

# SENTRY-AD™

Real-time, performance monitoring of microbial activity in an anaerobic digestion system.



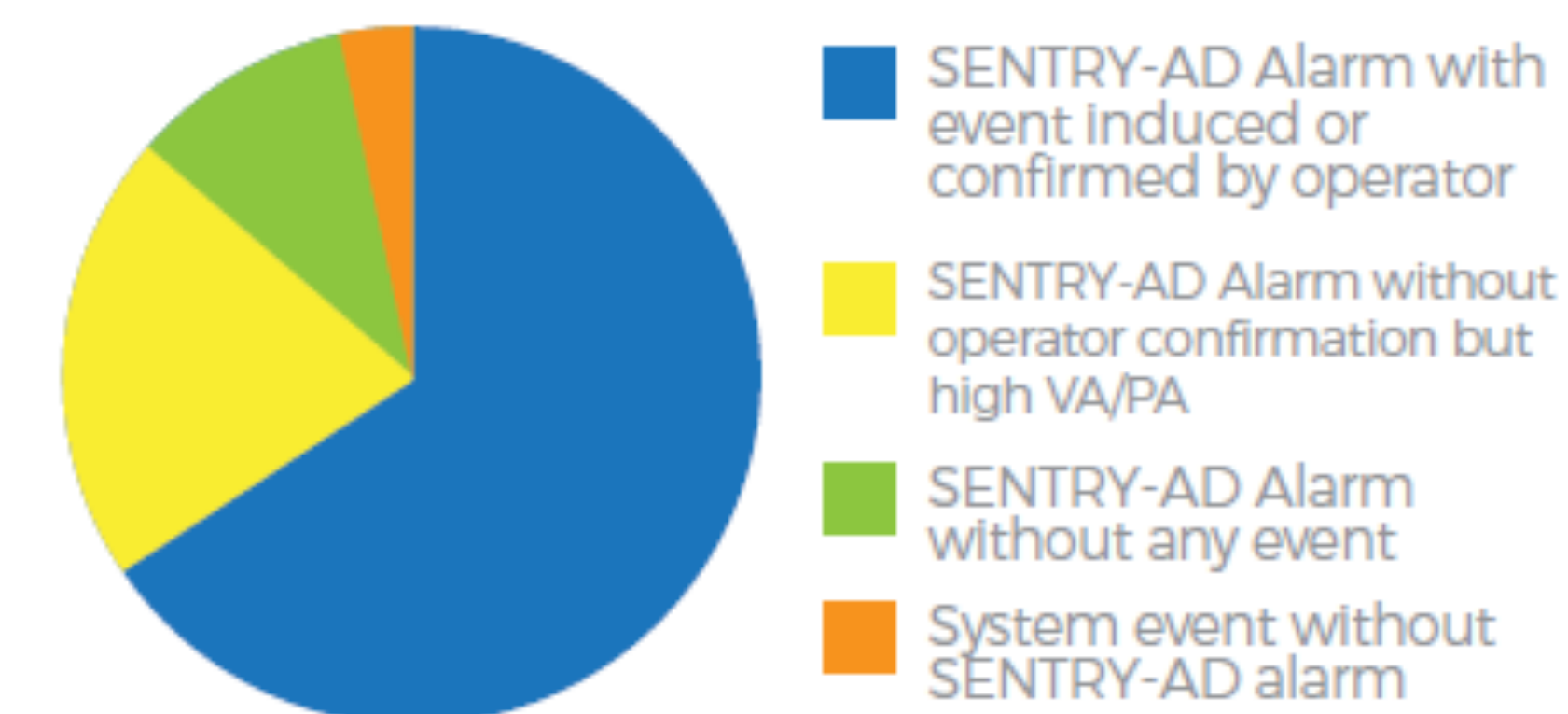
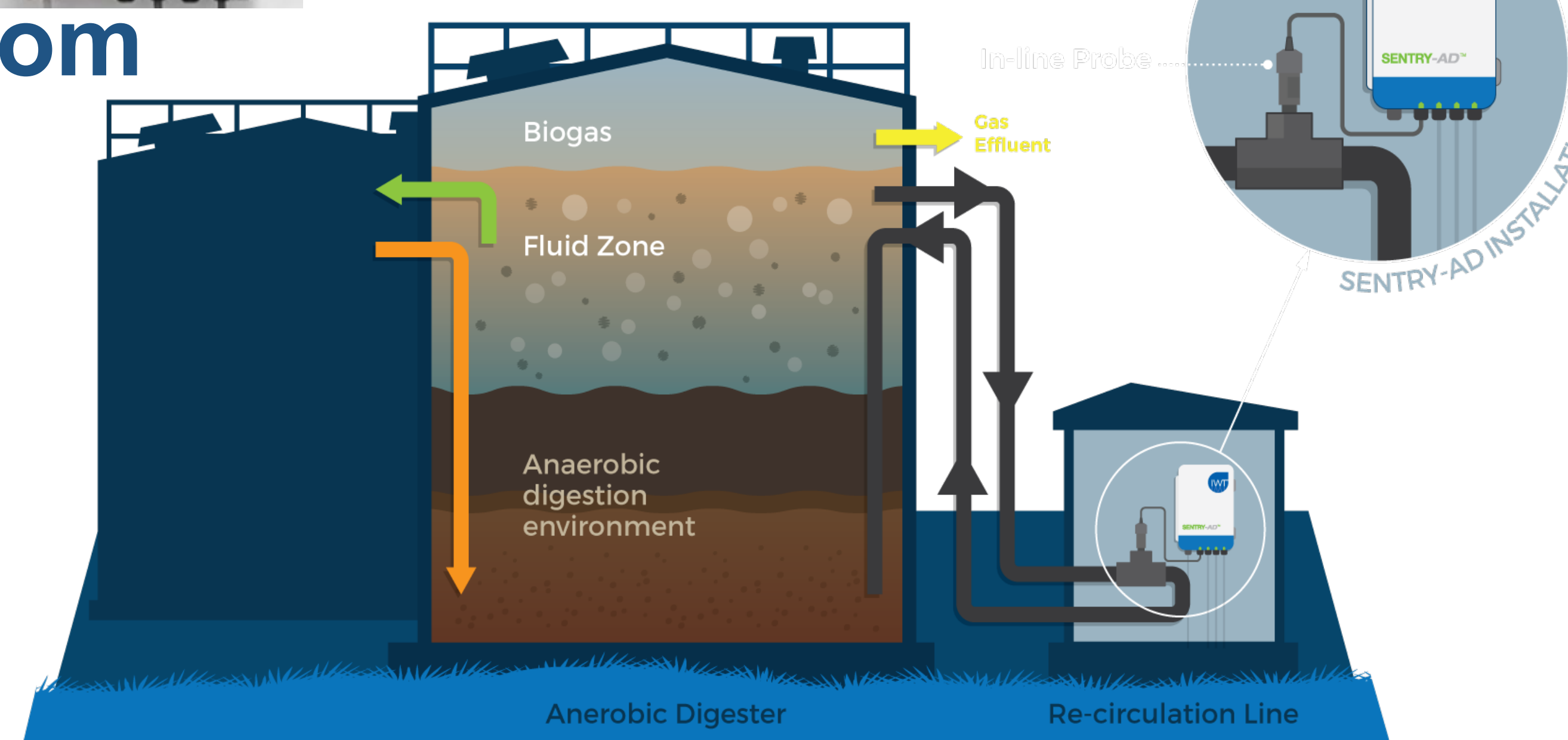
[www.sentrywatertech.com](http://www.sentrywatertech.com)

