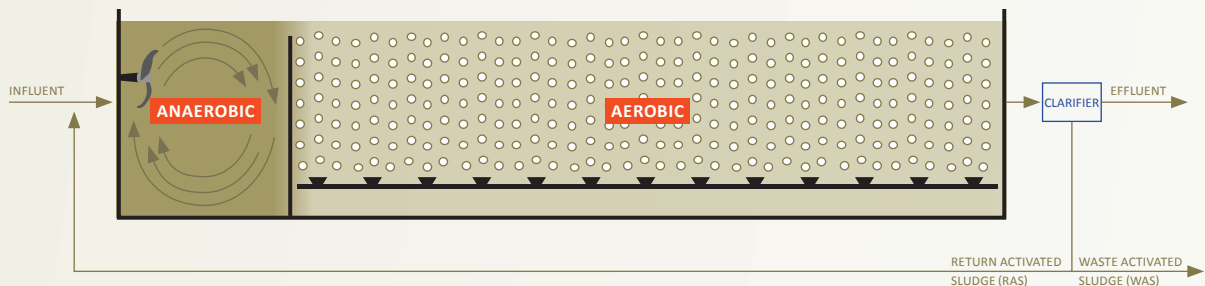


## BIOCYCLE-ENR ACTIVATED SLUDGE PROCESS

# AO Configuration

The **BioCycle-ENR Anaerobic Oxidic (AO)** process configuration is a biological nutrient removal treatment solution that is designed for facilities required to meet effluent total phosphorus and ammonia limits. Utilizing the FlexZone™ Adaptive Process Volume System, the AO process transitions excess aeration volume to simultaneous nitrification denitrification (SNDN) operation. This low dissolved oxygen (DO) SNDN environment reduces nitrates in recycle streams and protects the anaerobic environment. In addition, the FlexZone system enables best carbon management practices to optimize energy and chemical consumption.

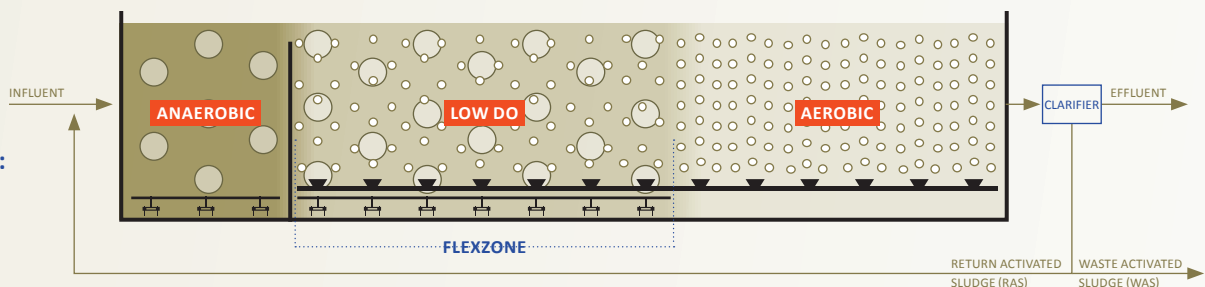
### THE PROBLEM: Conventional Approach



High nitrate concentrations in the RAS stream can alter anaerobic conditions and inhibit biological phosphorus removal.

Conventional point source mixers **require physical baffles** to facilitate the mixing regime needed to ensure complete mixing.

### THE SOLUTION: BioCycle-ENR for AO



**SyncoMix**, the unique combination of BioMix integrated with fine bubble diffused aeration, **creates low DO environments** and prevents mixing limited over-aerated conditions through **independent control of aeration and mixing**.

Utilizing the FlexZone to create a low DO environment **promotes denitrification**, resulting in **lower nitrates in the RAS stream**.

