Proposal Summary

From Sorted MSW to Clean Syngas via Solvent Targeted Recovery and Precipitation (STRAP)

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Project Description: Producing sustainable fuel (SAF), from biomass, via gasification, is costly and energy intensive. Using municipal solid waste (MSW) can reduce costs but MSW is contaminated, inconsistent, and heterogenous, and using it in gasification to produce syngas requires costly cleanup. Michigan Technological University (MTU) and the University of Wisconsin-Madison (UWM) have developed a series of technologies that can extract from MSW: (1) Clean biogenic material that can be used in gasification to produce cleaner syngas, that require less cleanup. (2) A few resins (polyethylene, polypropylene, etc.) in their pure form that can be used in the original applications. The production of the resins as by-products has strong economic value as it lowers the production cost of SAF. MTU and UWM have developed patents-pending solvent-based technology to extract pure resins from MSW. The technology is based on the preferential dissolution of a certain resin by a specific solvent. The technology is called *Solvent-Targeted Recovery and Precipitation* (STRAP).

Project Objectives: The objective of this project is to de-risk the technology by:

(i) Integrate a 24 kg/h STRAP pilot system and test it with MSW, which is pre-processed by INL, to remove metal, stone, and glass and provide initial fractionation and shredding to the required size.
(ii) Produce 400 kg of biogenic material to be tested by TRI to produce cleaner syngas.
(iii) Produce a few kgs of resins to be converted by Amcor, a packaging company, into films and test them.
(iv) Carry our TEA by Convergen Energy, a waste processor, and USA BioEnergy, a SAF producer, and determine the economic value of this approach to produce biogenic material and SAF.

Potential Impact of the project: We are building a regional STRAP pilot scale unit, at a 24kg/h (or 0.5 ton/day) throughput, to be used with MSW to separate the biogenic and the resins in pure forms. We will produce large amounts of MSW and resins, characterize them, and convert them into the final product and test them. The main impacts of this project are: (i) avoiding MSW disposal to landfills, and (ii) producing pure biogenic material and sellable recyclable high-quality resins. This is a risky project, not yet ready for private investment; thus, DOE funding will be used to de-risk of the technology.