مصادر المستقبل | FUTURE RESOURCES

WATER MATRIX TECHNOLOGIES FZE

WATER MATRIX TECHNOLOGIES FZE.

“Unleashing the best solutions”

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  - Ideal Aerator Characteristics
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We Care

The available fresh water on the earth is less than 1% which is to fulfill the need for the entire world population!!! The incessant growth of the world population and accompanying pollution has led to serious water shortage by wasting precious resources. At Water Matrix Technologies FZE. we are dedicated with passion to preserving precious resources by viable technologies for reuse and recycle of wastewater.

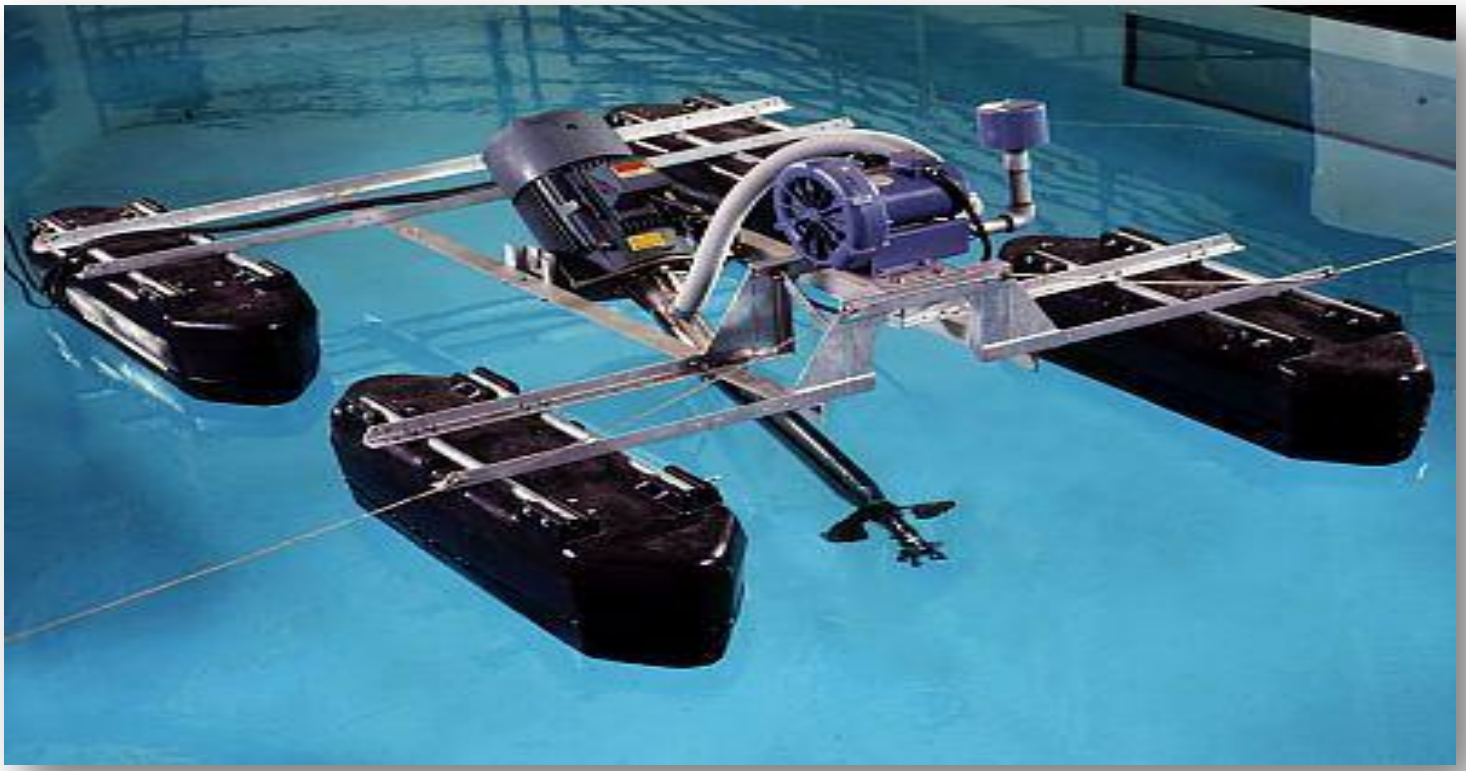
Our Mission

"To meet and exceed customer expectations through innovation and continuous improvement in technology, system and human capabilities and to be the leading provider of the cost effective instruments, equipments and Technical services in the Water and Wastewater treatment field at local and global perspective."

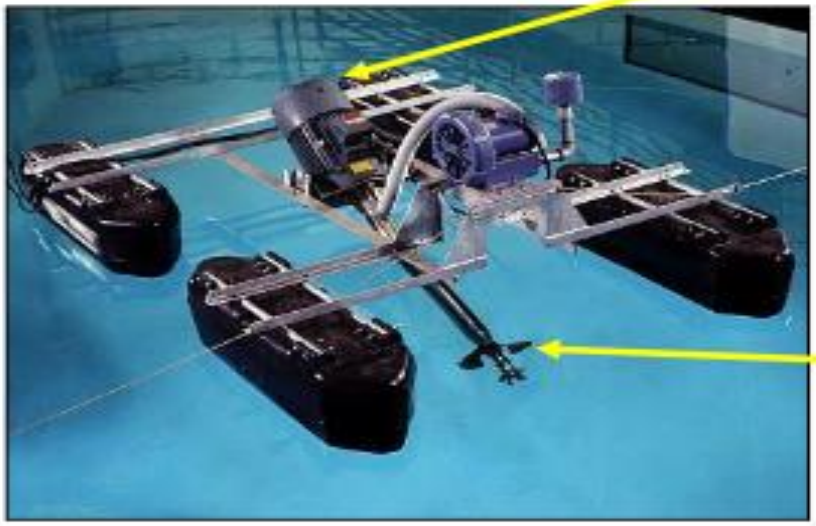
Aeration Industries International (AIRE – O2)

Aeration Industries International, Inc. was co-founded in 1974; The Company developed and introduced the innovative aspirator aeration technology first time in the world into the water treatment market under the trademark, "AIRE-O_2". Today, Aeration Industries is the world's largest manufacturer of aspirator aeration equipment and has installation in more than 92 countries around the globe operating almost 62,000 maintenance friendly AIRE – O2 units.

Patented Technology – Triton Process Aerator



Key Feature of the AIRE-O_2 Triton® Aerator



- Low Speed Motor
  - 900 RPM 60 Hz.
  - 750 RPM 50 Hz.
- Addition of Onboard Regenerative Blower Allows for Process Control (Nitrification / Denitrification)
- Oversized Mixing Propeller Ensures Excellent Mixing
- Higher O_2 Transfer
- Energy Savings Due to Improved Efficiencies & Turn Down Capability

Theory of Operation – Aeration Mode

- Air is pressurized using a high efficiency regenerative blower
- Air is forced down the hollow shaft through Saturn Ring Diffuser
- The air is then sheered into fine bubbles, while the large mixing propeller forces the air in a downward direction
- This action dramatically extends bubble hang time and the pressure that the bubble is under, thus increasing oxygen transfer
- Allows for deeper tank configurations, thereby allowing a small footprint and less land required for the system.

