

Applicant Name: Montgomery County

Principal Investigator/Project Director: Marilu Enciso

Project Title: Food to Fuel: Exploring the Feasibility of Recycling Wasted Food to Power Montgomery County's Bus Fleet



Project Objectives: The project will build on Montgomery County's (County) past work in waste diversion and sustainable materials management to conduct a multi-factor feasibility study quantifying the technical, environmental, and economic benefits of processing organics utilizing anaerobic digestion (AD) to generate Hydrogen (H₂) upgraded from biogas for transit bus fleet fueling.

Project Description/Methods to be Employed: Over 157,000 tons of organics, comprised of yard trim, food scraps, and non-recyclable paper, are disposed of via incineration or landfilling annually in the County. The feasibility of processing the County's organics waste streams via AD has not been studied in detail, nor has the use of AD end products, such as biogas, been considered for beneficial reuse. The project will determine whether AD is a feasible technology to process the County's organic waste stream and support the beneficial reuse of biogas generated and upgraded to H₂ for fueling the County's 400-bus transit fleet. The County Team will determine approach feasibility by completing four (4) major tasks:

- Task 1: Evaluating the technical feasibility of bus fleet fueling from H₂ by verifying the State-of-the-art fleet fueling from H₂ and developing desktop and laboratory scale estimates of biogas and H₂ yields from anaerobic digestion of organics feedstocks.
- Task 2: Based on gas yields, completing a life-cycle analysis of GHG emissions reductions from fleet fueling alternatives, including comparing generation, upgrading, storage, and transport stages with a cradle-to-grave analysis.
- Task 3: Completing a facility siting study to identify a feasible, in-County location for an organics processing facility.
- Task 4: Performing a life-cycle cost analysis (LCCA) comparing the long-term costs, including Capital Expenditures and Operational Expenditures, of RNG and H₂ fuel alternatives

Potential Project Impact (Benefits, Outcomes): Local advances can be made in synergizing solid waste management—by recycling the organics waste streams from over one million County residents via anaerobic digestion—to produce renewable energy, reduce GHG emissions from transportation, and support advancements in the County's transit bus fleet fueling program. The project outcomes will be utilized to advance regional understanding of other potential synergies between organics management and end product beneficial reuses for large-scale fueling and energy needs.

Member Organizations: Montgomery County Department of Environmental Protection (DEP), Department of Transportation (DOT), Department of General Services (DGS); EA Engineering, Science, and Technology, Inc., PBC; University of Maryland, Bioenergy and Biotechnology Lab; and Barton & Loguidice.

Supporting Organization: and Metropolitan Washington Council of Governments and Maryland Department of the Environment.