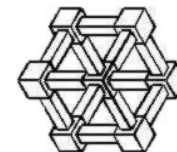


# JET-LOOP SYSTEM®

A New Energy Efficient  
and Near Zero Excess Sludge Production  
for Aerobic Wastewater Treatment  
using Atmospheric Oxygen  
Driven to the Effluent by Ejector(s)

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## **The waste sewage disposal recent history:**

**First Sewage treatment plants by the beginning of 20<sup>th</sup> century.**

**Septic tanks for individual households at rural areas – first half 20<sup>th</sup> century.**

**Introduction of lagoons and similar sewage treatments decade 50-70 -20<sup>th</sup> century.**

# The waste sewage disposal present :

## Secondary wastewater treatment systems

### Activated sludge processes:

- EXTENDED AERATED LAGOONS
- OXIDATION DITCHES
- HIGH RATE ACTIVATED SLUDGE PLANTS
- BIOFILTERS

HIGH ENERGY DEMAND AND CONSUMPTION

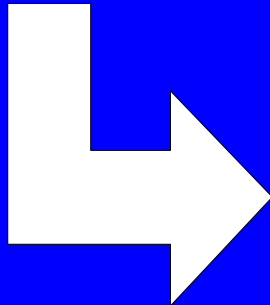
BIG AMOUNTS OF SLUDGE EXCESS → SLUDGE DISPOSAL

LOW ELIMINATION OF NUTRIENTS: NITROGEN, PHOSPHOROUS

NO WATER REUSE

# THE NEEDS FOR PRESENT AND FUTURE:

**Total reclamation of treated wastewater**



- LESS ENERGY SPENT ON THE TRATMENT
- ZERO EXCESS SLUDGE
- HIGH QUALITY OF FINAL TREATED WATER

## **The JET-LOOP SYSTEM® answer to the challenge :**

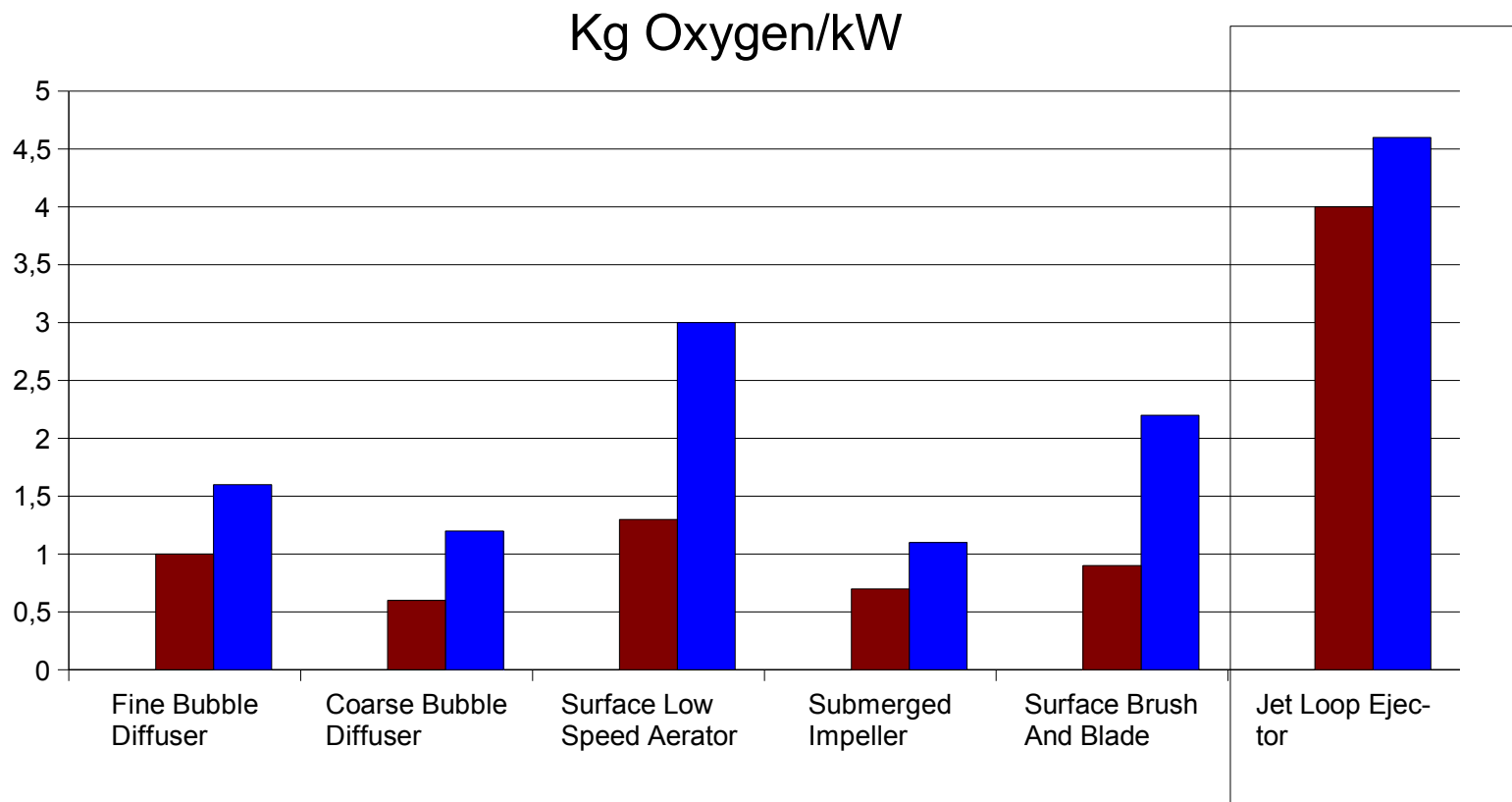
**Energy consumption reduction , through the efficiency in oxygen diffusion.**