Theory of Operation – Mixing Mode

- When blower is turned off, the mixing propeller maintains velocities in the channel without the introduction of air
- This allows for turn down capability when BOD & flows are at lower levels resulting in energy savings
- Uniform solids suspension in the basin at all depths is maintained for optimal denitrication

Ideal Aerator Characteristics

1. High Oxygen Transfer
2. Tremendous Mixing Ability
3. Energy Efficient
4. Ability to Address Biological Nutrient Removal (BNR) regulations
5. Low Maintenance & Cost of Ownership
6. Environmentally Safe

High Oxygen Transfer

1. Low speed operation (750 RPM) and addition of high volume blower forced aeration create a precise mixing velocity and high air flow
2. Unique dual propeller design shears airflow into fine bubbles (the Aire-O_2® is the only 'fine bubble' aspirator as defined by EPA – 2.2 mm or less)
3. The result of increased bubble hang time and fine bubble aeration is <u>Higher Oxygen Transfer</u>

Mixing Ability

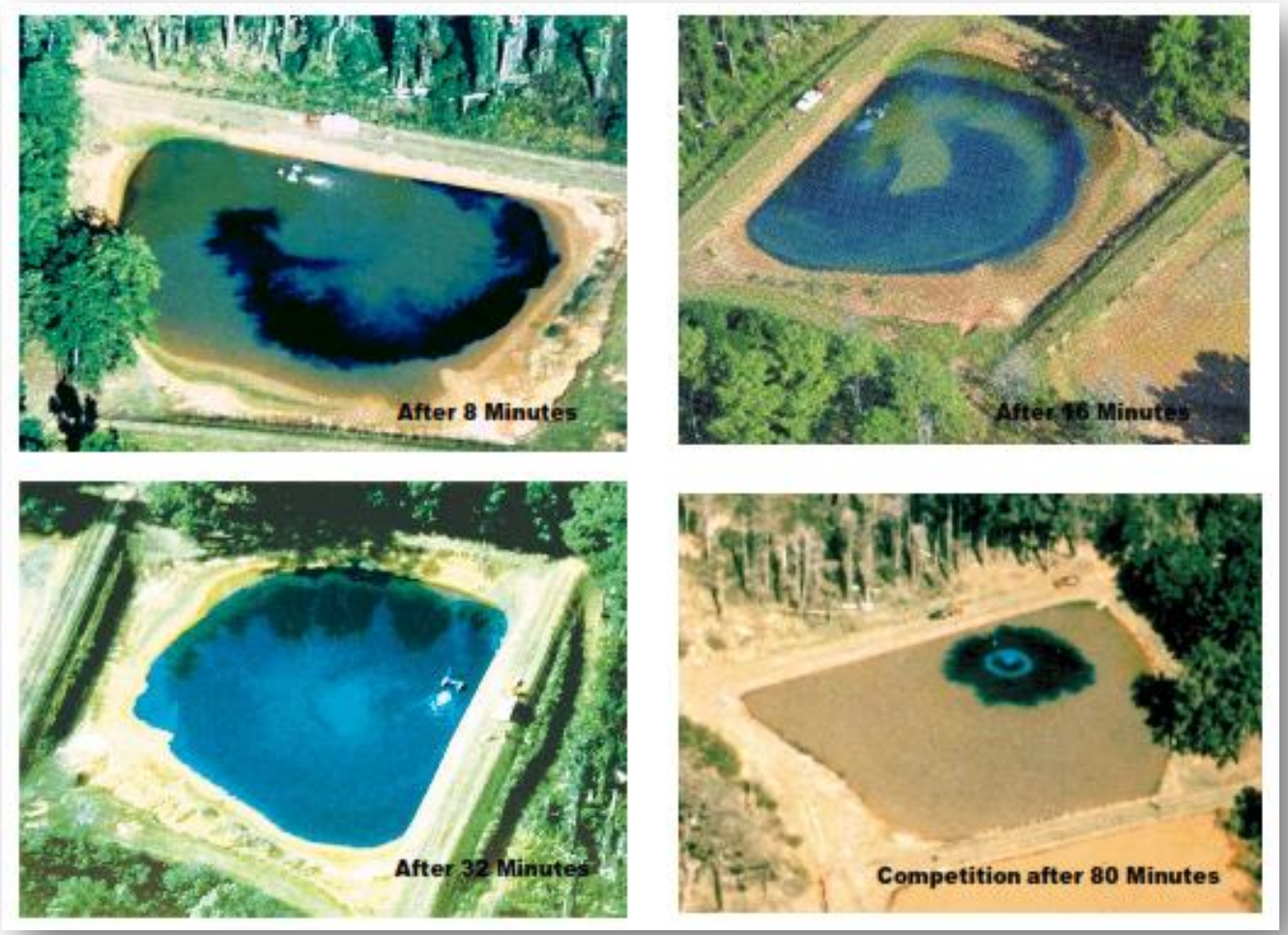
1. Because low speed, mixing prop much larger than standard high speed aerators
2. Independent tests in Florida, USA confirm Triton aerator can mix depths up to 10 meters.
3. Great depths = smaller footprint installations
4. The resulting mixing superiority means better oxygen dispersion and improved wastewater treatment efficiencies

10 Hp AIRE-O_2 Triton® Power Mix™ (Top)

10 Hp AIRE-O_2® Aspirator Propeller (Bottom)

Satellite Image of Mixing ability

2 Hp AIRE-O_2® Aerator Dye Test at Auburn University



Existing AIRE-O_2® Aerators in Saudi Arabia

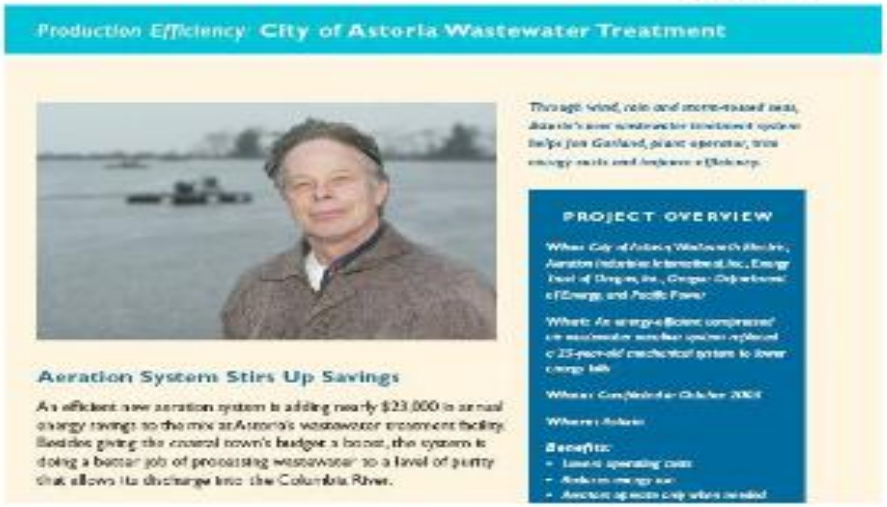
CHEMNOL Manufacturing Company in Jubail Industrial City is using 3 Aerators in their treatment plant as following:

- 5 HP Aerator in the Chemical Mixing Tank.
- 7.5 HP in the Equalization Tank.
- 10 HP in The Final Treated Water Tank.

