SILO

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VP & GM - WTS

DISTRIBUTOR SUMMIT
BILBAO

A New Approach to Decentralized Treatment

SILO

Packaged and Mobile Membrane Plant

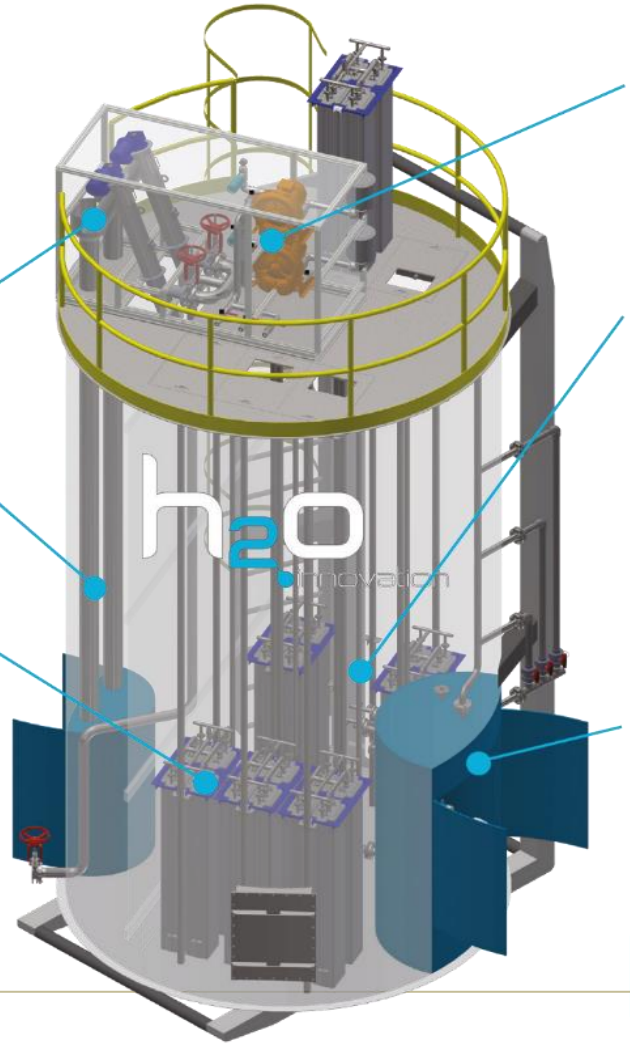
Simple | Independent | Level Based | Operation

WASTEWATER FEED

FINE SCREENS
Automated fine screens with 2mm openings protect the system from debris

ANOXIC ZONE
Chemical consumption is limited, and TN reduced, through denitrification in the anoxic zone

AEROBIC ZONE
The high concentration bioreactor reduces plant footprint and provides a high solids retention time, to produce extremely low effluent BOD & allow complete nitrification



EQUIPMENT SKID
Blowers and instruments are installed at the top of the system for compact footprint and true plug-and-play installation.

MEMBRANE FILTRATION
Bacteria are retained in the system using membrane filters with microscopic pores. An abundant supply of membrane area allows passive filtration without the use of pumps or complicated cleaning regimes to provide simple, worry-free treatment

EQUIPMENT ENCLOSURE
Items requiring frequent access are installed in the patented equipment enclosure at ground level.

TREATED EFFLUENT

SXV:HEO

Advantages

- Speed = Money, especially now → Quick Deployment.
- Low cost. System = building.
- Simple Operation. Minimal moving parts
- Perfect for Decentralized or Remote locations
- Pre-engineered means quick to fabrication and quick to delivery
- Superior performance with membranes
- Industrial and Municipal Applications