Name of client:  
ADI Systems

Timeline:  
Feb 2016 – Feb 2017

Location of plant:  
Fredericton, New Brunswick, Canada

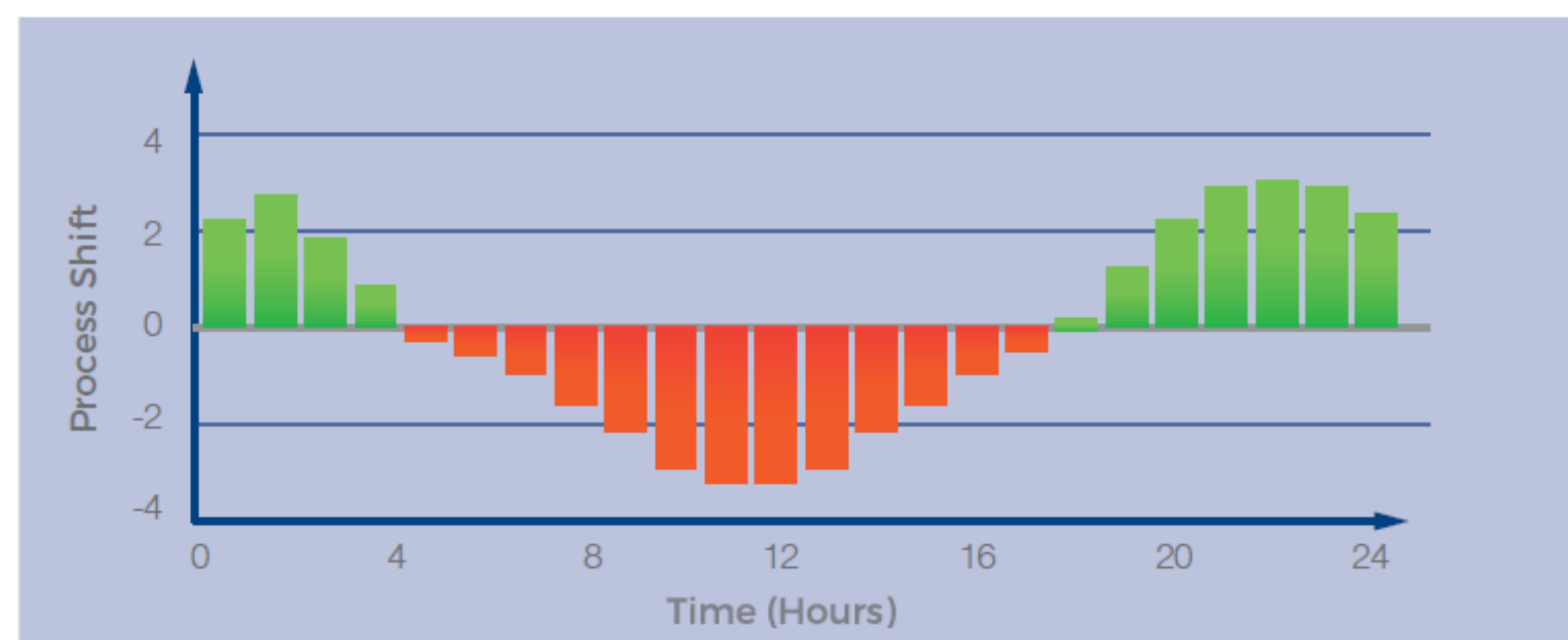
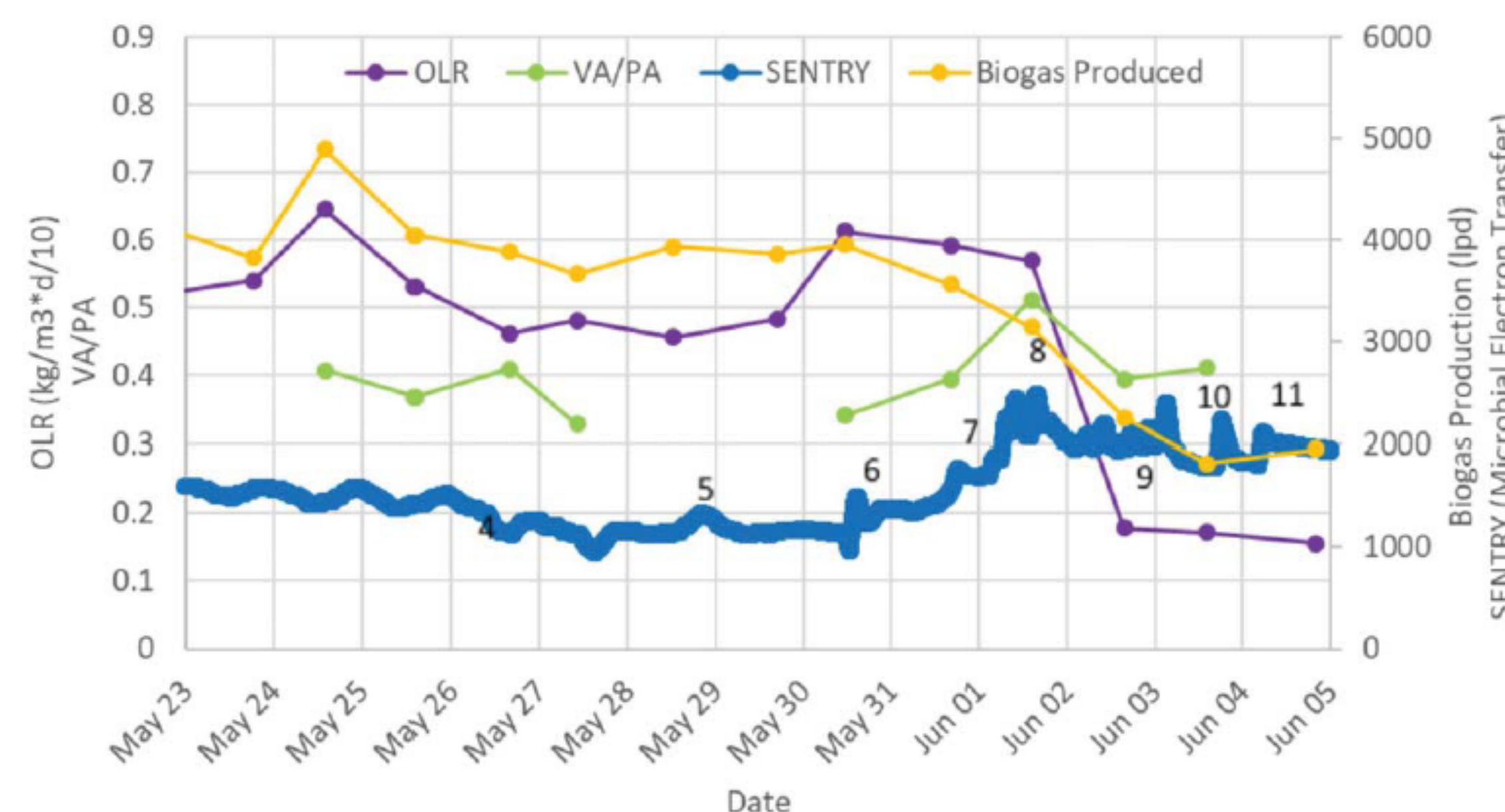
Application Type:  
Demonstration Anaerobic MBR