Energy Efficient

1. **High Oxygen Transfer and Superior Mixing means less kW is required for installation**
2. **The result is energy savings of thousands of dollars to end users and municipalities over time**
3. **Case studies include Energy Trust of Oregon where total of $23,000 USD is saved annuallv ($230K over 10 years)**

EnergyTrust of Oregon, Inc.



2000 m³/day Lagoon Project

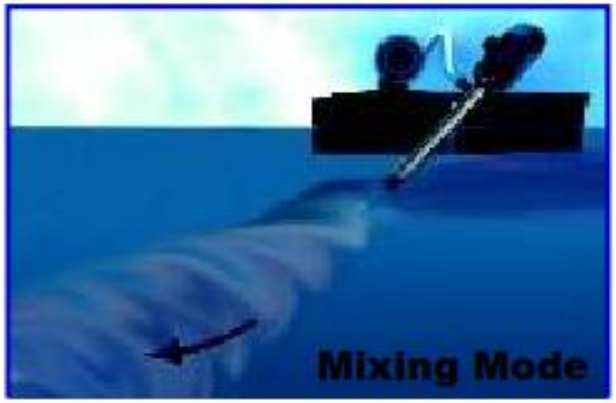
Triton's High Efficiency = Major Savings!

- **Conventional Surface Aeration**
  - 50Hp For Oxygen Demand
  - 400Hp For Mixing
- **Aspirator**
  - 70Hp For Oxygen Demand
  - 200Hp For Mixing
- **Triton**
  - 50Hp For Oxygen Demand
  - 100Hp For Mixing

Thus, client saved 100 Hp (74.6 kW) in choosing Tritons!

Ability to Address BNR

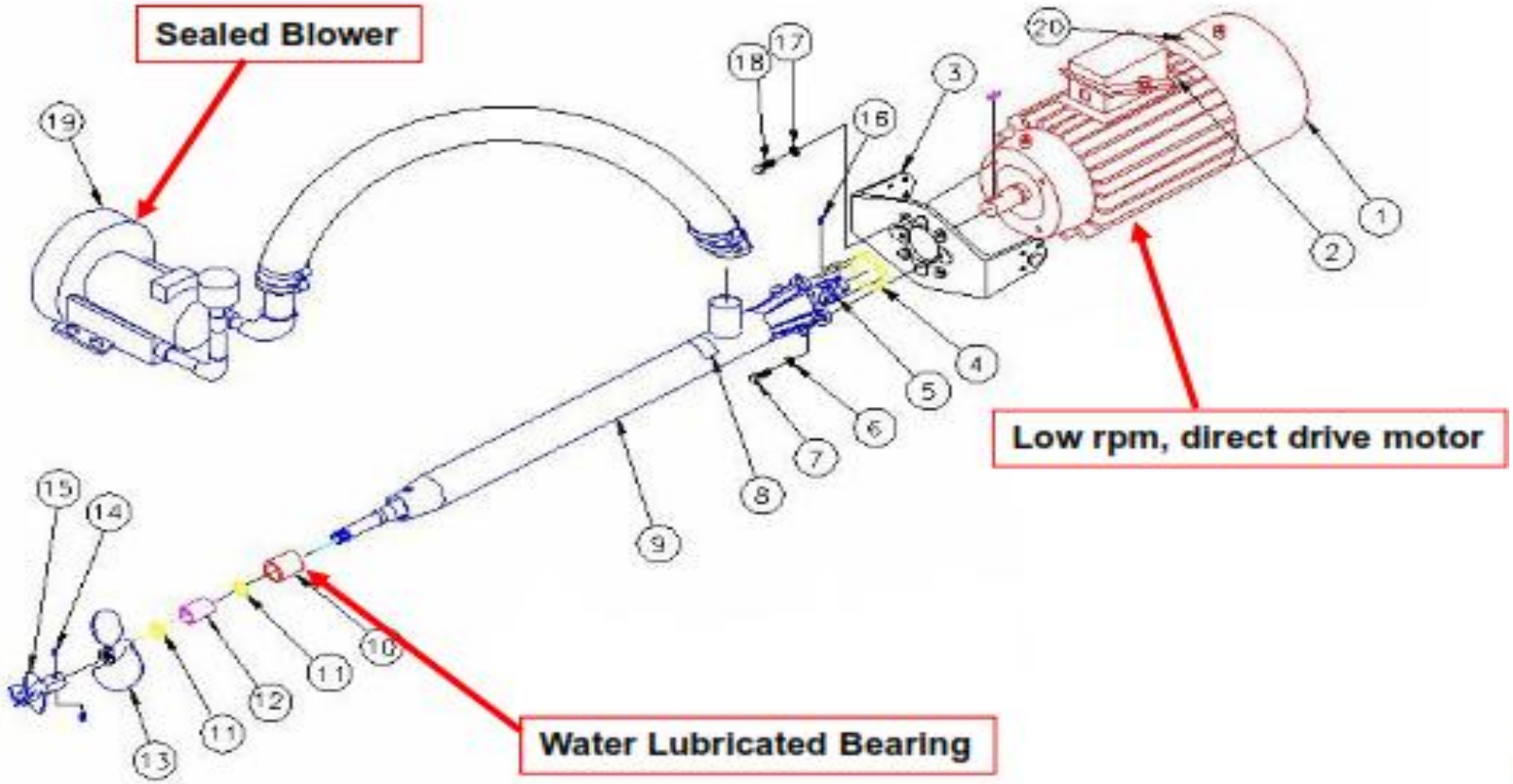
1. Compete separation of 'Mixing Only' and 'Mixing / Aeration' Modes means Dual Mode Operation
2. Conventional aeration systems only operate in aeration mode only, thus additional mixers are required for BNR Removal or denitrification
3. With Triton aerator, BNR is possible with one single aerator / mixer! (Ideal for Sequencing Batch Reactors)
4. Allows for complete Process Control of system



Low Maintenance & Cost of Ownership

1. Slow speed operation (750 RPM 50 Hz. / 900 RPM 60 Hz.) means less wear & tear, thus lower maintenance
2. Triton aerator does not have troublesome and expensive gear boxes. Only spare part is water lubricated bearing
3. Warranty up to Five (5) years
4. Aerator maintenance and inspection can be done on aerator without any down time, crane usage or pond draining (see photo below)
5. All of the above = Lower Cost of Ownership

Simplicity of Design



Environmentally Safe

1. No splashing or aerosoling of toxins
2. No VOC Emissions into Atmosphere
3. All aeration / mixing done subsurface
4. Quiet operation (60 dBA) insures no noise pollution. No housing enclosures required

Comparison with Other Aerators

Diffused Air Aeration

- ✓ Requires heavy maintenance; frequent replacement requires significant down time
- ✓ Blowers are extremely loud and require separate housing enclosures
- ✓ Requires separate mixers for BNR removal / denitrification

