Performance Evaluation of Seven on-farm Digesters in NYS

**OBJECTIVES**
- Monitor baseline performance of 7 digesters in New York State
- Follow the protocol developed by the Association of State Energy Research and Technology Transfer Institutions and USEPA AgSTAR program
- Evaluate economic viability of digester systems
- Investigate optimization opportunities

**DATA COLLECTION AND EVALUATION**
Information describing the project farms and systems needs to be put in context, so that farms considering AD can apply this information to their specific situation. This includes:

- Flow diagrams with planned material balances
- Major equipment design parameters and specifications
- Number of animals
- Bedding type, amount and characteristics
- Other amendments: washwater, food waste, feed waste

**Inputs:** In order to size and select the components of a planned system, the characteristics of the influent, the effluent, and the percent change of each of these components needs to be estimated.

- Total Volatile Solids (TVS)
- Total Volatile Acids as Acetic (TVA)
- Total Solids (TS)
- Chemical Oxygen Demand (COD)
- pH

For farms with co-digestion of food waste, components analyzed are:

- Ammonia (NH₃-N)
- Total Phosphate (TP)
- Potassium (K)
- Total Kjeldahl Nitrogen (TKN)
- Ortho phosphate

**Outputs:** The expected biogas, power and heat production is needed in order to estimate the size of the gas utilization system information collected includes:

- Energy (Btu) to heat digester
- Biogas concentrations (CO₂, H₂S)
- Energy (kWh) generated
- Thermal energy (Btu) recovered
- Biogas Production (gross)
- Energy offset by production (kWh)

**Economic data** is vital to show the actual capital costs, operating costs, and potential value-added revenue of products such as electricity, gas, heat - all important for projecting profitability. Data collected includes:

- Capital investment
- Electric cost savings and revenues
- Heating cost savings
- Savings in bedding purchases
- Operating costs (eg. oil changes, repairs)