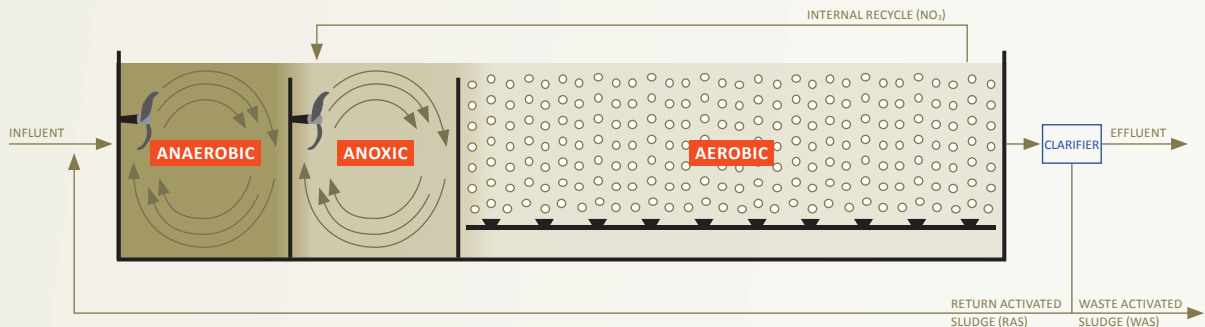


## BIOCYCLE-ENR ACTIVATED SLUDGE PROCESS

# A2O Configuration

The **BioCycle-ENR Anaerobic-Anoxic-Aerobic (A2O)** process configuration is a biological nutrient removal treatment solution that is designed for facilities required to meet effluent total phosphorus and nitrogen limits. Utilizing the FlexZone™ Adaptive Process Volume System, the A2O process ensures the proper balance of anoxic, low dissolved oxygen (DO), and aerobic environments to meet nitrification and denitrification requirements under varying loading conditions throughout the life of the treatment facility. In addition to ensuring low levels of effluent total phosphorus and nitrogen, the FlexZone system enables best carbon management practices to optimize energy and minimize chemical consumption.

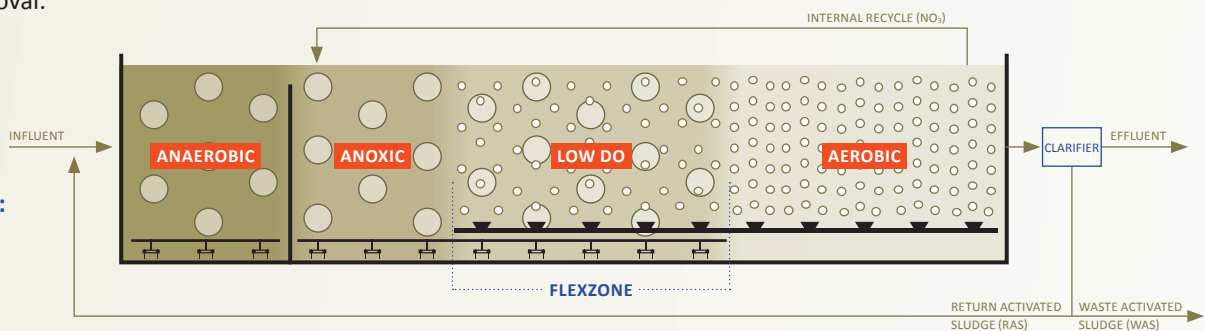
### THE PROBLEM: Conventional Approach



When operating at less than design conditions, **excess aerobic volume leads to high DO in the internal recycle and RAS streams**, negatively affecting denitrification and 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 A2O



BioCycle-ENR **transitions the excess aerobic volume to low DO or anoxic volume**, ensuring more effective aeration control and efficient nutrient removal.

**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**.

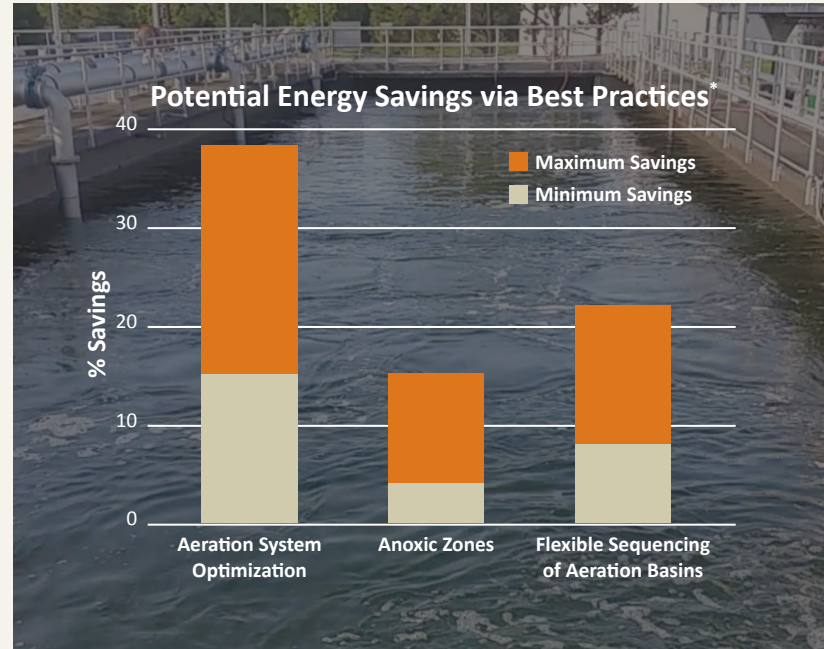
The **vertical mixing regime of BioMix Compressed Gas Mixing maintains the integrity** of the anoxic and aerobic environments without the need for physical baffled zones.

## 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 A2O CONFIGURATION



### Process Optimization

- Capitalizing on the FlexZone system, BioCycle-ENR utilizes the proven A2O activated sludge process to dynamically adapt anoxic and aerobic environments to changing temperature and loading conditions.
- Delivers the ability to ensure proper balance of anoxic and aerobic volumes to achieve effluent total nitrogen goals and minimize nitrate recycle to the anaerobic zone.



### 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 and nitrogen objectives, minimizing energy and chemical consumption.
- Provides the ability to create or expand anoxic zones without adding additional tank volume.



### 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 A2O CONFIGURATION  
WITH BIOCYLE-ENR.