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Forecasting Control Software for Energy Services through INtegrated FLexible Operation of Wastewater Systems

Stanford researchers in the WE3 and S3 Labs developed software for biogas modeling suitable for real-time, co-digestion forecasting control for waste streams with widely varying biodegradability rates.

Fermenting organic wastes in anaerobic digesters to produce biogas can reduce landfill emissions and waste, leverages an underutilized source of renewable energy, and can save money by generating electricity during peak energy demands. Controlling biogas production is challenging, because anaerobic digestion processes are complex, variable, and difficult to observe in real time. The WE3Lab model uses volumetric flows of digester feedstocks and a multi-stage approach to address the complexity of co-digesting fast and slow degrading organic wastes. The INtegrated FLexible Operation of Wastewater Systems Software includes a base API and computing infrastructure for running model predictive control on a local server. INFL Operation of Wastewater Systems Software incorporates the multi-horizon prediction WE3Lab model in systems software for biogas microgrid infrastructure at wastewater facilities.

Stage of Development – Proof of Concept

Applications

- Software for clean, renewable biogas management and production

Advantages

- Demand driven (flexible) biogas production maximizes biogas value
- Lowers cost, and reduces venting and flaring
- Lower electricity costs
- Leverages an underutilized source of renewable energy

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