mg/Nm3	Average of 10 WTEs	E.U. standard	WTEs as % of E.U. standard
Particulates	3.06	10	31%
SO2	12.2	50	24%
NOx	123	200	61%
HCl	7.88	10	79%
CO	26.3	50	53%
Mercury	0.01	0.05	20%
TOC	0.92	10	9%
Dioxins, ng TEQ/m3	0.02	0.10	21%

* source: WTE facility submissions

Emissions from Large and Small MSW Combustion Facilities Pre - vs. Post-MACT Comparison (EPA)

Pollutants	1990 Emissions (tons per year)	2005 Emissions (tons per year)	Reduction 1990-2005
Mercury	57	2.3	96%
Cadmium	9.6	0.4	96%
Lead	170	5.5	97%
Particulate Matter	18,600	780	96%
Hydrogen Chloride	57,400	3,200	94%
Sulfur Dioxide	38,300	4,600	88%
Nitrogen Oxides	64,900	49,500	24%

stack emissions

National Renewable Energy Laboratory has high praise for the emission standards that govern WTE facilities in the U.S. *See Waste Not, Want Not: Analyzing the Economic and Environmental Viability of Waste-to-Energy (WTE) Technology for Site-Specific Optimization of Renewable Energy Options*, NREL/TP-6A50-52829, p. 2, February 2013, http://www.nrel.gov/docs/fy13osti/52829.pdf.

The suggestion that WTE facilities are "more polluting than burning coal" is also incorrect. To the contrary, on a lifecycle basis, and for all but one emission category, WTE is clearly cleaner than coal. For example, NOx, sulfur dioxide (SOx) and CO2 emissions for WTE and coal plants are shown in EPA's Emissions and Generation Resource Integrated Database (eGRID). The results show that, on average, WTE emissions of SOx and CO2 are *lower* than coal plants by 90% and 50%, respectively, while NOx is about 25% higher (0.29 lb $mmBTU^{-1}$ compared to 0.22 lb $mmBTU^{-1}$ for coal). While this data for individual emission types favors WTE, it bears emphasis that a scientist assessing comparative emissions of different energy sources would not look at one emission type in isolation from others. That is why scientists instead rely on lifecycle assessments, which show that WTE is not only cleaner than landfilling, but also cleaner than coal.[15]

One closely related and fundamental fact bears particular emphasis here. Specifically, a local government that decides to utilize WTE does not do so for the purpose of producing energy in and of itself (put another way, MSW would not be a first choice of fuel if the only objective was energy production). Instead, the affected local government's *primary* obligation is to manage its community's post-recycled MSW in the most environmentally responsible manner. That said, energy production is, to be sure, a *secondary* objective, and the ability to produce energy from waste as an adjunct to managing disposal of post-recycled MSW serves to underscore the benefits of WTE and its advantages over landfilling.

Regarding public health, EJN claims that studies "have found connections" between WTE and public health (EJN, p. 2, n. 6). But scientific studies tell us otherwise. The attached report, *SCIENTIFIC TRUTH ABOUT WASTE-TO-ENERGY*, pp. 16-18, provides a thorough discussion of such studies. As the report explains (internal citations omitted):

> The longstanding and well-documented scientific consensus is that human health is not adversely impacted by WTE. A National Research Council report in 2000 stated that pollutants such as particulate matter, lead, mercury, and dioxins and

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15 Here is the eGRID data:

	Average NO_x [lb/MMBTU]			Average SO_2 [lb/MMBTU]			Average CO_2 [lb/MMBTU]		
	MSW Plant	Coal Plant	MSW/Coal ratio	MSW Plant	Coal Plant	MSW/coal ratio	MSW Plant	Coal Plant	MSW/Coal ratio
EPA 2009 data	0.43	0.33	**1.3**	0.66	1.06	**0.6**	188	203	**1.1**
Std. Dev. (±)	0.27	0.23		0.88	1.08		45	20	
EPA 2019 data	0.29	0.22	**1.3**	0.05	0.41	**0.1**	99	200	**0.5**
Std. Dev. (±)	0.11	0.53		0.06	0.88		2	27	
10-year change of average emissions (%)	-33.1	-33.5		-91.7	-61.1		-47	-1	

> furans from well-run WTE facilities are expected to contribute little to environmental concentrations or to health risks.