Comparison with Other Aerators

Low Speed Surface Aeration

- ✓ Mixing only local; sludge can form in many parts of the pond / tank
- ✓ Heavy splashing emits harmful toxins into atmosphere and is very loud
- ✓ Consists of troublesome gearboxes which are expensive to replace and suspect to failure

Comparison with Other Aerators

High Speed Surface Aeration

- ✓ Aeration mode only, not capable of BRN removal
- ✓ Mixing only local; sludge can form in the pond & tank (especially in deeper ponds)
- ✓ Lack of oxygen dispersion (see dye test photo)
- ✓ Heavy splashing emits harmful toxins into atmosphere and is very loud

Comparison with Other Aerators

Brush & Disk Rotor Aeration

- ✓ Mixing only on top surface layer, sludge accumulates beyond 2 meters depth
- ✓ Heavy splashing emits harmful toxins into atmosphere and is very loud
- ✓ Consists of troublesome gearboxes which are expensive to replace and suspect to failure

Various Applications

- Municipal Wastewater
  - -New Plants
  - -Upgrade Facilities (lagoons, ovals, tanks, etc.)
- Industrial Wastewater
  - -Pulp & Paper
  - -Petro Chemical
  - -Dairy
  - -Food Processors
  - -Beverage
  - -Leachate
  - -Meat & Poultry
  - -Lakes, Rivers and Harbor Beautification
  - -Golf Course Management
  - -Aquaculture

Installation Images

Lagoons

Aeration Basins

Oxidation Ovals / Ditches

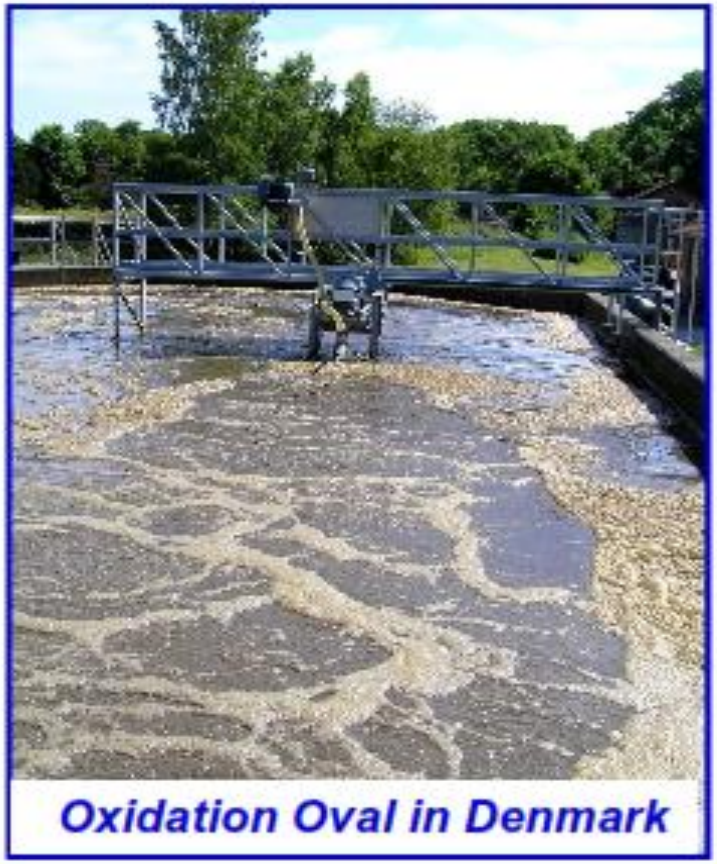
Installation Images

Sequencing Batch Reactors (SBR's)

Lake Restoration

Examples around the Globe

Lagoons in Mexico



Oxidation Oval in Denmark

Examples around the Globe

Activated Sludge in China

Pulp & Paper in Sweden

Cost Analysis

Aeration System for 1 MLD Sewage Treatment Plant			
	Triton (240 HP)	**Surface (360 HP)**	**Diffuser (360 HP)**
Capital Cost	$ 302,916	$ 224,300	$ 174,750
Operational Cost/annum	$ 235,206	$ 353,466	$ 353,466
Cumulative maintenance cost for 3 years	$ 1,000	$ 58,500	$58,500
Savings with Triton after 3 years		$ 412,280	$ 412,280

Summing-up

- **Aeration Industries International Inc.'s AIRE-O_2 Triton® aerator is the ideal aerator because it offers:**
  - **High Oxygen Transfer**
  - **Tremendous Mixing Ability**
  - **Energy Efficiency**
  - **Biological Nutrient Removal (BNR) due to its unique dual mode operation**
  - **Low Maintenance and Cost of Ownership**
  - **Environmentally Safe Solution**
- **Aeration Industries Stands Behind Its Product with Industry Leading Minimum 3-Year Warranties and Professional Technical Support**