SENTRY-AD identified:

**SENTRY-AD™** is a real-time, bio-electrode sensor (BES) that monitors the microbial metabolic activity of exoelectrogenic bacteria and can be used in anaerobic digestion wastewater treatment processes. The data collected aids operators in:

- Monitoring AD process stability:**  
Bio-electrode data allows operators to monitor, in real-time, the reactor's microbial health.
- Protecting the AD from upset:**  
Imbalance or toxic shock events can be identified the instant they begin to impact microbial activity. This allows the operator to take immediate action to reduce the impact on system performance.
- Process optimization:**  
Aggregation of data and integration with existing water quality and process information provides novel insights into system performance and patterns that can be used to tune operation and maintenance.



**Imbalances, in real-time:**  
SENTRY-AD data had a strong correlation ( $p \leq 0.01$ ) with the VA/PA ratio (commonly used as an imbalance indicator) validating the predictive capacity of SENTRY-AD. SENTRY-AD signaled the onset of imbalance in real time. This increased resolution allows for constant monitoring and the maximum time for issue mitigation. SENTRY-AD indicated periods of process instability that operators were unaware of from routine monitoring and analysis. SENTRY-AD's ability to capture them demonstrate its novelty.

**Long-term process characteristics:**  
The data was pooled into two populations punctuated by a system clean. Statistically it was demonstrated that these two periods were significantly ( $p < 0.01$ ) different, demonstrating that SENTRY-AD is a useful tool for assessing long-term reactor operation and health and illuminating operational changes.

**Emergent daily patterns:**  
SENTRY-AD's data was aggregated over a month and the daily data was overlaid. When doing so, a daily pattern became evident. SENTRY-AD had a cyclical range in performance of 6.3% over a day with the minima occurring at 10am and the maxima at 9pm. Operators were unaware of the cyclical variability in the process, and this information can be used to tune the operation of the system.

