WASTEWATER TECHNOLOGY

MicroSludge® Treatment of Waste Activated Sludge from Industrial and Municipal Wastewater Treatment Plants Paradigm Environmental Technologies Inc.

OVERVIEW OF WASTEWATER TECHNOLOGY:

Municipal and industrial wastewater treatment plants (WWTPs) generate a waste by-product termed “waste activated sludge” (WAS) that requires costly handling and waste disposal. MicroSludge® is a patented WAS pre-treatment process that increases both the rate and the extent of anaerobic digestion of WAS to increase biogas production and decrease sludge for disposal.

MicroSludge® and anaerobic digestion result in: faster digestion of WAS and thus much smaller digesters required, increased biogas, no or minimal polymer for WAS thickening, less polymer for sludge dewatering, and much less WAS for disposal. Each of these attributes results in significant economic benefits and reduction of greenhouse gas emissions.

For municipal or industrial (pulp and paper mills, meat packing plants) WWTPs, WAS is centrifuge thickened, MicroSludge processed, and anaerobically digested. Biogas production, GHG reduction, and economics are estimated below.

ESTIMATE ANNUAL EMISSION REDUCTIONS: 15,000 $MTCO_2E$

BIOGAS PRODUCTION

PULP AND PAPER WWTP PRODUCING 6,700 DRY TONNES WAS/YEAR:

- **Anaerobic Digesters:** 1 day HRT 37°C acid phase digester + two mixed 37°C methane phase 5 day HRT digesters connected in series
- **Methane Production:** 150 m^3/hour (1,345,000 m^3 CH_4/y)
- **Methane Content in Biogas:** 65 to 70%
- **Biogas Treatment Process:** H_2S is stripped from biogas using iron chloride solution. Stripped biogas is bubbled through anaerobic digester to remove dissolved sulphide.
- **Biogas End Use:** option for thermal, combined heat and power, export to pipeline, vehicle fuel

COST AND REVENUE EXAMPLE

Installed Cost: US$10,000,000

Net Annual Savings: US$3,000,000/y

Estimated Payback Period: 3.3 years

***Savings in Operating Costs:**

- Biogas production and lower purchases of natural gas for boiler operation
- Lower chemical consumption of polymer and defoamer
- Less electricity for aeration of activated sludge effluent treatment plant

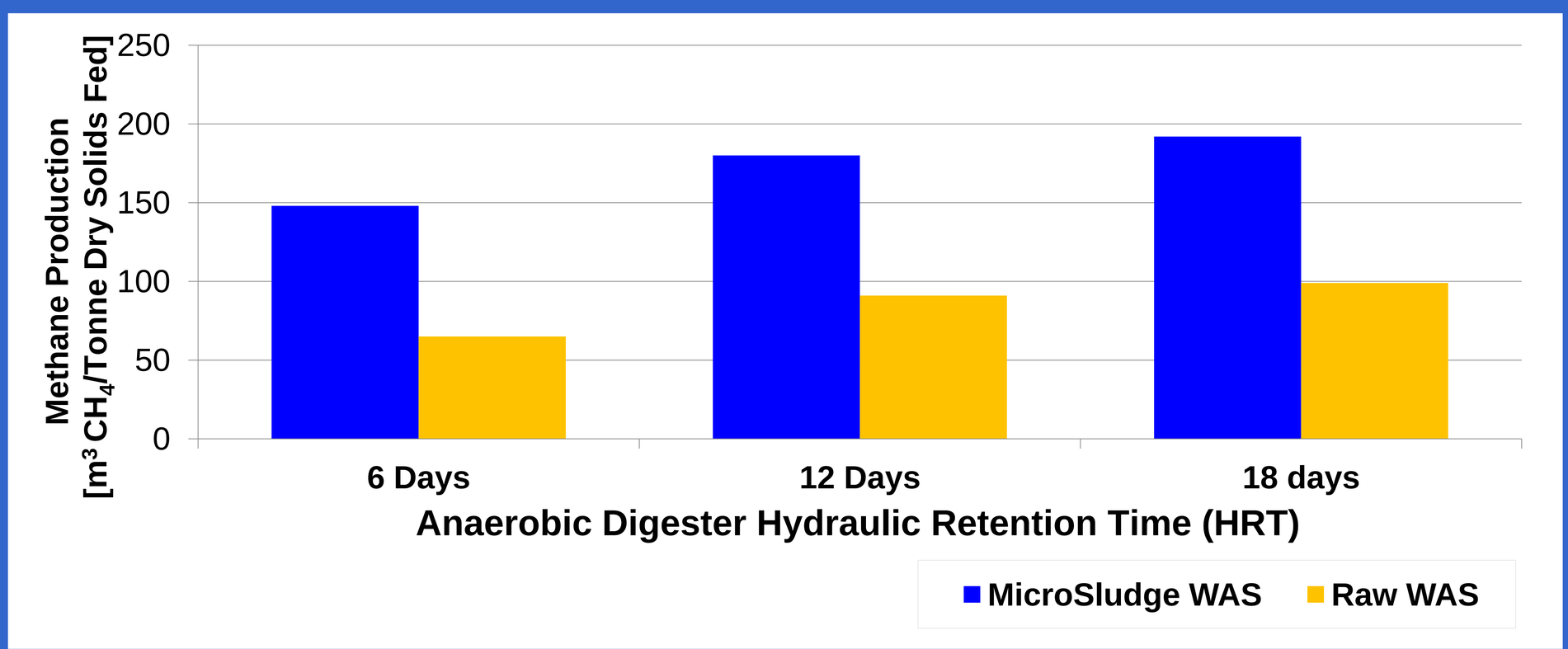
PROJECT OPPORTUNITY

- Patented process converts waste sludge to bioenergy, greatly reducing sludge for disposal and GHGs to provide an attractive ROI

OTHER PROJECT BENEFITS

- Faster anaerobic digestion of thickened WAS, so digesters can be much smaller and less expensive
- WAS for dewatering and disposal is substantially reduced or eliminated
- Enables activated sludge plant to be operated at lower aeration costs
- Enhanced performance of secondary clarifier

Methane Production vs. Digestion Time with MicroSludge



TYPES OF COOPERATION SOUGHT

- Project financing
- Anaerobic digester suppliers
- Purchasers of renewable energy

FOR MORE INFORMATION

Gordon Skene
Paradigm Environmental Technologies Inc.
200 – 1600 West 6th Avenue
Vancouver, BC
CANADA V6J 1R3
604 732 0360 x 271 (tel)
gskene@microsludge.com
www.microsludge.com