Containerized Packaged Sewage Treatment Plant

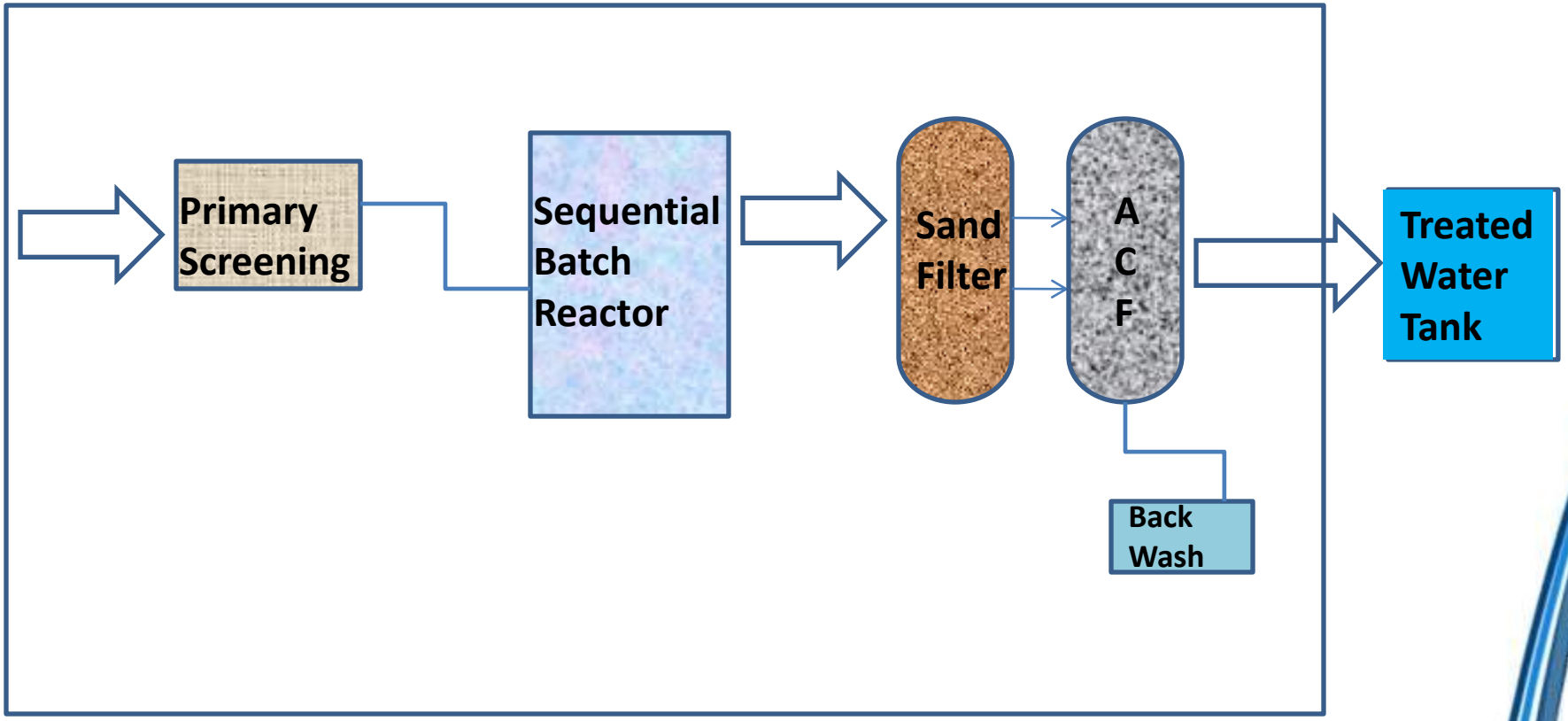
Requirement of Packaged STP

- Best technology for camps, movable camps in desert, Housing colonies, Resorts & Hotels, Hospitals, Universities and Industries having separate STP
- It is containerized and hence would not hamper aesthetic values of the site
- Desired results of using treated water for irrigation application can be achieved in Packaged STP
- Easy to install and move its location

Our System

- Our system is based on proven technology of SBR – Sequencing Batch Reactor
- It is plug and play kind of system
- It is fully automatic plant with back wash system for filters
- Treated water can directly be used for irrigation or other equivalent application without need of further tertiary treatment

Overview of the System



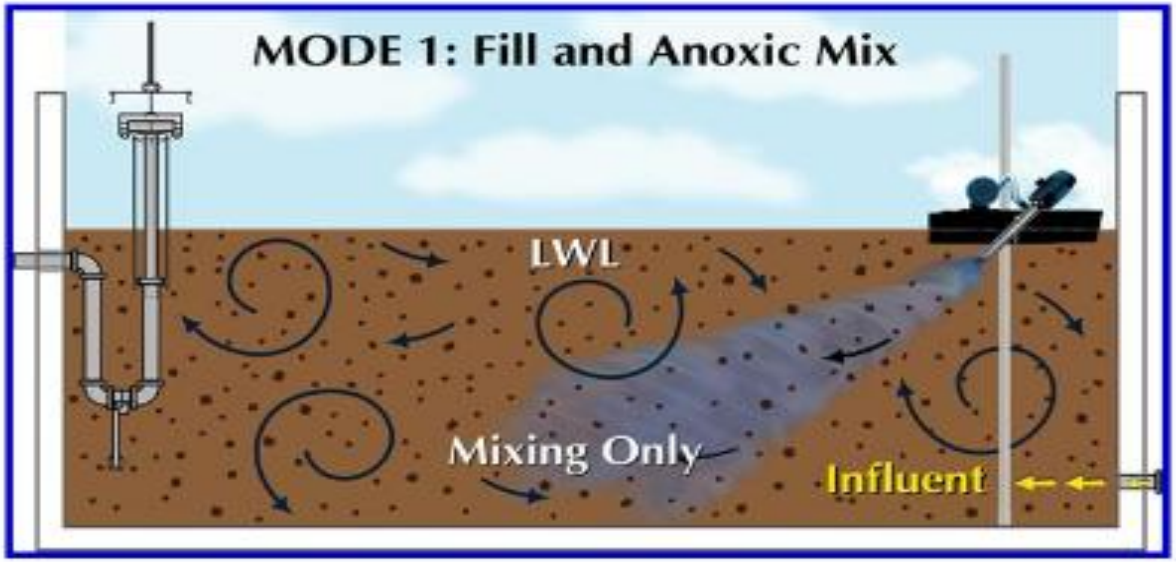
SBR – Sequencing Batch Reactor

Uniqueness of SBR:

- Primary & Secondary Clarifier is not required
- Eliminates Diffused air piping system, blowers and mixers
- Low Sludge volume
- Quick response to changing influent condition
- Enhanced nutrient removal

Step 1: Fill and Anoxic Mix

- Influent Entering SBR
- Water Level Rising from Low Water Level for Set Time
- Triton Blower is OFF, Triton Mixer ON
- Decanter Raised Above Maximum Water Level
- Note: If process does not need an anoxic mix, this will be aerobic mix.



Step 2: Fill and Aerobic Mix

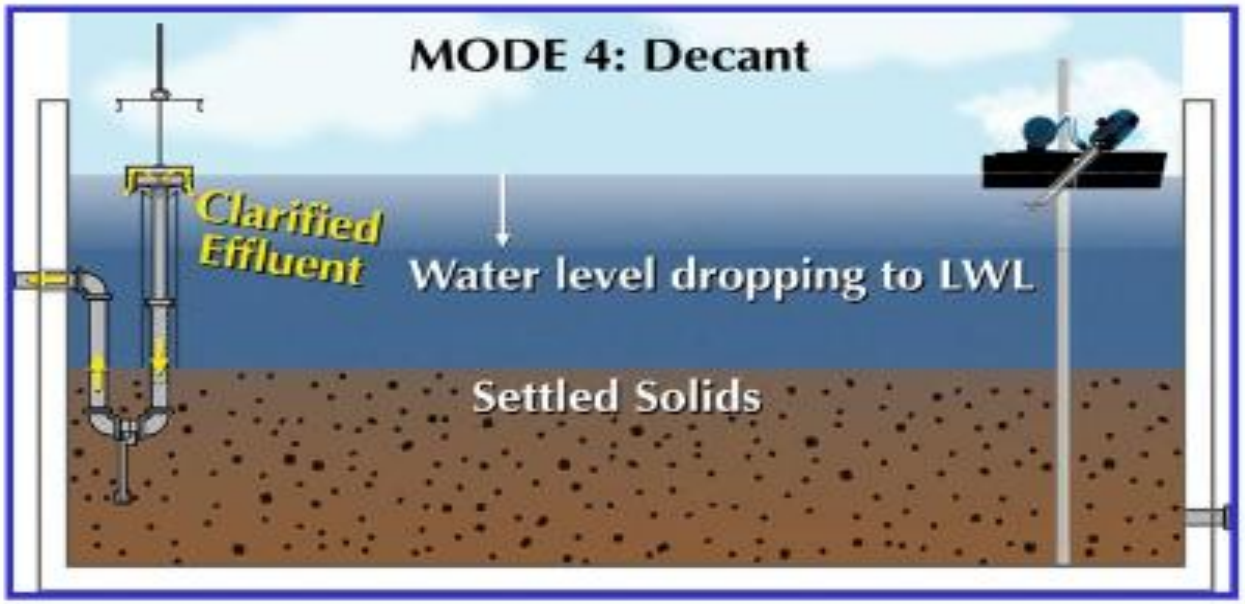
- Influent Entering SBR until High Water Level Reached, then Influent Stops
- Aeration and Mixing Continuing for a Set Time
- Triton Blower and Mixer Both ON

