



Funding Selections: WASTE – Waste Analysis and Strategies for Transportation End-uses



Wastewater Treatment Plant. Image from Istock.com

Offices: Bioenergy Technologies Office and Vehicle Technologies Office

FOA number: DE-FOA-0003072

FOA amount: \$6.9 million

The U.S. Department of Energy's (DOE) Bioenergy Technologies Office (BETO) and Vehicle Technologies Office (VTO) announced \$6.9 million in funding for nine projects to support local waste-to-energy management solutions for transportation energy needs. Located across six states, these selected projects will help sustainably manage and recover potential clean

energy sources from local community waste streams using innovative and cost-effective technologies to produce low-carbon biofuels.

Organic waste streams from food waste, municipal wastewater sludge and solid waste, and manure are a key feedstock for producing biofuels and bioproducts. However, these waste streams represent one of the largest sources of greenhouse gas emissions and contribute to water, soil and air quality pollution. In addition, waste management costs for treatment, stabilization, hauling, and disposal are considerable, and municipal landfills can contaminate soil and water. This funding will support local communities to plan and identify waste-to-energy solutions for their waste streams, and also help reduce other impacts associated with waste collection and landfilling, including reducing heavy vehicle traffic, odors, and litter.

Recognizing that local communities may be at different stages in their sustainable waste management planning efforts, the selected projects will address the above waste-to-energy needs through two topic areas:

- **Topic Area 1: Feasibility Study Development Analyses**

Topic Area 1 is aimed at helping move communities beyond a conceptualization phase by supporting more in-depth feasibility or scoping analysis. It will support feasibility study development, to include activities such as feasibility studies, identification of transportation use cases, and sustainability indicator baselining.

- **Topic Area 2: Design Work and Experimental Validation**

Topic Area 2 will support and advance more detailed engineering design work for communities that are further along and may have already identified potential solutions for their waste/transportation needs. Outcomes from this Topic Area will include FEL-3 engineering design work, detailed siting analysis, transportation fuel testing, experimental testing and validation, and generation of data for air quality assessment (Phase 1). Upon the conclusion of Phase 1 activities, recipients are eligible for additional Phase 2 funding which will allow for the construction and operation of a pilot-scale system designed in Phase 1.

The following projects were selected:

Selectee	Location	Project Title & Description	Federal Cost Share
Topic Area 1: Feasibility Study Development			
<u>Dairy Methane Utilization for Clean Hydrogen Production</u>			
California Dairy Research Foundation	Davis, California	This project will assess the environmental and economic feasibility of converting methane from dairy manure into hydrogen. The study will instead assess various hydrogen production pathways, including steam methane reforming and electrolysis.	\$750,000
<u>Project "SMRF": Establishing 'Virtual Landfills' and Transportation Alternatives to Address Existing MSW and Landfill Constraints in Northwest Arkansas</u>			
City of Berryville, Arkansas	Berryville, Arkansas	This project will evaluate the establishment of primary and secondary materials recovery facility infrastructure to enable more efficient municipal solid waste separations and eventual conversion to fuels (renewable natural gas, methanol, and hydrogen).	\$745,932
<u>Organic Waste Energy Conversion</u>			
City of Reedley - California	Reedley, California	This project will evaluate a closed-loop system to produce renewable natural gas, electricity, and/or hydrogen from agricultural food processing waste within a 100 mile radius. The project will test seasonal and geographic blends to inform economic and environmental analysis.	\$750,000

**Renewable Natural Gas (RNG)
Production from Organic Wastes for
Local Transportation in Bloomington-
Normal, Illinois**

Ecology Action
Center

Normal, Illinois

This project will perform a waste audit from a 75-mile radius to evaluate co-digestion to renewable natural gas. The project is testing a new anaerobic digester technology to evaluate the benefits a lower-energy mixing approach.

\$513,185

**HARVEST: Hydrogen Assessment
from Remote Valorization of Energy
Sources Through Organic Waste**

GTI Energy

(Des Plaines,
IL; Walcott, IA;
Fair Oaks, IN;
Middleton, WI)

The project will assess a system to produce fuel-cell quality hydrogen from organic waste at three locations: the Fair Oaks Dairy in Indiana, I-80 truck stop in Iowa, and a dairy cooperative in Wisconsin. The project will analyze a variety of impacts including generation of fertilizer as a co-product, air quality, job creation, and diversification of farm revenue.

\$559,527

**Waste to CLEAN Fuels for
Decarbonizing Transportation in the
Rio Grande Valley Region**

Houston
Advanced
Research
Center

Houston, Texas

This project will investigate the feasibility of capturing waste at Wastewater Treatment Facilities in the Rio Grande Valley (RGV) and converting it into renewable fuels such as biogas, renewable natural gas (RNG), and hydrogen. 25 candidate wastewater treatment sites have been identified and this project will identify the individual transportation fuel use cases (biogas,

\$748,194

renewable natural gas, and hydrogen) for each site.

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

Montgomery County, Maryland

Rockville, Maryland

This project will evaluate resource potential and technical feasibility of converting wastewater residuals to hydrogen for use in the County's regional bus fleet. The project will also complete a siting analysis for an in-county organics processing facility.

\$750,000

Closed Loop Organic Waste to Transportation Fuel Virtual Fueling Station

New Jersey Clean Cities Coalition

Elizabeth, New Jersey

This project will perform a waste analysis of 44 New Jersey higher education campuses and perform a cost-benefit analysis of using the waste-derived fuels for on-site fleet usage versus utilizing food waste recycling facilities versus business as usual practices. The project will also establish a verified emissions reductions tracking system.

\$500,000

Topic Area 2: Design Work and Experimental Validation

Conversion of Biosolids and Biogas to Hydrogen for Transportation

Las Virgenes
Municipal
Water District

Calabasas,
California

This project proposes to design a system that collects biogas and biosolids to generate clean hydrogen. The proposed approach will use on-site biochar as a catalyst for reforming to reduce capital and operating costs and to enable more modular biogas reforming technologies. The project will design a 1-2 ton of biosolids/day system capable of producing 100 kg/day of fuel cell grade hydrogen. \$1,600,000