Id. at 16. Among the studies cited for that conclusion was one concerning WTE facilities in Spokane, Washington and Lee County, Florida, which found that:

> [T]he probability of an individual contracting cancer from exposure to emissions through all exposure pathways ranged from 0.02 to 4 in 1 million. To provide context for that result, the typical background rate of cancer in the United States is 1 in 3. Importantly the findings were based on actual facility emissions and included exposure via multiple pathways.

Id. at 18. International studies are very much the same (*id.*):

> For example, a review of 21 peer-reviewed articles prepared for Metro Vancouver concluded that a modern WTE facility would not pose unacceptable health risks to residents. . . . Finally, the Ministry of Public Health in England determined that it is not able to connect any negative health impacts associated with well-regulated WTE facilities.

Dioxin emissions are a clear example of the dramatic reductions in WTE emissions: since the late 1980's total annual WTE dioxin emissions in the U.S. have decreased by a factor of 1,000 to less than 12 grams. In short, WTE dioxin emissions are miniscule and WTE is not a significant contributor of dioxin. *SCIENTIFIC TRUTH ABOUT WASTE-TO-ENERGY*, p. 22.

B. WTE – Efficient, Reliable and Renewable

WTE's efficiency and reliability are clear as well. WTE recovers approximately 600 kWh of electricity per ton of waste, which is approximately 10 times the electric energy recoverable from a ton of landfilled waste. *Better to Burn or Bury, supra*, p. 1714; *see also Life After Fresh Kills, supra*, p. B-29. In addition, WTE is the paradigm example of "distributed generation" that serves nearby load without the need for new long-distance transmission lines. WTE is also highly reliable base-load generation, available 24/7 and unaffected by days that are too cloudy, calm or cold (the latter being a frequent cause of disruptions at natural gas power plants), with availability factors typically above 90%.[16] In fact, if the MSW that is currently landfilled in the U.S. were instead diverted to WTE, the electricity generated could supply 13.8 million households, roughly 12% of the U.S. total. *See Energy and Economic Value of Municipal Solid Waste*, Executive Summary p. 3, July 2014. https://www.americanchemistry.com/better-policy-regulation/plastics/resources/2014-energy-and-economic-value-of-municipal-solid-waste-msw-including-non-recycled-plastics-nrp-currently-landfilled-in-the-fifty-states.

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16 Dr. Castaldi's research also shows that WTE availability (85-92%) is not only better than baseload coal (80-90%), but also other renewable categories including other biomass, thermal solar, wind and photovoltaic solar.

In addition, EPA's analysis shows that WTE yields the best results (compared to landfills) in terms of maximum energy recovery and lowest GHG and criteria pollutant emissions (with the previously noted exception of NOx), *Better to Burn or Bury, supra*, pp. 1711-14, 1716-17. It should also be noted that like the CEQ, *supra*, EPA's hierarchy for "integrated waste management" recommends waste combustion with energy recovery over landfilling (as does the European Union).[17]

We should also note the widespread and well-justified recognition of WTE-produced energy as renewable energy, including recognition by federal and state government. EJN's contrary claims (p. 4 and n. 18) -- that WTE "displaces" other renewables, and in measuring GHG reduction benefits WTE proponents "double count" the biogenic portion of MSW as carbon neutral and give WTE and landfills dissimilar treatment that favors WTE -- are wrong. EJN cites no scientific or other factual authority for its claims, and the only support EJN offers is an August 2021 letter which, in notably familiar fashion, also cites no scientific or factual support. Simply put, and contrary to EJN, there is no evidence that WTE displaces the use of any other renewable energy source on the national energy grid,[18] and EJN's assumptions ignore the sophisticated, data-driven methods used by EPA's Waste Reduction Model (WARM) to determine the power sector source mix that WTE is most likely to offset. *See Documentation for Greenhouse Gas Emission and Energy Factors Used in the Waste Reduction Model (WARM) – Management Practices Chapters*, U.S. EPA, Office of Resource Conservation and Recovery, November 2020, *available at* https://www.epa.gov/warm/documentation-chapters-greenhouse-gas-emission-energy-and-economic-factors-used-waste. Equally invalid are EJN's claims of "double counting" biogenic MSW as carbon-neutral and disparate treatment of landfill biomass; EJN disregards why and how biogenic emissions are discounted from total CO2-equivalent emissions (not only for WTE facilities, but also for landfills) under EPA's WARM model.[19]

Finally, it should also be noted that WTE facilities, compared to landfills, have very modest (essentially miniscule) footprints. Moreover, unlike the vast areas required for landfills, which (for all practical purposes) cannot be reused, WTE facilities "do not have a continuing cost in land." *See Waste-to-Energy: A review of status and benefits in USA*, C.S. Psomopoulos,

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17 *Municipal Solid Waste in the United States: 2007 Facts and Figures*, p. 11, http://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P1001UYV.PDF.

