Profile of Wastewater Treatment Plants in Illinois

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ABSTRACT

Poster summarizes the results of a study of wastewater treatment plants in Illinois with an emphasis on performance metrics. A survey was sent out to over 200 wastewater treatment plants in IL, of which 77 plants responded. 14 major wastewater treatment plants with flows between 10-100 MGD were further analyzed to capture performance metrics. The results of this evaluation are presented here.

OBJECTIVES

- Construct a profile of major wastewater treatment plants in Illinois with an emphasis on performance metrics.
- Lay the groundwork for comparative evaluation of performance metrics to chart pathways for improvement of operations of wastewater treatment plants.

METHOD

- Over 200 wastewater treatment plants in Illinois were contacted to complete a survey.
- Completed surveys were received from 67 treatment plants and 10 lagoon systems.
- The completed surveys included information on operational and economic parameters, and organic loading of influent and effluent streams.
- Major plants with treated flows between 10-100 MGD were analyzed with an emphasis on performance metrics.

LESSONS LEARNED

- There is a lack of standardized terminology used among wastewater treatment plants to describe unit processes with clarity.
- There is a need to reduce reporting errors by building validation tools in the survey to quality check the data during the response process.
- Minimize errors in unit conversions by standardizing units and providing examples of conversions when required.
- Being aware that data being requested may reside in jurisdictions outside the purview of respondent.

RESULTS

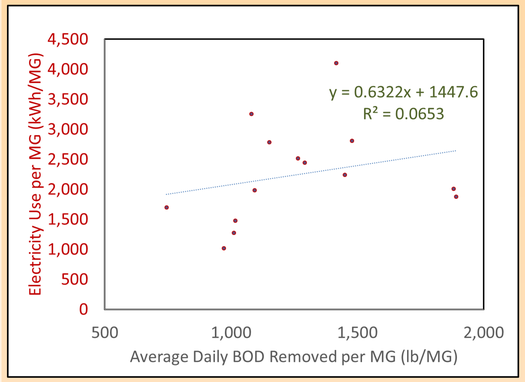

Fig. 1: Poor correlation between electricity use and BOD removal per MG treated indicates wide variation in energy efficiency.

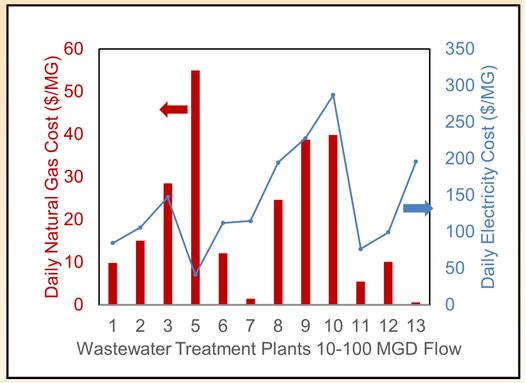

Fig. 2: Daily electricity and natural gas cost per MG treated. Electricity costs dominate treatment costs.

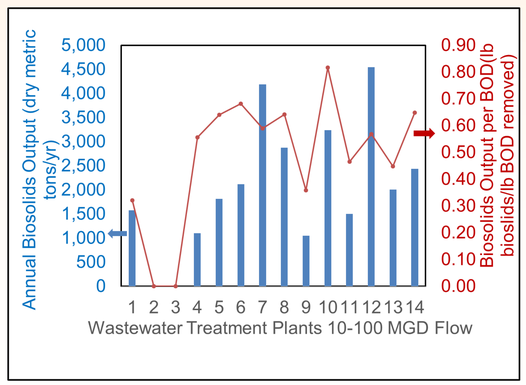

Fig. 3: Annual biosolids output and biosolids output per unit of BOD removed from influent water. Biosolids include both waste activated sludge and digested solids. Lower output biosolids to removed BOD is better

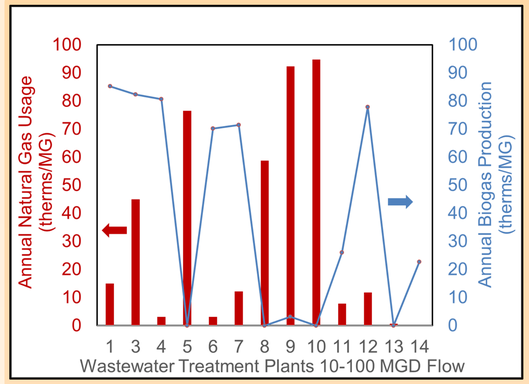

Fig. 4: Annual natural gas usage and biogas production. Lack of biogas recovery and usage increase natural gas use.

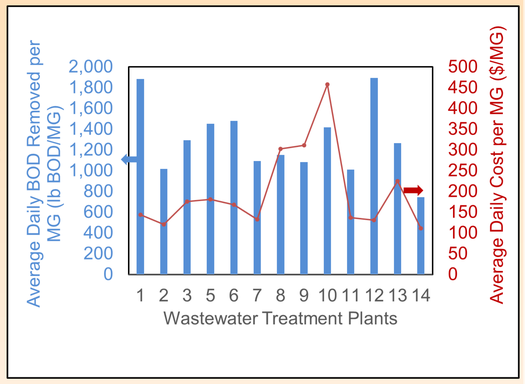

Fig. 5: Average daily cost (includes energy and biosolids disposal) is $200/MG treated.

FUTURE DIRECTIONS

- Correlate energy use to organic loading of influent and effluent streams, biogas production, and sludge utilization.
- Benchmark performance metrics for mid-size treatment plants with flows between 1-10 MGD in IL.
- Benchmark performance metrics for natural treatment systems like lagoons.
- Improve the current survey to include quality checks, standardization of terminology and units, and reduce respondent time burden.

ACKNOWLEDGEMENTS

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- Mr. Bruce Rabe at the Urbana Champaign Sanitary District for helping with survey construction and testing.