Step 3: Settling

- No Influent
- No Aeration / Mixing (Triton OFF completely)
- Mixed Liquor Suspended Solids (MLSS) Allowed to Settle Out

Step 4: Decant

- No Influent
- No Aeration / Mixing (Triton OFF Completely)
- Decanter is Slowly Lowered to Remove the Clarified Effluent



Technical Comparison with Competitor Product

Sequencing Batch Reactor (SBR) Packaged STP	Moving Bed Bio-Reactor (MBBR) Packaged STP
Maintenance Friendly as membranes are not used	Maintenance is difficult
Pumps are not choked because of media	Pumps get choked because of media
Media is not required	Media is to be replaced every 2 to 3 years
Good settling of TSS and hence water quality is better	Water quality has high TSS value as settling period is more
BOD reduction is better because of batch process	It is not batch process
It can easily take load fluctuations	Load fluctuations are not easily acceptable, as minimum and max. load need to be balanced
Sludge retention is more and hence sludge generation is less	Sludge retention is less compared to SBR process

Cost Analysis

50 KLD Packaged Sewage Treatment Plant		
	SBR based PSTP	**MBBR based PSTP**
Capital Cost	$ 65,000	$ 50,000
Operational Cost/annum	$ 6,000	$ 12,000
Cumulative operational cost for 10 years	$ 60,000	$ 120,000
Cumulative maintenance cost for 10 years	$ 20,000	$ 60,000

Waste Water Treatment

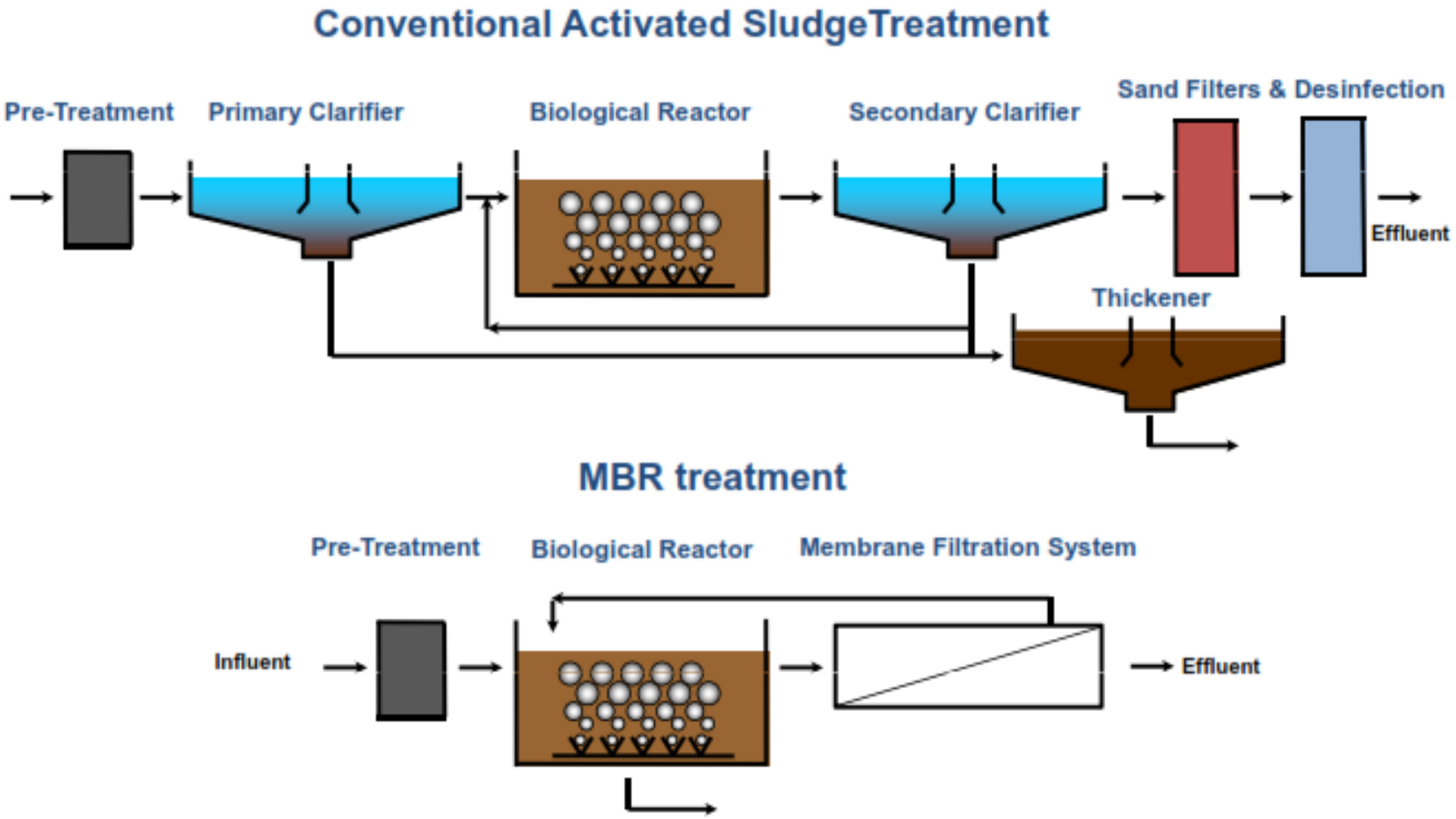
First company to design & provide a wastewater reuse plant to potable standards in food sector in UK (Kanes Foods 2001) and USA (General Mills/Cheerio's, 2006)

First company to provide eligible wastewater reuse plant under UK governments ECA tax allowance scheme (G's Beetroot, 2006)

Second and third eligible plants under the ECA scheme now been constructed and commissioned at Unilever UK/Marmite (EGSB/AMBR™/RO) and Simpsons Malt in Berwick (AMBR™/RO)

Frost & Sullivan Research placed Aquabio Ltd as 2006 European Market Leader in Industrial Wastewater Recycling & Reuse

Evolution of Industrial Wastewater Treatment



Why Evolution?

- Reduced footprint
- Reduced maintenance
  - More automation
    - Greater control and feedback
- Guarantied discharge quality
- Reduced sludge disposal costs
- Greater process flexibility
- Modular system

Which MBR system?