18 Even EJN's framing of this argument – which assumes that WTE energy produced in one state "competes" only with other energy sources in the same state – fundamentally misunderstands how energy distribution works across regional grids linked by interconnection agreements. While EJN has not identified a single state that produces a surplus of renewable energy (or even a state in which the incumbent utilities have excess renewable energy), the larger fallacy is the assumption that renewable energy from a state that produces "too much" would not be sold to a state that produces too little. Simply put, as long as fossil fuel energy sources are supplying power to regional grids, WTE will convey an important benefit by reducing reliance on those fossil sources.

19 A significant reason for WTE's recognition as renewable energy technology is that it is the only large-scale energy generation method to use human byproducts as its fuel source. This highlights one of WTE's important environmental advantages: it generates power close to its fuel source, eliminating the need for long-distance fuel transport, which decreases energy consumption, GHG emissions, and emissions of other criteria pollutants. *See* pp. 13-14, supra. These factors must be considered in any adequate life-cycle analysis of WTE technology.

et al., p. 1721 (copy on file with authors). WTE also results in a 90% reduction in waste volume, conserving landfill space. This is the context in which The Nature Conservancy has commended WTE's sound environmental protection benefits. *See Climate Change and Renewable Energy*, The Nature Conservancy, presentation to Covanta Energy, Feb. 11, 2009, p. 24 (copy on file with the authors).

C. WTE Encourages Recycling

WTE is also entirely compatible with recycling. In fact, WTE communities routinely outperform non-WTE communities in recycling, with rates typically well in excess of the national average, and in a number of instances are nation-leading. This point is confirmed by a May 2014 national survey. *See* https://www.wtienergy.com/sites/default/files/ERC-2014-Berenyi-recycling-study-1.pdf. Although recycling rates are driven by state policies that apply equally to WTE and non-WTE communities, WTE communities' recycling rates are typically higher than the overall recycling rates for their respective states. *Id.*, pp. 5, 9-11. For these reasons, the Center for American Progress describes the use of WTE, in conjunction with recycling and composting, as "a win-win-win" for the United States. https://www.americanprogress.org/wp-content/uploads/sites/2/2013/04/EnergyFromWaste-PDF1.pdf.

D. EPA's Monitoring Requirements for WTE Are Sound

Contrary to EJN, annual testing for dioxins is typical for all stationary combustion systems, and the conditions for conducting tests must be representative of typical operating conditions, not optimal performance. Information cited by EJN (n. 11) regarding dioxin emissions at a WTE facility in Belgium is 25-30 years out-of-date. Moreover, as discussed above, numerous (and more recent) independent studies demonstrate that human health is not adversely affected by WTE facilities. Another European study cited by EJN (n. 12) calculated dioxin emissions based on short-lived start-up and shut-down events, which are typically less than 5% of operating time, and are not representative of normal facility operations. Moreover, the data cited in that study shows that the facility operated well below the EU dioxin limit of 0.1 ng TEQ Nm-3 during continuous testing. Finally, referring to WTE, EJN claims (p. 3) that "there is no excuse for not requiring continuous dioxin sampling" because EPA has used similar technology for *other* emissions since 2006. That contention ignores the actual state of the relevant monitoring technologies; while several laboratories have attempted to develop reliable continuous monitoring systems for dioxin, none has proven to yield reliable or consistent results when compared to EPA Method 23 measurements.[20]

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[20] *See* USEPA, "Dioxin Emissions Monitoring Systems," (*available at* https://archive.epa.gov/nrmrl/archive-etv/web/pdf/p10012za.pdf). EPA tested four continuous emissions monitoring (CEM) technologies for dioxins, comparing each measurement to simultaneously collected EPA Method 23 reference samples. The results showed that three of the technologies departed from the reference samples by 22.6%, 48.2% and 78.2%, respectively, and the fourth technology failed to quantitatively measure the presence of dioxins. Deviations of this magnitude imply a significant risk that such unproven technologies would under- or over-estimate actual dioxin emissions.