EASY
FAST
DECENTRALIZED

Unload...and connect

Blower Room, Membrane Hoist, Access Hatch

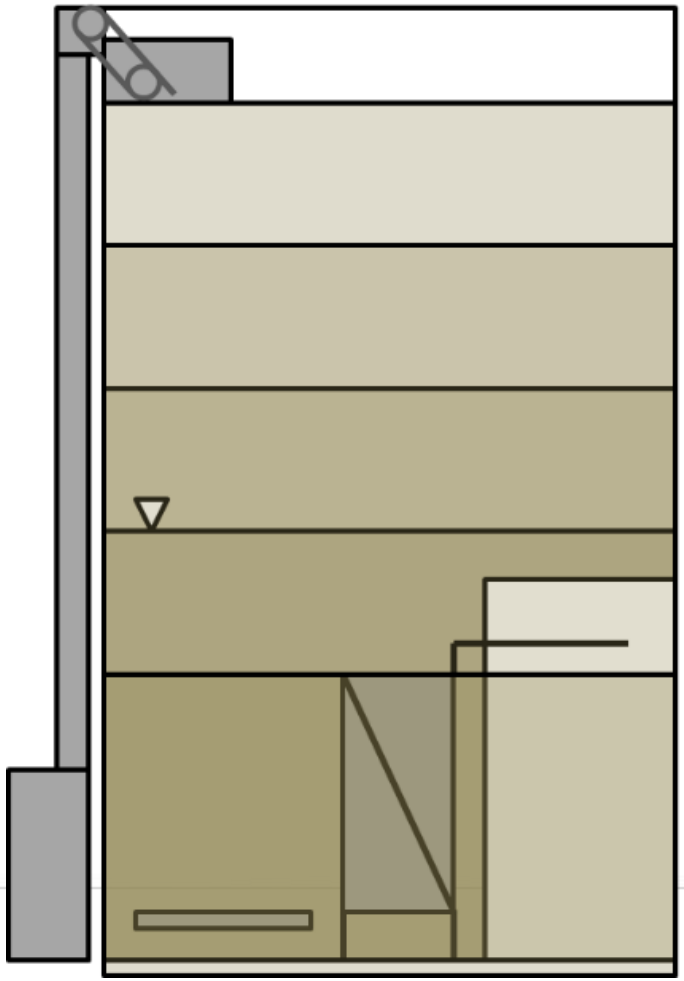
Main Vault and Panel

Built to last

1. Simplified Controls with gravity operation
2. Full redundancy (2 blowers, 2 screens, etc…)
3. All equipment contained within a delivered package
4. Secure – equipment inside vaults

Gravity You Can Trust

Screenings Room



Driving Pressure

27 kPa

18 kPa

9 kPa

Idle

What can it do for you?

- MBR - Biological treatment (with anoxic/aerobic zone)
  - ✓ Municipal Wastewater
  - ✓ Industrial Wastewater

- UF
  - ✓ Tertiary treatment of wastewater – polishing
  - ✓ Drinking water treatment

Typical flow of 200 m^3/day

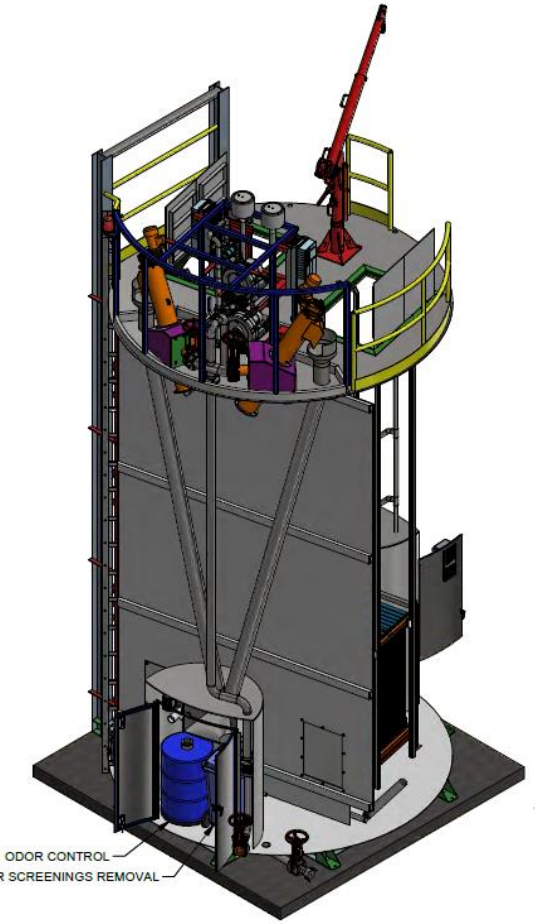
Get new customers, expand scope, leverage SILO to sell other product lines
- ✓ Sell
- ✓ Rent, move, rent, etc…

How do you get one?