**Sludge elimination through the high mechanical sheer stress**

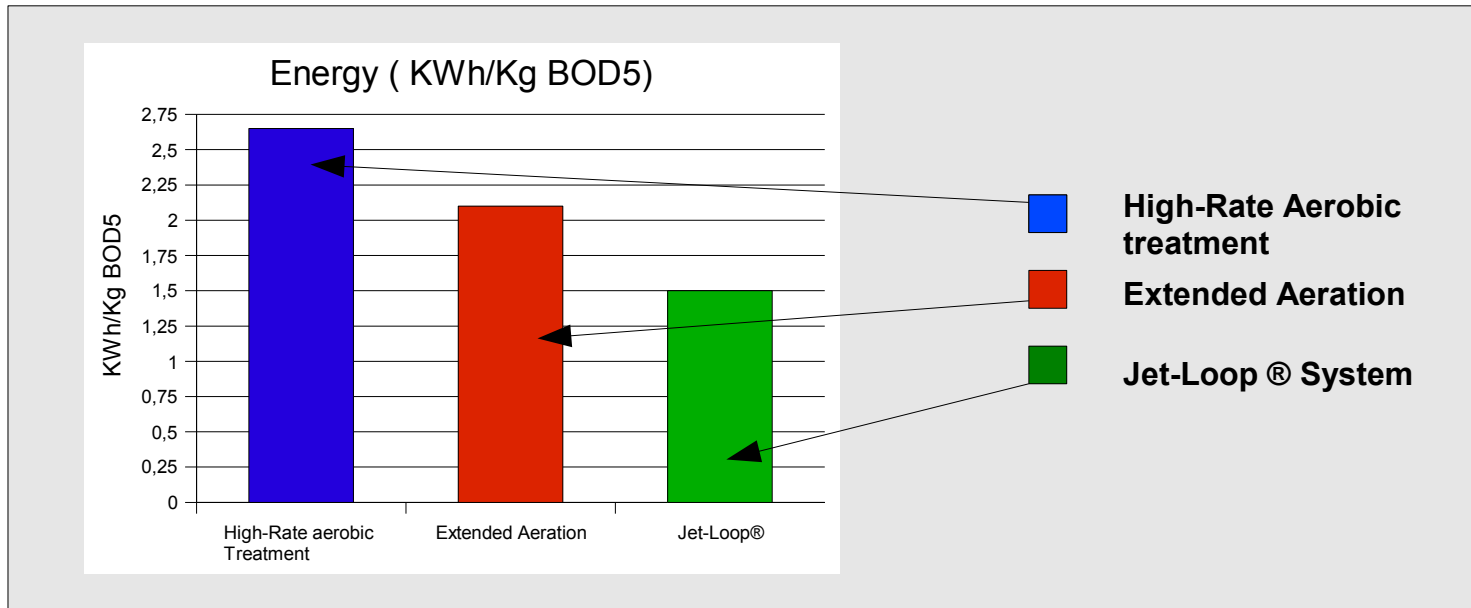
**Treated water reuse/ reclamation through the use of UF /MBR**

