

Name of Applicant: City of Berryville, Arkansas (Tim McKinney, Mayor)

Project Directors: Mr. Tom Waggoner (PD) and Dr. Susan P. Rupp (co-PD)

Project Title: Project 'SMRF': Establishing 'Virtual Landfills' and Transportation Alternatives to Address Existing MSW and Landfill Constraints in Northwest Arkansas

Objectives: The overall objectives of this feasibility study are to: 1) Explore options to reduce/eliminate landfill pressures via chemical recycling (i.e., a "virtual landfill") through the production of "Refuse-Derived Materials (RDMs)" (not RDF) that can be used as a feedstock in a proprietary "Pivot Plant" design, 2) to evaluate the potential to produce renewable fuel for community vehicles and for external sale, 3) set up a Community Environmental and Education Center (CEEC) for outreach, demonstration, and DEIA-informed resources, and 4) utilize the EERE funding to generate a multiplicative benefit by looping in private players for technology, market access for fuels, and attract additional funding that is orders of magnitude larger.

Project Description: The EcoVista Landfill in Tontitown, AR, is emblematic of the complexities associated with waste management, permitting, and community relations experienced across the country. Restrictions on siting new landfills demand a new approach to waste control and transportation end uses. The primary obstacle facing energy recovery from MSW has been the cost of collecting and separating the wastes into economically sustainable feedstocks to be processed by the selected conversion facilities. To make waste-to-energy conversion economically feasible, the system must be able to handle a diverse mix of petrochemical and bio-based wastes with as little separation as possible. Existing technologies require selective separation, while being energy intensive. This feasibility study will achieve the following:

- Explore the potential for local beneficial utilization of waste in a region with dire need
 - Quantify the transportation energy savings compared to current practices/fuel usage
 - Identify/quantify local environmental and social sustainability challenges and opportunities
- To achieve these, Project SMRF's Proposed Approach Is to **Pelletize, Pyrolyze, and Synthesize:**

Pelletize: Convert waste into 'RDM' feedstocks that are fed into a proprietary, pyrolysis-based thermal conversion system

Pyrolyze: Use commercially proven pyrolysis technology – with steam reforming gasification

Synthesize: Create hydrogen or hydrogen carriers to fuel transportation fleets or H2 Hubs

The City of Berryville, AR - a federally designated Opportunity Zone and home to Carroll County Solid Waste District (CCSWD) – along with Syntex industries, the University of Arkansas, Enviroscapes Ecological Consulting, and Via Analytics proposes the development of a "virtual landfill" molecular recycling facility to remove the need for a physical landfill. This "Sustainable Molecular Recycling Facility (SMRF)" will be integrated with a series of modularized systems (i.e., Baby SMRFs) to process existing MSW streams into "Refuse-Derived Material (RDM)" pellets that will then serve as a front-end feedstock to be fed into centralized facility (i.e., Papa SMRF) that combines pyrolysis and gasification into a process that can pivot production into various refined fuel products, including hydrogen and hydrogen carriers. By re-envisioning the way in which we process MSW, and by actively engaging the public through DEIA-informed education and outreach, many of the concerns of traditional waste handling can be abated.