- License agreement
  - ✓ Complete engineering package (Mechanical, Electrical, O&M, Spare parts, etc…)
  - ✓ Work with you on the process design
  - ✓ On site help if desired to your location

- Operators are standing by

1-800-GET-SILO

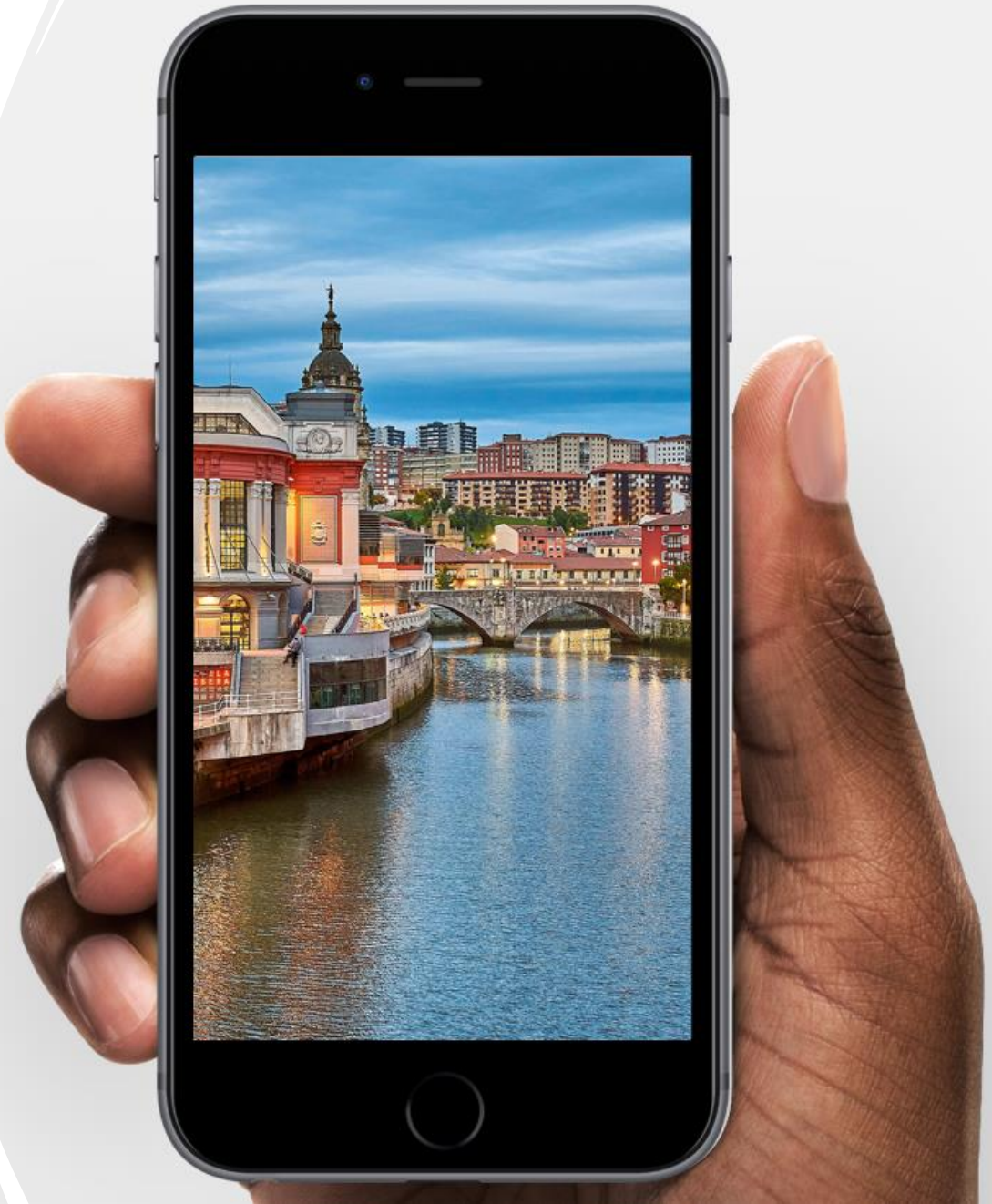


Questions?

1) Have you seen a concept like this before?

2) Do you think you can use this in your market?

3) Would you use it more for MBR (wastewater) or UF ("clean" water)?