**Mechanically simple and affordable system**

# Typical Ranges of Oxygen Transfer for different Aeration Systems



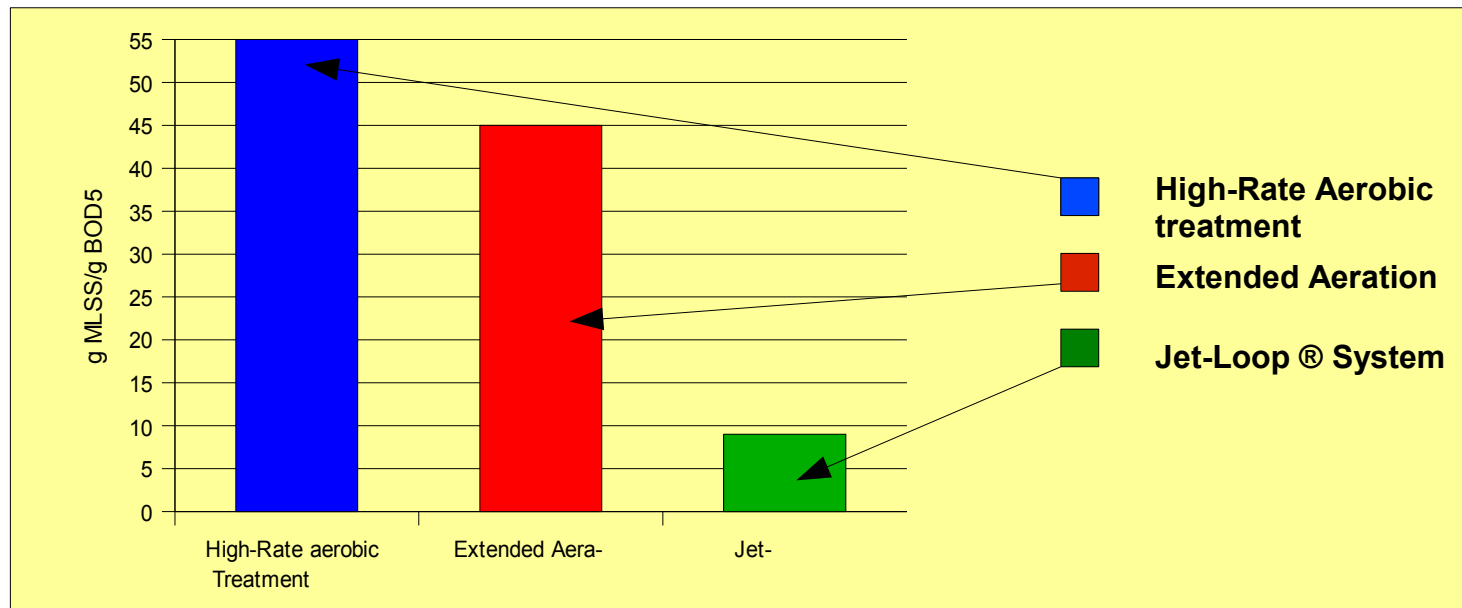
# Aerobic Processes Comparative Energy Consumption.



Example: wastewater treatment plant for 1M habitants city:  
High-Rate AEROBIC TREATMENT energy required: **5958KWh.**  
Extended Aeration: = **4812 KWh.**  
JET-LOOP®: = **1895 kWh.**

Energy difference per year:  $(5958-3437) \times 24 \times 365 = \mathbf{35.591 Mw/year}$

