

# Selection and Design of Fine Bubble Diffusers for Maximum Economic Value

**Treatment of wastewater is an energy intensive process. The cost of operating a wastewater treatment facility is increasing dramatically at current and projected energy costs. Energy efficient technologies should be a primary focal point in the planning and design of today's WWTP facilities.**

**Figure No. 1**

Treatment Type	No. Facilities Surveyed	kWh per Million Gallons
Activated Sludge	51	3,954
Aerated Lagoons	15	7,288
Oxidation Ditch	19	6,895

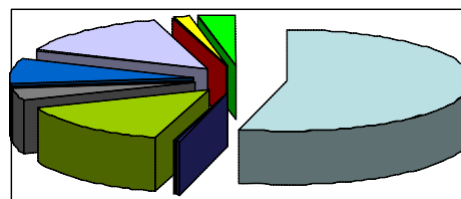
Figure No. 1 presents energy use data for primary types of treatment facilities. The energy requirement varies significantly, but in all cases, a significant amount of energy is consumed for all types of facilities.

Derived from data from the State of WI, Focus on Energy, Water and Wastewater Energy Best Practice Guidebook

**Figure No. 2**

## Electricity Requirements for Activated Sludge Facility

Figure No. 2 shows the electricity requirements for the major components in an activated sludge facility. The aeration technology used at the facility is paramount as aeration is the most energy intensive operation in the plant. The requirement for aeration increases even more when aerobic digestion is used.



- Aeration
- Sludge Pumping
- Gravity Thickening
- Anaerobic Digestion
- Dewatering
- Chlorination
- Lighting & Bldgs
- Influent Pumping
- Screens
- Grit
- Clarifiers

Derived from data from the Water Environment Energy Conservation Task Force *Energy Conservation in Wastewater Treatment*



# PRODUCT SPECIFICATION SHEET

## Technology Review:

The aeration system in terms of technology selection, system design, and facility operations must be appropriately managed in order to meet industry "best practice" guidelines. A focus on life cycle ownership costs is critical to achieve true maximum value.

In general, all fine bubble (fine pore) diffusers provide increasing oxygen transfer at decreasing diffuser gassing rates, however, few products can deliver true maximum total ownership value.

## Typical Diffuser Characteristics:

- Ceramic diffusers are limited due to high clogging rates at low gassing rates.
- Circular (disc) diffusers offer an ideal gas release profile but only support limited diffuser densities due to poor spatial (nesting) efficiency.
- Tube diffusers can be installed at high diffuser density but present a less than ideal gas release profile.
- FlexAir® MiniPanel diffuser offers significant design flexibility including high spatial (nesting) efficiency, ideal gas release profile, and a range of perforation options to match volume and pressure constraints.

**Figure No. 3**

**Available Savings using Total Ownership Design Approach  
Retrofit Application using Existing Blowers**

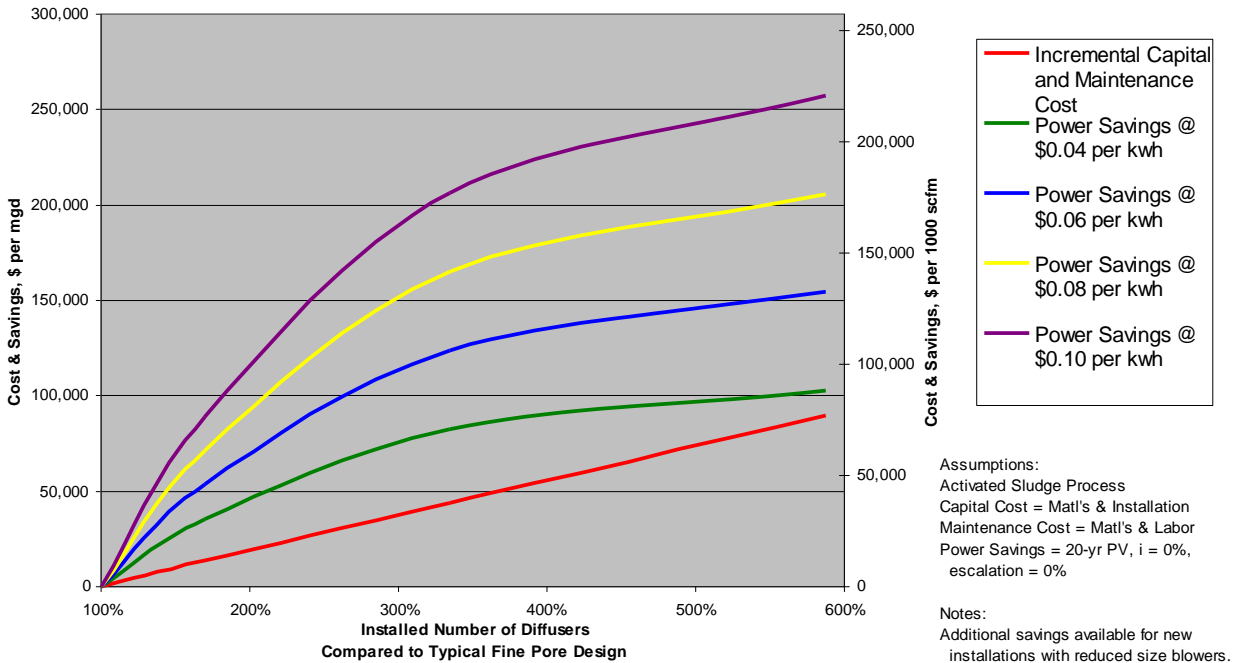


Figure No. 3 shows the incremental investment and return available with high density, fine bubble diffuser applications. Total return on investment in excess of 300 to 500% are available with the appropriate technology and design methodology.

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