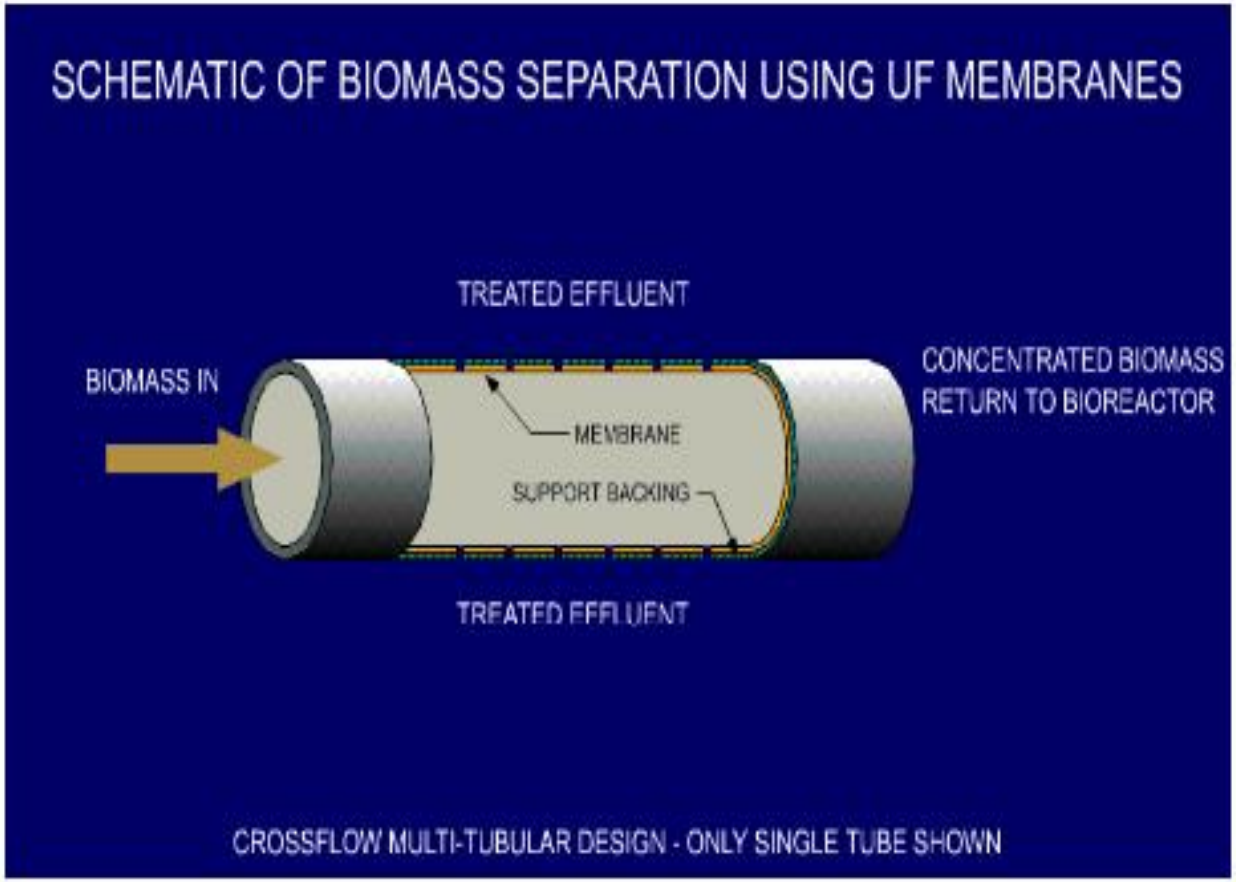
Submersible Membranes

- Higher investment due to need of 20- 30% more volume of the bioreactor to install the submersible membranes or complete secondary tank
- More complex and expensive equipment necessary for replacement of submerged modules.
- High membrane fouling potential
- Difficult to clean
- Large space requirements
- Low permeate flux

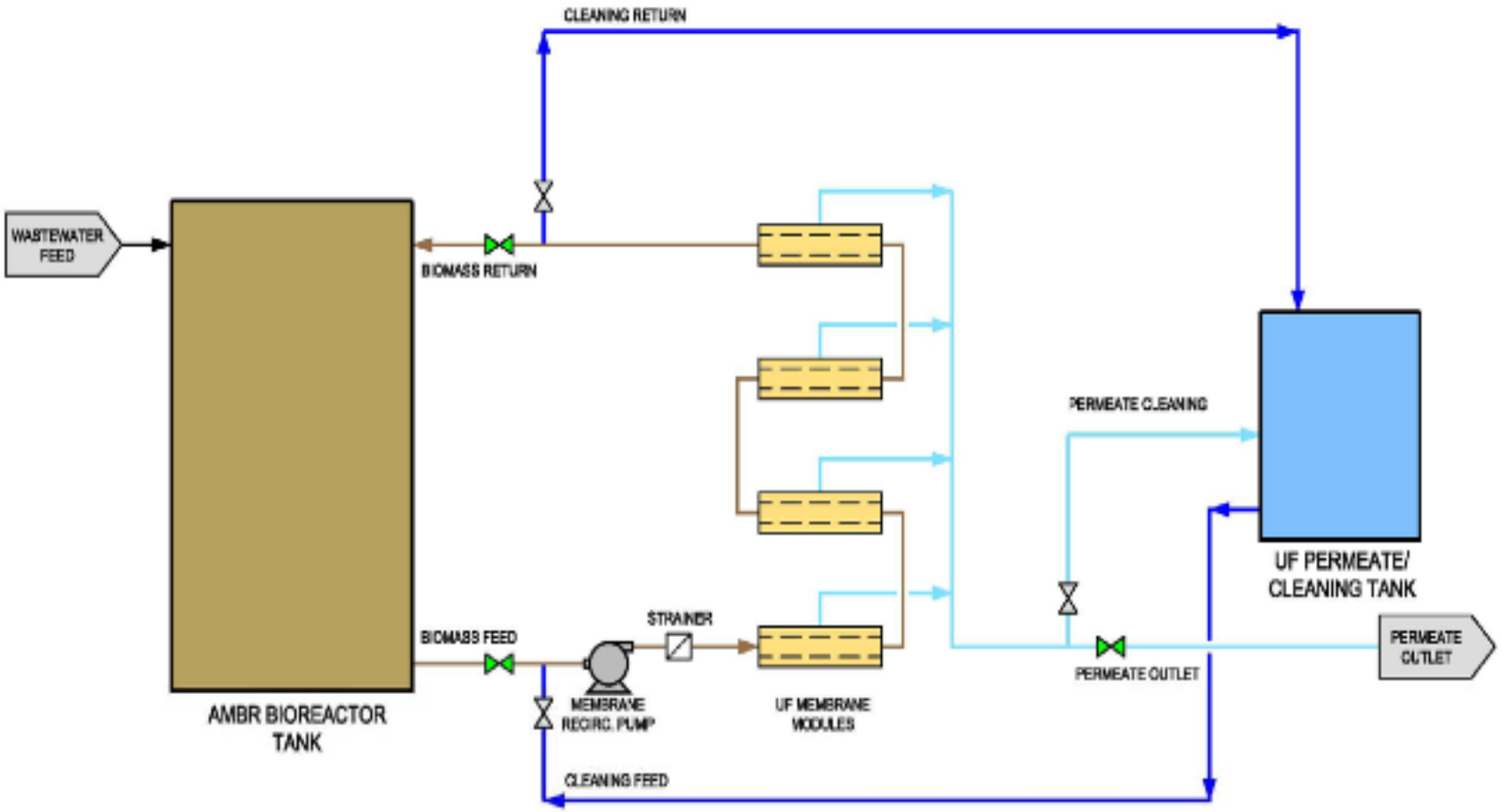
External Membranes – Cross flow

- Membrane placement outside the reactor
- Easily accessible & clean environment
- Optimum fouling control
- Fully automated cleaning
- Robust & reliable membrane products
- Reliable treatment under optimum economical conditions
- Small footprint
- High permeate flux
  - Reduced initial and replacement costs

