COVANTA
Powering Today. Protecting Tomorrow.

Michael E. Van Brunt, P.E.
Sr. Director, Sustainability

Covanta
445 South Street
Morristown, NJ 07960
Tel: 862.345.5279
mvanbrunt@covanta.com

Via e-mail to: GHGMRR@dep.nj.gov

March 6, 2020

Robert Kettig
Assistant Director, Climate Change, Clean Energy & Sustainability Element
NJ Department of Environmental Protection
Division of Air Quality
401 E. State St.
Trenton, NJ 08625-0420

Re: Greenhouse Gas Monitoring and Reporting Rule

Assistant Director Kettig:

Covanta is pleased to offer comments on the NJ Protecting Against Climate Threats (PACT) rule to reduce carbon emissions in New Jersey. Covanta is a U.S.-based company with headquarters in Morristown, NJ providing sustainable waste management and energy services internationally. Covanta is a national leader in developing, owning and operating waste-to-energy ("WTE") facilities that convert municipal solid waste ("MSW") into renewable energy. We operate three such facilities in New Jersey, in Union, Camden, and Essex counties. Statewide, the four WTE facilities generate over 150 MW of renewable electricity, recognized as Tier II in the state's RPS, close to load centers and act as critical community infrastructure processing almost 2 million tons of MSW annually, or roughly 20% of the State's total annual MSW generation.

As the DEP considers approaches to reducing GHG emissions in the state, the management of waste and materials should be a top priority. When it comes to addressing climate change, we normally think of carbon pollution from power plants, cars, and heating our homes and businesses. However, how we manage materials and waste has a big impact on the climate as well. The U.S. EPA has found that the full lifecycle of materials management, including the provision of goods and food, is responsible for 42% of U.S. GHG emissions.[1]

Given the role more sustainable waste and materials management can play in helping to reduce the state's contribution to GHG emissions, robust emissions data is critical. WTE facilities, internationally recognized as a means of GHG mitigation through the diversion of waste from landfills, either directly measure, or can accurately predict, GHG emissions. In contrast, landfill emissions data needs significant attention. Currently based solely on models, new measurements are finding actual emissions to be far greater than predicted and methane is emerging as critically important to efforts to slow climate change. Better quantification of landfill emission impacts is critical.

Landfills should be required to measure methane emissions

Landfills are a leading source of anthropogenic methane, globally and in the United States.[2,3] When biodegradable waste is placed in landfills, it breaks down anaerobically, generating methane. While many landfills have systems in place to capture and combust this methane, either in flares or engines for energy recovery, it's not a perfect system: landfills only capture a fraction of the gas. LFG escapes through cracks and imperfections in the surface cap, around wells and penetrations, through leachate collection systems, and through the cap itself. Over the life of waste in a landfill, the lifetime collection efficiency is estimated to be only **35 – 70%**, leaving a significant amount of methane uncollected.[4-8]

Furthermore, landfills don't measure their emissions, they model them: Even within the modeling approaches currently accepted by the U.S. EPA for GHG reporting, significant differences can exist,[9] and landfill operators are given the choice of modeling approach taken without any requirements for substantiating their decision.[10]

A 2013 peer-reviewed study found the typical landfill emissions model used underestimated emissions.[11] Direct measurement of landfill methane plumes has corroborated this conclusion. Across a series of recent studies employing direct measurement of methane plumes via aircraft downwind of landfills, actual measured emissions from landfills have *averaged* twice the amount reported in GHG inventories. [12-17] Actual emissions from specific landfills have been measured over 14X greater than reported.

Techniques are emerging for the direct measurement of landfill methane emissions. In addition to studies already completed using aircraft, drone technology is enabling more-cost effective and frequent direct measurement of emissions.

