Project Summary

Project Title:	Hydrogen Assessment from Remote Valorization of Energy Sources Through organic waste: HARVEST
Principal Investigator:	Travis Pyrzynski
Name of Applicant:	GTI Energy
Solicitation Number:	DE-FOA-0003072 (Topic Area of Interest 1)

Objectives: The Hydrogen Assessment from Remote Valorization of Energy Sources Through organic waste (HARVEST) project team proposes a feasibility study to assess a system to produce fuel cell quality H_2 from organic waste, while studying the impacts to local communities and residents. The project is targeted to divert organic waste to an anaerobic digestor and will highlight several benefits, including reduction of greenhouse gases (GHG) and nutrient runoff into waterways, generation of a local nutrient rich fertilizer from digestion, improved air quality, job creation through new facility construction, and diversification of farm revenue with H_2 production and byproducts.

To accomplish this, the project will:

- Develop the HARVEST Framework Model that contains the detailed engineering design, as well as economic, environmental, and community benefits results of the system. The model will provide a model for other communities across the US to assess the potential impacts on their communities.
- Partners, stakeholders, and other contacts identified for a potential field demonstration.
- Determine opportunities to further enhance the HARVEST model to benefit local communities and provide additional environmental benefits (i.e. production of other fuels, incorporation of solar or geothermal, etc).

Methods to be employed: The team will develop a technoeconomic analysis, life cycle analysis, and detailed process simulation and model for the proposed process. These models will determine the feasibility of the process but also identify the economic and environmental impact. Through existing and new contacts, the team will engage with transporation end users (fuel cell electric vehicles) and stakeholders to determine realistic paths to implementation while identifying key hurdles to implementation.

Benefits and outcomes: Diverting organic waste to the anaerobic digestor has already shown to reduce GHG, contaminant runoff into waterways, ammonia emissions, and particulate emissions, while improving organic waste management and nutrient field reapplications. By converting the biogas to H_2, the proposed study would look at the added benefits to rural and local communities of fuel cell electric vehicle adoption, especially when compared to diesel vehicles. The model generated here could help identify pathways to increase the adoption of anaerobic digestors, with at least 8,000 locations currently identified to generate enough H_2 to fuel about 5% of the total US Class 8 trucks. By converting 5% of the class 8 trucks, there is the potential to reduce CO_2, SO_2, and NO_2 emissions by 20 million, 3,000, and 15,000 metric tons, respesctively, per year.

Major participants (collaborative projects):

Chomp, Inc., University of Texas at Austin, University of Wisconsin-Madison.