# Aerobic Processes Comparative Sludge Production

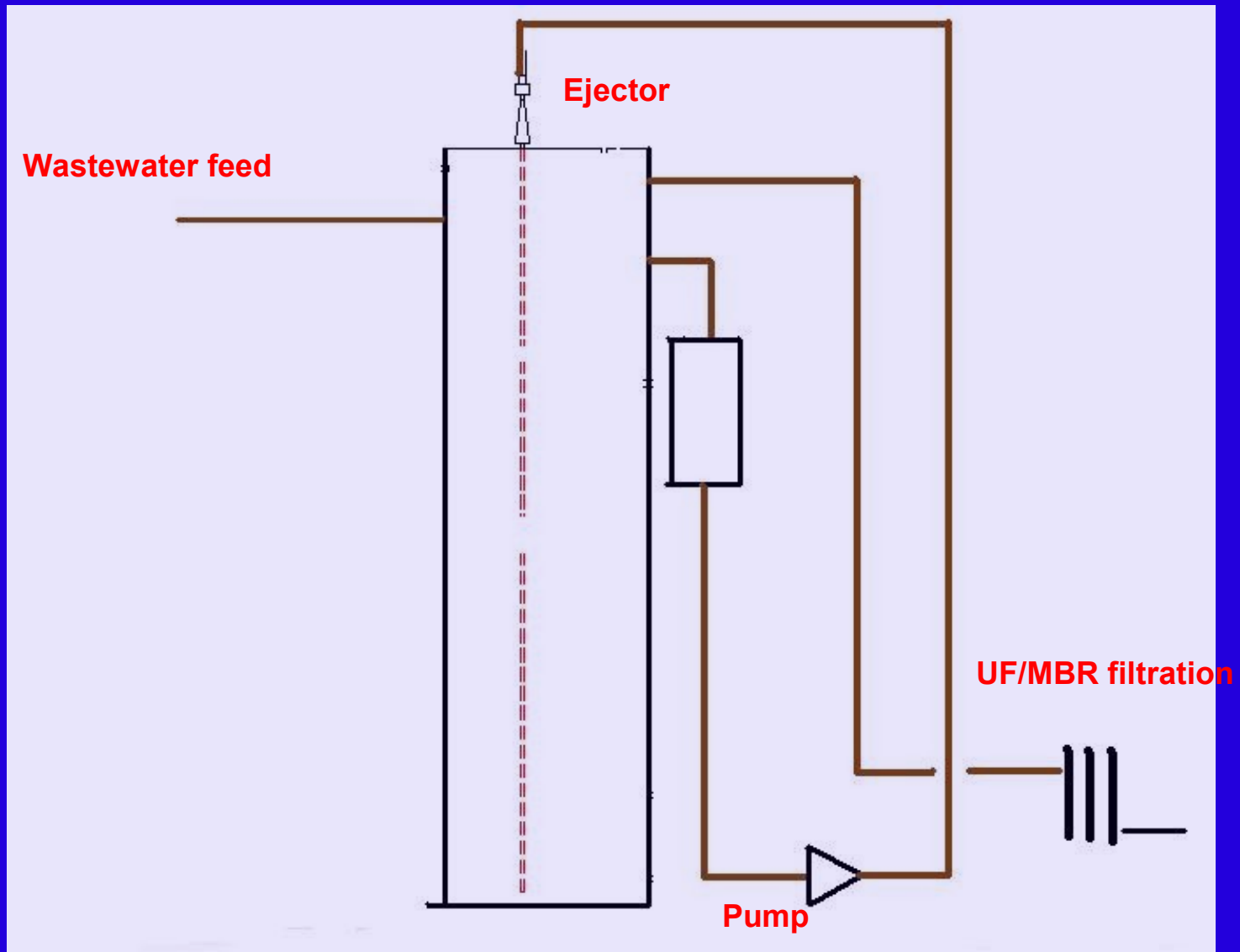


Example: wastewater treatment plant for 1M habitants city:

- High-Rate sludge production:  $55\text{gBOD5} \times 1\text{M} \times 0,55 = 30,250$  Tons/day.
- Extended Aeration: = **24,750 Tons/day.**
- JET-LOOP® SYSTEM: = **4,950 Tons/day.**

