May 5, 2022

Re: Michigan Renewable Natural Gas Study Stakeholder Meeting #2

Anaergia is a global leader in recovering organics from landfill-bound waste and converting them into renewable energy and soil amendments. Based in Carlsbad, CA, Anaergia is actively expanding capacity to divert organics from landfill into carbon-negative fuels by developing multiple facilities that are capable of processing over 300,000 tons per year of diverted organics. This infrastructure is expected to produce approximately 2,000,000 MMBtu/yr of biomethane. Our Rialto Bioenergy Facility (RBF) – the largest landfill diverted organics to renewable fuel facility in California – alone can process over 175,000 tons per year of diverted organics to produce up to 3,500 scfm of biogas and 1,000,000 MMBTU/yr of biomethane. After 4 years of planning and construction with over $180M invested, RBF is now operational and has created 30 new jobs along with 500,000hr of construction work. Anaergia, in partnership with the Victorville Wastewater Reclamation Authority, just opened a new facility leveraging existing wastewater treatment infrastructure to convert organic waste and sewage sludge into biomethane and is capable of producing 300,000 MMBTU/yr. Anaergia is currently partnering with Kent County, Michigan, to develop the Kent County Sustainable Business Park, which will divert organic waste from 400,00 tons per year of landfill-bound municipal solid waste to generate 600,000 MMBTU/yr of carbon-negative RNG.

We wish to write and express our support for the foundational work being done to evaluate RNG production potential in Michigan. This study will help to support the development and deployment of this critical climate change mitigation resource in Michigan.

i. Inputs & Assumptions – Food Waste Feedstock & Supply

Landfill-diverted food waste is a major source of organic feedstock for carbon-negative renewable natural gas (RNG) from anaerobic digestion (AD). Food waste represents a large portion of landfilled waste, often around 30% or more. Therefore, the organic fraction of municipal solid waste (OFMSW) from landfills represents a significant, reliable, and energy-dense feedstock source to generate RNG. Anaergia's RBF has capacity to generate up to 3,500 scfm biogas from approximately 180,00 tons per year of landfill-diverted food waste, demonstrating significantly higher biogas production per ton of food waste than what is assumed in Table 17 of the Inputs and Assumptions document, and supporting reduced LCOE.

Anaergia's Organics Extrusion (OREX) line can recover ~90% of putrescible organics from municipal solid waste, accessing feedstock in even the most challenging waste streams. Importantly, this waste separation technology can recover organics from residential, multi-family, and commercial municipal solid waste streams in addition to typical institutional and industrial sources. **This commercially proven technology and associated recovery rates should be accounted for when defining technical, achievable, and feasible supply scenarios of resource potential for OFMSW.** In particular, the proven ability to capture food waste from residential MSW should be accounted for by increasing achievable and feasible diversion rates.

Further, the OREX technology can process higher throughputs of waste, which enables increased organics recovery compared to traditional organics separation methods. The resource potential of food waste far exceeds capacity of existing alternative end uses of the feedstock, such as compost. Further, by providing

organics recovery for expanded MSW streams, MSW feedstock potential for gasification (as identified in the study outline) may also be increased.

RNG derived from OFMSW is carbon negative (as demonstrated in the CA GREET model). Significantly increasing generation of carbon-negative RNG by leveraging OFMSW feedstock will drive meaningful progress towards deep decarbonization and the State's carbon neutrality goals, beyond what is achievable through more carbon intense RNG derived from other identified feedstock sources considered as part of the inventory (e.g., landfill gas) and alternative food waste end uses such as compost.

ii. Inputs & Assumptions – Animal Manure Feedstock & Supply

Anaergia agrees that feedstock potential of animal manure should be reduced, as discussed in the Inputs and Assumptions document. Increased concentration of animal manure generators should not be incentivized due to negative environmental, climate, and economic factors associated with large-scale animal farms.

iii. Inputs & Assumptions - Energy Crop Feedstock & Supply

Energy crops may be considered feedstock for AD, in addition to gasification, for efficient conversion to RNG. Energy crops represent a necessary feedstock for decarbonization due to complement recovery of other feedstock supplies which may be less predictable, more finite, or less achievable in comparison than purpose grown energy crops.

iv. Cost Benefit Analysis – Cost-Effectiveness

Cost-effectiveness is important for any climate change mitigation effort. However, it is important to conduct a holistic cost-benefit analysis of RNG, and that cost-effectiveness not be the only metric used in evaluating RNG potential within the State. Analysis should reflect greenhouse gas reductions, carbon intensity, job creation, and social benefit. California's SB1440 recommends a similarly holistic approach in evaluating RNG procurement, including accounting for a social cost of methane emissions. CA SB1440 proposes **RNG value to reflect the social cost of methane, beginning at $26/MMBtu**. (From SB1440, "the proposed value is based on the most recent 2021 federal Interagency Working Group (IWG) estimate, and meaning the monetary value of the net harm to society associated with adding a small amount of methane to the atmosphere, including the value of all climate change impacts such as changes in net agricultural productivity, health effects, property damage from natural disaster, energy system disruption, risk of conflict, migration, and the value of ecosystem services.") Meanwhile, British Columbia's 2021 update to its Greenhouse Gas Reduction Regulation (GGRR) set the RNG price cap for purchasing utilities at $30/GJ, with allowable increases for inflation.

v. Cost Benefit Analysis – GHG Emissions

Accurately quantifying the carbon intensity of RNG will support appropriate monetization of the environmental benefits and therefore bolster RNG development and deployment. **The proposed lifecycle accounting methodology most accurately captures the emissions reduction potential and value of various feedstocks**.

RNG derived from **anaerobic digestion of food waste results in a negative CI score, per the CA GREET model which can provide a basis for the accounting methodology**. However, the rate of landfill methane capture is central to quantifying carbon intensity for food waste. **The methodology should reflect the latest research on methane emissions from landfill**, which demonstrate that fugitive methane emissions from landfill are significantly higher, and landfill capture much lower, than historically assumed. In particular, a 2019 study by the NASA JPL estimates that landfills' contribution to the state's methane inventory is double current estimates – approximately 41% of all point source emissions in California[1]. The CI of RNG from landfill-diverted food waste should reflect the full extent of emissions prevention form landfill.

Similarly, GHG emissions determinations for **animal manure feedstock should incorporate complete lifecycle emissions**, including feed crop production, manure from grazing animals, and fugitive intestinal emissions. Negative environmental and GHG impacts are often compounded at large-scale facilities that typically provide the needed scale for RNG production. Incentivizing more concentrated animal farming to support animal manure feedstock at scale may increase GHG emissions overall.

vi. Cost Benefit Analysis – Cost Considerations

Existing AD infrastructure at wastewater treatment plants (WWTP) provides capacity for RNG generation and can enable a circular economy within local communities. WWTP AD of municipal sludge generates biogas which can be upgraded to RNG eligible for D3 RINs (currently trading ~$2.50/RIN and ~$30/MMBTU). Further, food waste (both source separated and landfill-diverted) is suitable for co-digestion at municipal WWTP, and such programs can provide numerous operational and economic benefits to wastewater authorities. Overall, WWTPs provide an opportunity to improve cost-effectiveness of RNG as a climate change mitigation resource.

Thank you for your consideration,

Anaergia

[1] Duren, R.M., Thorpe, A.K., Foster, K.T. et al. California's methane super-emitters. Nature575, 180–184 (2019). https://doi.org/10.1038/s41586-019-1720-3