

# Anaerobic Digester System Planning

Steve Safferman  
[SteveS@msu.edu](mailto:SteveS@msu.edu)

517-432-0812

<http://www.egr.msu.edu/~steves/>

Michigan State University  
 Department of Biosystems and Agricultural Engineering

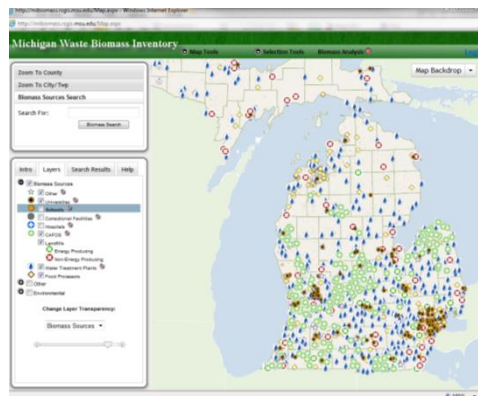
## Iterative process to site and screen the potential for a digester with blended feedstocks

1. Establish objectives such as environmental protection, nuisance avoidance, renewable energy production, carbon credits or a combination.
2. Design an optimized feedstock produced from blended biomass sources.
  - a. Estimate feed stock constituents and energy potential.
  - b. Assess the nutritional value of the blend.
  - c. Redesign the feedstock if objectives not met.
3. Estimate costs/benefits.
4. Conduct a biogas assay to determine if the estimated energy potential is realistic and stable digestion is likely.
5. Collect design and cost data to prepare plans and specifications.

## Tools

### Michigan Waste Biomass Inventory to Support Renewable Energy Development

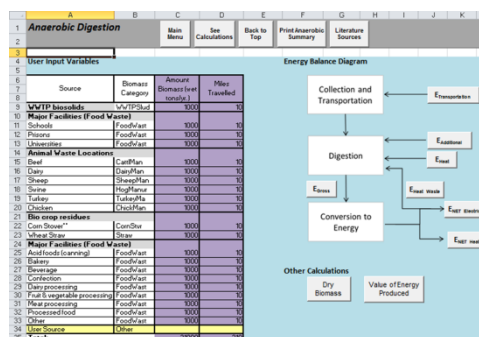
Identifies sites of residual biomass and land that can produce energy, estimates the net energy theoretically available from the biomass, and identifies constraints that limit the utility of biomass conversion technologies. Intended to provide a starting point in locating a centralized biomass conversion technology but all data are estimates and may not be accurate



### Energy Spreadsheet

Excel spreadsheet showing modeling approach, all calculations, assumptions, and default values to determine net energy from a blended feedstock.

- Anaerobic Digestion
- Gasification
- Direct Combustion
- Biodiesel
- Ethanol



### Costs/Benefits Assessments

Steps to screen the costs/benefits of a proposed site-specific anaerobic digestion housed in an Excel spreadsheet containing the following sheets.

1. Site identification and preliminary biomass source identification.
2. Theoretical energy potential assessment.
3. Blend nutritional assessment.
4. Preliminary cost/benefit analyses
5. Verification of theoretical potential.