NJDEP should adopt the 20-year GWP required by SB 3215 for reporting.[18]

Overall, the climate impact of methane is much larger than previously reported and atmospheric concentrations continue to rise. According to the IPCC's 5th Assessment Report, methane is 34 times stronger than CO_2 over 100 years when all effects are included and 84 times more potent over 20 years.[19]

Methane is the second largest contributor to global climate change.[20] A short-lived climate pollutant (SLCP) increasingly under international scrutiny, methane has a larger climate impact and its atmospheric concentrations continue to rise. [21] Methane also may be lingering longer in the atmosphere today than before, as a result of a possible decline in the atmosphere's oxidative capacity, adding to its impact.[22] Fast action to reduce SLCPs, including methane, can significantly reduce the rate of sea level rise and "has the potential to slow down the global warming expected by 2050 by as much as 0.5 Celsius degrees." [23] In the near-term, reducing emissions of SLCPs like methane is more effective than reducing CO_2.[24] A failure to address SLCPs, like methane, significantly increases the risk of crossing the 2°C temperature increase threshold widely discussed as the harbinger of severe climate change impacts.[25]

In response to the growing concern about methane and other SLCPs, the 20-year GWP has been adopted by California in its *Short-Lived Climate Pollutant Reduction Strategy*[26] and by NY State in its recent Climate Bill.[27] Specifically, CARB concluded that "The use of GWPs with a time horizon of 20 years better captures the importance of the SLCPs and gives a better perspective on the speed at which SLCP emission controls will impact the atmosphere relative to CO_2 emission controls."[26]

Landfill emissions should be allocated to the year in which waste is placed

Waste placed in landfills today will emit landfill gas, including methane, for up to one hundred years or more. Under the current typical inventory approach, landfill operators report their emissions over time from waste placed in the landfill *today*, in effect amortizing the burden today's waste management decisions place on the environment. This also serves to obfuscate the effects of the most important means of reducing GHG emissions from landfills: diversion through waste avoidance, recycling or energy recovery.

To addresses this situation, we recommend that lifetime landfill emissions should be allocated to the year in which the waste is placed. Such an approach would better align landfill emissions with the most effective policy measures that can be taken to reduce such emissions (e.g. AD, waste diversion, recycling). This approach has been adopted by ICLEI – Local Governments for Sustainability to determine the emissions associated with the landfill disposal of a community's waste to better temporarily align quantified emissions impacts with policies designed to divert wastes from landfilling.[28]

Thank you again for the opportunity to comment on the (PACT) rule for GHG monitoring and reporting. We look forward to working with you to develop an integrated approach to reducing GHG emissions from waste and materials management, based on accurate and defensible data that provides the appropriate information to guide policy development and implementation.

Sincerely,

Michael E. Van Brunt, P.E.

References

[1] U.S. EPA (2009) *Opportunities to Reduce Greenhouse Gas Emissions through Materials and Land Management Practices* https://www.epa.gov/sites/production/files/documents/ghg-land-materials-management.pdf

[2] Environment Canada (2014) *National Inventory Report, 1990-2012: Greenhouse Gas Sources and Sinks in Canada.*

[3] U.S. EPA (2019) *U.S. Inventory of Greenhouse Gas Emissions and Sinks: 1990 – 2017*. https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2017

[4] See Appendix 5 of Environmental Commissioner of Ontario (2011) Annual Greenhouse Gas Progress Report 2011. http://www.auditor.on.ca/en/content/reporttopics/envreports/env11/2011-GHG.pdf

[5] Fischedick M. *et al.* (2014) *Industry. In: Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Edenhofer, O., *et al.* (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_chapter10.pdf

[6] Levis, J., M.A. Barlaz (2014) *Landfill Gas Monte Carlo Model Documentation and Results*, Available at: https://19january2017snapshot.epa.gov/www3/epawaste/conserve/tools/warm/pdfs/lanfl_gas_mont_carlo_modl.pdf

[7] CalRecycle (2012) CalRecycle Review of Waste-to-Energy and Avoided Landfill Methane Emissions. Available at: https://pw.lacounty.gov/epd/conversiontechnology/download/CalRecycle_Review_of_WtE_Avoided_Emissions_07032012.pdf

[8] See Exhibit 7-9 of U.S. EPA (2015) *Documentation for Greenhouse Gas Emission and Energy Factors Used in the Waste Reduction Model (WARM)*, https://archive.epa.gov/epawaste/conserve/tools/warm/pdfs/WARM_Documentation.pdf

[9] U.S. EPA Facility Level Information on Greenhouse Gases Tool, https://ghgdata.epa.gov/ghgp/service/facilityDetail/2010?id=1007054&ds=E&et=&popup=true, accessed January 7, 2020.