E. WTE Ash Residue Is Not Hazardous and Its Reuse Is Sound Federal Policy

Finally, EJN's criticisms (p. 6) of WTE ash and ash reuse are unfounded, including the insinuation that WTE operators "manipulate" ash prior to testing. Beneficial reuse of WTE ash is entirely safe for human health and the environment, which goes hand in glove with local governments' commitment to proper reuse processes and programs. In that regard, the U.S. Department of Energy, Advanced Research Projects Agency, https://arpa-e.energy.gov/, has a funding program underway for research to advance beneficial reuse of WTE ash.

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In conclusion, the Coalition, USCM, NLC and NACo appreciate your consideration of this letter and the information we have addressed. We urge EPA to take into account the facts provided above before issuing any new rules that could negatively impact WTE and the environmental benefits it provides. We also encourage the agency to adhere to its policy of basing its Section 129(a)(5) MACT review on the adequacy of existing controls for protection of public health, as well as an updated residual risk analysis, before requiring WTE facilities to make costly modifications that could impact their viability and cause significant diversion of waste to landfills. We offer our assistance to EPA as this rulemaking proceeds, and ask the agency to continue to engage with local governments in a meaningful manner -- sharing of emissions data and analyses are examples, as it reviews the MACT standards for existing LMWC units.

Please contact us with any questions, and we very much welcome the opportunity for further dialog regarding the matters addressed above.

Sincerely,

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Malcolm Seymour
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APPENDIX

The Local Government Coalition for Renewable Energy is a national consortium of local government agencies that proactively advance "integrated waste management" for their communities, which consists of programs and infrastructure for waste minimization and recycling together with the most environmentally sound technologies for waste processing and disposal, including state of the art waste-to-energy (WTE) facilities. The Coalition was formed by its members in April 2009 in response to the need for a strong, coordinated local government voice focused on the WTE aspects of renewable energy-climate change legislation, and extends to a number of other matters that impact the public sector's role in WTE operations, including agency rulemaking proceedings (federal and state) that affect WTE operations. The individual Coalition members are the: City of Ames, Iowa; City and County of Honolulu, Hawaii; ecomaine (Portland, Maine); Lancaster County Solid Waste Management Authority, Lancaster, Pennsylvania; Marion County, Oregon; Northeast Maryland Waste Disposal Authority, Baltimore, Maryland; City of Huntsville Solid Waste Disposal Authority, Huntsville, Alabama; Solid Waste Authority of Palm Beach County, Palm Beach, Florida; Spokane Regional Solid Waste System, Spokane, Washington; Wasatch Integrated Waste Management District, Layton, Utah; and the York County Solid Waste Authority, York, Pennsylvania.

The United States Conference of Mayors is the official non-partisan organization of cities with populations of 30,000 or more. There are over 1,400 such cities in the country today. Each city is represented in the Conference by its chief elected official, the mayor. As the leading voice for cities in nation, the Conference brings together mayors from across the country to engage with the White House, Administration and Congress to ensure that federal policy addresses the priorities of cities. The Conference offers a platform for mayors to share best practices on how they are tackling challenges in a variety of issue areas that concern local governments. The Conference's environmental affiliate, the ***Municipal Waste Management Association*** (MWMA) is a national membership association, representing solid waste directors, environmental commissioners, and other municipal solid waste decision makers from major cities, counties, and other local and regional public authorities and agencies across the country. The MWMA is dedicated to and driven by the needs of municipal solid waste directors, environmental commissioners, and public works professionals. Formed in 1982, its mission is to impact policy, share best practices, promote operational efficiencies, and provide information on innovations in the delivery of integrated waste management services.

The ***National League of Cities*** (NLC) is the voice of America's cities, towns and villages, representing more than 200 million people across the country. NLC works to strengthen local leadership, influence federal policy and drive innovative solutions.

The ***National Association of Counties*** (NACo) strengthens America's counties, serving nearly 40,000 county elected officials and 3.6 million county employees. NACo unites county officials to advocate for county priorities in federal policy making, nurture leadership skills, optimize county and taxpayer resources, and enrich the public's understanding of county government.