Unique Cross-flow filtration and back flushing



AMBR Overview



Cross-flow AMBR a winning formula

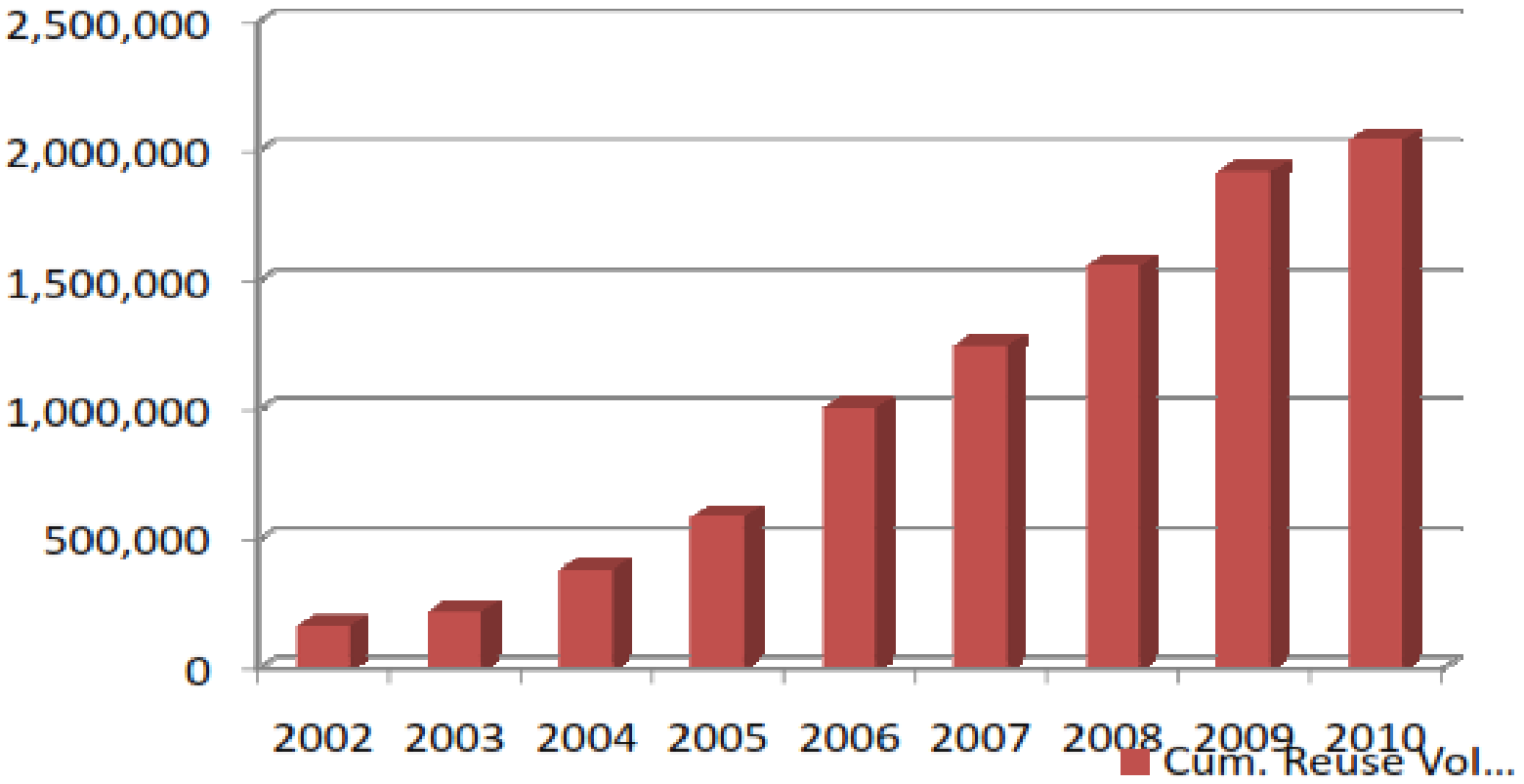
MBR Type	Normal Operating MLSS range (gTSS/l)	Sustainable Normalised flux LMH	Energy use on biomass separation kWh/m³ permeate produced	Configuration/ Maintenance	Energy Management
AMBR™	10 to 20 (Air) 15 to 35 (Pure oxygen 'enhanced)	80 to 250	1.8 to 3.5	'Dry', out of tank. Low level, horizontally mounted membranes	Yes. Banks are automatically flushed & shutdown on low/no flow
AMBR LE™	10 to 20	40 to 120	0.25 to 1.4	'Dry', out of tank. Low level, horizontally mounted membranes	Yes. Permeate flow automatically regulated & banks can still be automatically shutdown on v. low/no flow
BIOVERT®	8 to 15	30 to 60	0.2 to 0.5	'Dry', out of tank. Vertically mounted membranes	Yes. Banks are automatically flushed & shutdown on low/no flow
Submerged HF/Flat Sheet	6 to 12	8 to 25	0.6 to 2	Submerged in biomass & vertically mounted with course air scouring from below	No. Membranes submerged in biomass and must be regularly 'scoured'. Energy >2kWh/m³ during v. low/no flow.

Industrial Customers

Municipal Customers

Summing up

Our WWTP Plants- Re-Use Volume



Online Analysis Instruments

- Industrial control instruments designed for measuring pH/ORP, DO, conductivity, turbidity, SS, Chlorine, Chlorine Dioxide, Ozone.

  We are able to satisfy the most common applications and moreover to develop specific solutions for the most demanding markets.

- Range of online analyzers for measuring COD, Nitrate, Ammonia, Oil Hydrocarbons, T.O.C., and its Colorimetric Analyzer.

Flow, Level & Pressure Meters

- Flow meters are known for their high efficiency and reliability. A complete series of meters are specifically designed according to the most common applications.

  It has wide range like electromagnetic,

  Doppler, area velocity,

  ultrasonic (venture ch.).

- Its range of level and pressure meters like

  ultrasonic, piezometric, radar, capacitive,

  Idrostatic and differential.

  A complete series of meters are specifically

  designed according to the most common applications.

Fluorimeter

- A modernized hand held fluorimeter which, in combination with the consumable DNA based sensors can quickly measure water contaminants (heavy metals) at the sample site, greatly reducing the time and effort required by current technologies. This advantage creates a cost savings for organizations that are responsible for water testing of public drinking water supplies or industrial water operations.
- This new product requires no special knowledge of chemistry, greatly reducing operational testing time and cost for the water industry.

Bioprocess Control (AMPTS)

- Bioprocess Control stands as a technology leader in the biogas industry providing solutions for optimized process design and support during the operation of biogas process. An optimized design will help to remove bottlenecks that may inhibit a process from operating at 100% of its designed capacity.
- Bioprocess control can play a key role at this stage, assisting designers and builders with ensuring that a new biogas plant or plant undergoing expansion or retrofitting is optimally designed from a process control standpoint.

System Advantages of AMPTS

- Automated analytical procedure reducing workload and time.
- On-line and real-time data logging of total biogas or bio-methane production and flow rate.
- User friendly interface for real-time data display and analysis overview
- High quality data for extracting process kinetic information
- Easy and low maintenance

THANK YOU FOR YOUR KIND ATTENTION

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We Care For the Planet