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Background – Membrane Bioreactor Design

Key Benefits of an MBR:

1. High Effluent Quality
2. Higher SRT
3. Smaller Footprint

Perceived Challenges for MBR:

1. Complexity
2. Higher Cost
3. Energy Intensive

Typical Effluent	
BOD	<5 mg/L
TSS	<2 mg/L
NH_3	< 1 mg/L
TN	< 10 mg/L
TP	< 0.1 mg/L

WASTEWATER FEED

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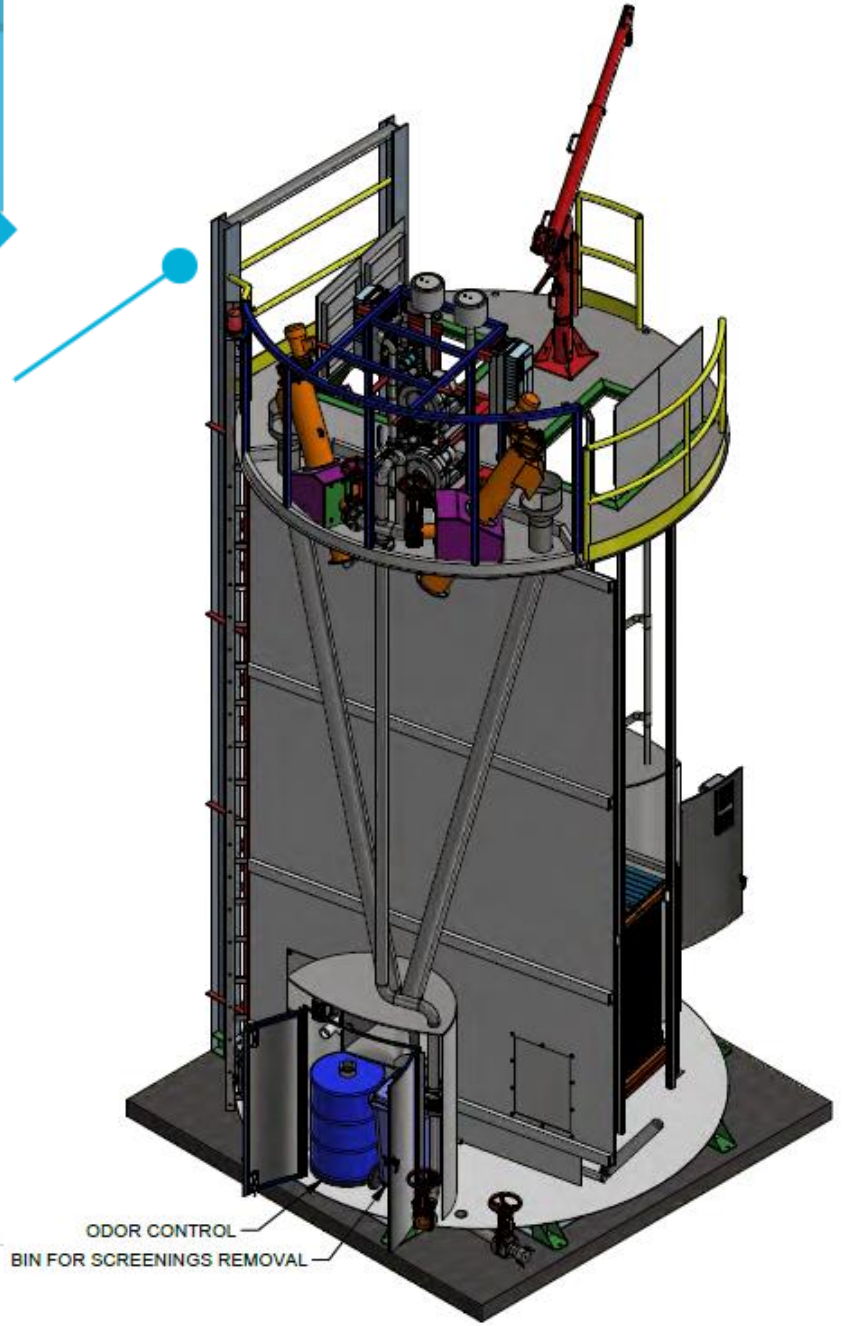