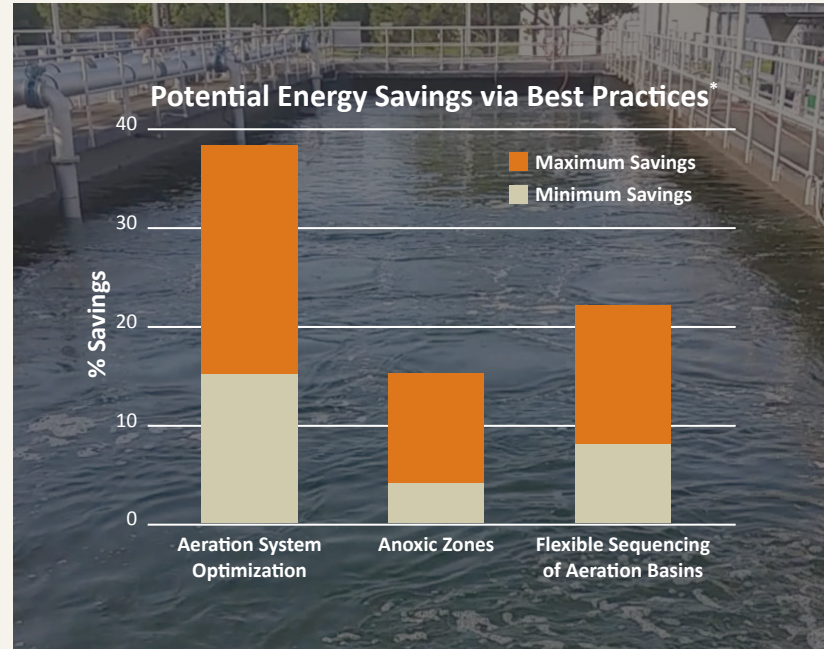
The **vertical mixing regime of BioMix Compressed Gas Mixing** maintains the **integrity of the low DO and aerobic environments** without the need for physical baffled zones.

## REDUCING ENERGY CONSUMPTION

According to Water Environment Research Foundation's Roadmap to Net Zero Energy, the three largest opportunities for energy savings at wastewater treatment plants are optimization of the aeration system, addition of an anoxic zone, and flexible sequencing of aeration basins. Utilizing low energy treatment options allows plants to get closer to energy neutrality. EnviroMix's BioCycle-ENR with the FlexZone system is perfectly suited to deliver on all three of these opportunities.

- BioCycle-ENR optimizes the aeration system by **matching the oxygen delivery to the oxygen demand through smart aeration controls** that have unmatched turn down and allow for low DO SyncroMix environments with independent control of aeration and mixing.
- Reducing required oxygen delivery by **manipulating the reactor environment to create anoxic conditions** recovers alkalinity and reduces nitrate recycle through denitrification kinetics.
- The FlexZone system takes sequencing to the next level without compromising mixing by dynamically **transitioning excess aerobic capacity** to energy-efficient mixing or low DO volumes.

\* Water Environment Research Foundation.  
Exploratory Team Report – Energy Management



## KEY ADVANTAGES FOR AN AO CONFIGURATION



### Process Optimization

- Capitalizing on the FlexZone system, BioCycle-ENR utilizes the proven AO activated sludge process to dynamically adapt the aerobic environment to changing temperature and loading conditions.
- Ability to reduce DO and nitrate in the return activated sludge stream to achieve effluent total phosphorus goals throughout the life of the system.



### Energy Efficiency

- Provides energy efficient operation by decoupling aeration and mixing.
- Independently meets mixing and oxygen demands with SyncroMix — concurrent operation of BioMix Compressed Gas Mixing and diffused aeration.



### Unparalleled Flexibility

- Offers a process configuration tailored to meet current and future total phosphorus objectives, optimizing energy consumption and treatment performance.
- Facilitates SNDN to optimize bio-P and minimize chemical consumption.



### Straightforward Operation

- Provides easy access to equipment outside of the tank.
- Requires minimal maintenance of in-tank equipment.

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TO OPTIMIZE YOUR AO CONFIGURATION  
WITH BIOCYLE-ENR.