[10]

[11] Amini, H.R., D. Reinhart, A. Niskanen (2013) Comparison of first-order-decay modeled and actual field measured municipal solid waste landfill methane data, *Waste Management* **33:** 12 (December 2013), 2720 – 2728.

[12] Peischl et al. (2013) Quantifying sources of methane using light alkanes in the Los Angeles basin, California, *Journal of Geophysical Research: Atmospheres*, **118**: 4974-4990. https://doi.org/10.1002/jgrd.50413

[13] Wecht *et al.* (2014) Spatially resolving methane emissions in California: constraints from the CalNex aircraft campaign and from present (GOSAT, TES) and future (TROPOMI, geostationary) satellite observations, *Atmos. Chem. Phys.* **14**, 8173-8184. https://www.atmos-chem-phys.net/14/8173/2014/acp-14-8173-2014.pdf

[14] Cambaliza *et al.* (2015) Quantification and source apportionment of the methane emission flux from the city of Indianapolis, *Elementa: Science of the Anthropocene*, **3**:37. https://www.elementascience.org/articles/10.12952/journal.elementa.000037/

[15] Cambaliza *et al.* (2017) Field measurements and modeling to resolve m^2 to km^2 CH_4 emissions for a complex urban source: An Indiana landfill study, *Elem Sci Anth*, **5**: 36, https://doi.org/10.1525/elementa.145

[16] Ren *et al.* (2018) Methane Emissions From the Baltimore-Washington Area Based on Airborne Observations: Comparison to Emissions Inventories, *Journal of Geophysical Research: Atmospheres*, **123**, 8869–8882. https://agupubs.onlinelibrary.wiley.com/doi/pdf/10.1029/2018JD028851

[17] Jeong, S., et al. (2017), Estimating methane emissions from biological and fossil-fuel sources in the San Francisco Bay Area, *Geophys. Res. Lett.*, **44**, 486–495 https://agupubs.onlinelibrary.wiley.com/doi/full/10.1002/2016GL071794

[18] https://www.njleg.state.nj.us/2018/Bills/S3500/3215_R1.PDF

[19] The IPCC concluded that "it is likely that including the climate-carbon feedback for non-CO_2 gases as well as for CO_2 provides a better estimate of the metric value than including it only for CO_2." See p714 & Table 8-7 of Myhre, G. *et al.* (2013) *Anthropogenic and Natural Radiative Forcing. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., *et al.* (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_Chapter08_FINAL.pdf

[20] See Figure SPM.5 of IPCC (2013) *Summary for Policymakers*. In: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., *et al.* (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA https://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_SPM_FINAL.pdf

[21] Lindsey & Scott (2017) After 2000-era plateau, global methane levels hitting new highs, NOAA website, accessed December 11, 2019. https://www.climate.gov/news-features/understanding-climate/after-2000-era-plateau-global-methane-levels-hitting-new-highs

[22] Voosen, P. (2016) Scientists flag new causes for surge in methane levels, *Science*, **354**, 1513. http://science.sciencemag.org/content/354/6319/1513

[23] Hu *et al.* (2013) Mitigation of short-lived climate pollutants slows sea-level rise, *Nature Climate Change,* 3, 730-734. https://www.nature.com/articles/nclimate1869

[24] *Ibid.*

---

[25] Shindell, D. *et al.*, (2012) Simultaneously Mitigating Near-Term Climate Change and Improving Human Health and Food Security, *Science*, **335**, 183-189. http://science.sciencemag.org/content/335/6065/183/

[26] CARB (2016) *Proposed Short-Lived Climate Pollutant Reduction Strategy* https://www.arb.ca.gov/cc/shortlived/meetings/04112016/proposedstrategy.pdf

[27] Climate Leadership and Community Protection Act, S.6599 / A.8429, 2019-2020 Regular Sessions (New York, 2019).

[28] ICEI – Local Governments for Sustainability USA (2013) U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions Appendix E: Solid Waste Emission Activities and Sources, Version 1.1 http://icleiusa.org/publications/us-community-protocol/