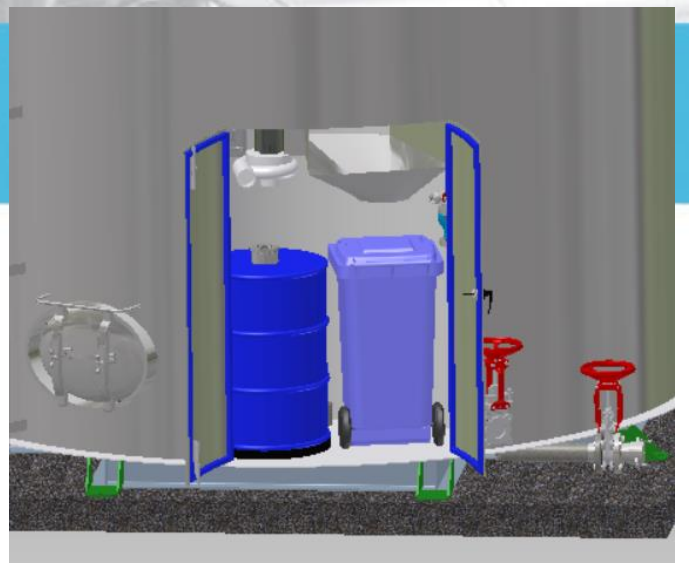

Anoxic Zone Provides:

1. Total Nitrogen Removal
2. Reduced Alkalinity Consumption
3. Improved Biological Stability

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CAPACITY	20 - 100 m^3/d 5,000 - 25,000 GPD
BOD	< 5 mg/L
TSS	< 5 mg/L
NH_3	< 0.5 mg/L
TN	< 10 mg/L

S I L O – Automated Fine Screens & Blowers

S I L O – Design Parameters

Process Design Parameters	Units	Effluent Quality
Design Capacity	gpd	25,000
Bioreactor Volume	gal	10,000
MLSS	mg/L	10,000
F:M ratio	-	0.08
Membrane flux	gfd	3.8

Water Quality Parameters	Units	Effluent
Biochemical Oxygen Demand (BOD)	mg/L	< 5
Total Suspended Solids (TSS)	mg/L	< 2
Ammonia Nitrogen (NH_3)	mg/L	< 1
Total Nitrogen (TN)	mg/L	<10
Total Phosphorus	mg/L	<0.1

S I L O – Conclusion

- Only **7 moving parts** minimizes mechanical failures as well as operation and maintenance costs
- **Simplified controls** allowing system to be serviced by an electrician
- Integrated equipment skid/enclosures **eliminate the need for a building**, reducing costs and onsite installation work
- Modularity allows **simple expansion** for growing treatment needs
- Advanced treatment process reliably produces **excellent effluent quality**