Sludge difference per year:  $(30,250 - 4,950) \times 365 = 9.234,5$  Tons/year

# JET-LOOP SYSTEM Process Diagram



## **Jet- Loop System, special features:**

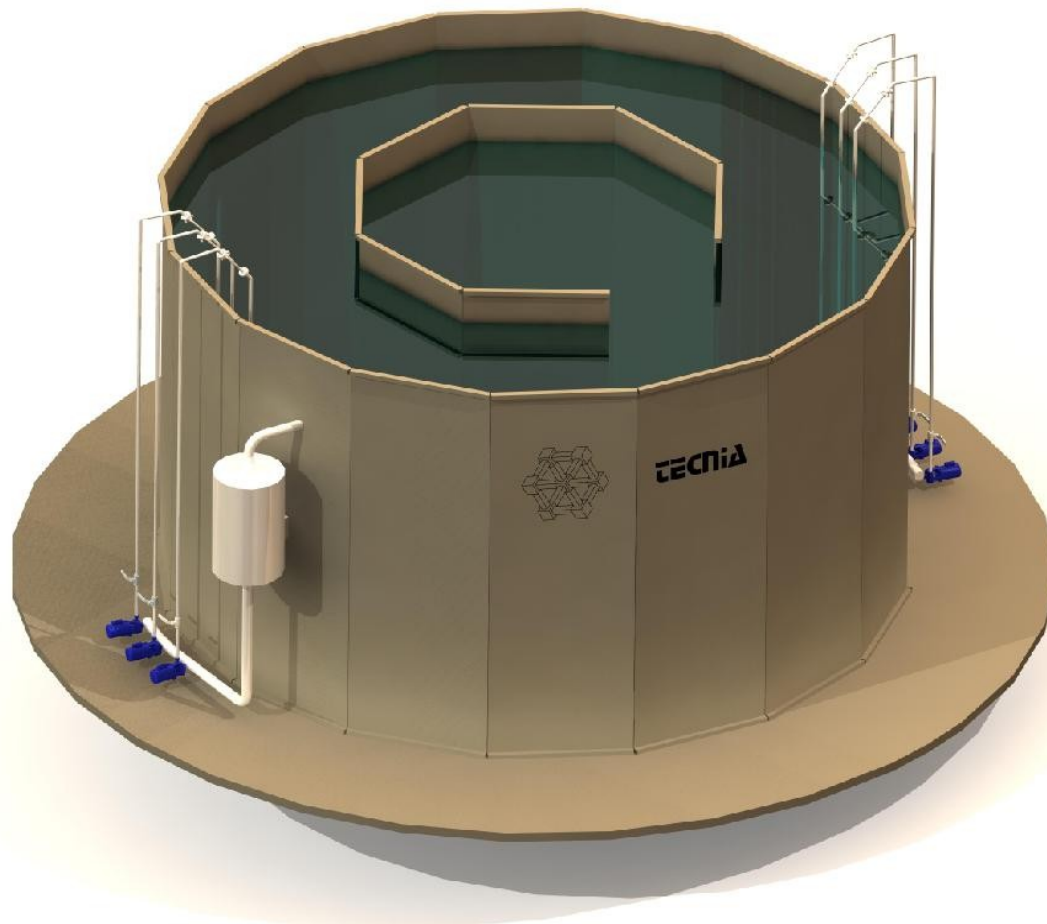
**The Ejector(s) position allows for a total passage of air in the effluent of 15 meters,( 7,5m down and 7,5m up-flow).**

**The result in Overall Oxygen Diffusion Coefficient (K<sub>la</sub>), is as high as 0,33 min<sup>-1</sup>, and the Standard Oxygen Transfer Rate (SOTR), is up to 4,6 Kg O<sub>2</sub>/KWh.**

**The Ejector(s) geometry was developed for optimize the volume of air introduced into the effluent. The actual ratio is as high as 3 volumes of air per 1 volume of effluent.**

**The operating pressure at the ejector(s), allow for a continuous destruction of biomass, preventing the formation of aggregated flocks of biomass, and damaging the wall cells by the mechanical sheer stress applied.**

## The Jet-Loop System®



The treated wastewater is clarified by Ultra-Filtration Membranes.

Objective:  
Water Reclamation

Water Quality:

NTU < 0,1  
TSS < 1 mg/L  
Fecal coliforms < 5 LRV  
Total coliforms < 6 LRV  
Viruses < 2,5 LRV

The Jet Loop System® wastewater treatment is an advanced solution, simultaneously simple and effective, applicable with advantages on several situations, from municipal wastewater, to industrial wastewater with high organic loads, producing very low amounts of sludge, demanding less energy and keeping the process mechanically reliable with low maintenance.

Thank you for your attention.