

AQUAHIVE

Energy-Efficient
concentration of industrial effluents
and circularization of process water



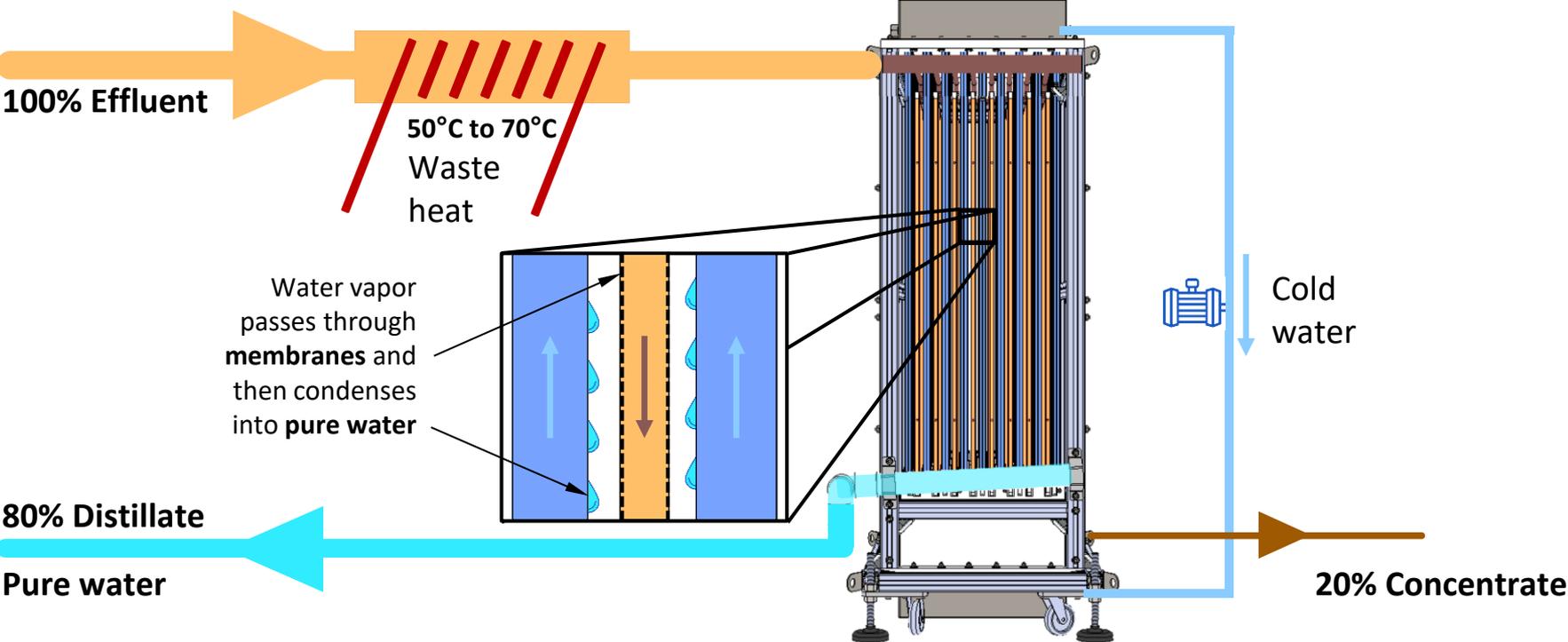
TOWARDS A MORE SUSTAINABLE INDUSTRY

Environmental regulations are getting tougher and water pressure is intensifying

- The treatment of industrial water (PFAS, ionic and organic compounds,...) must be organized
- Water consumption must be reduced to anticipate future shortages
- We must continue to reduce the carbon footprint

THE AQUAHIVE[®] SOLUTION

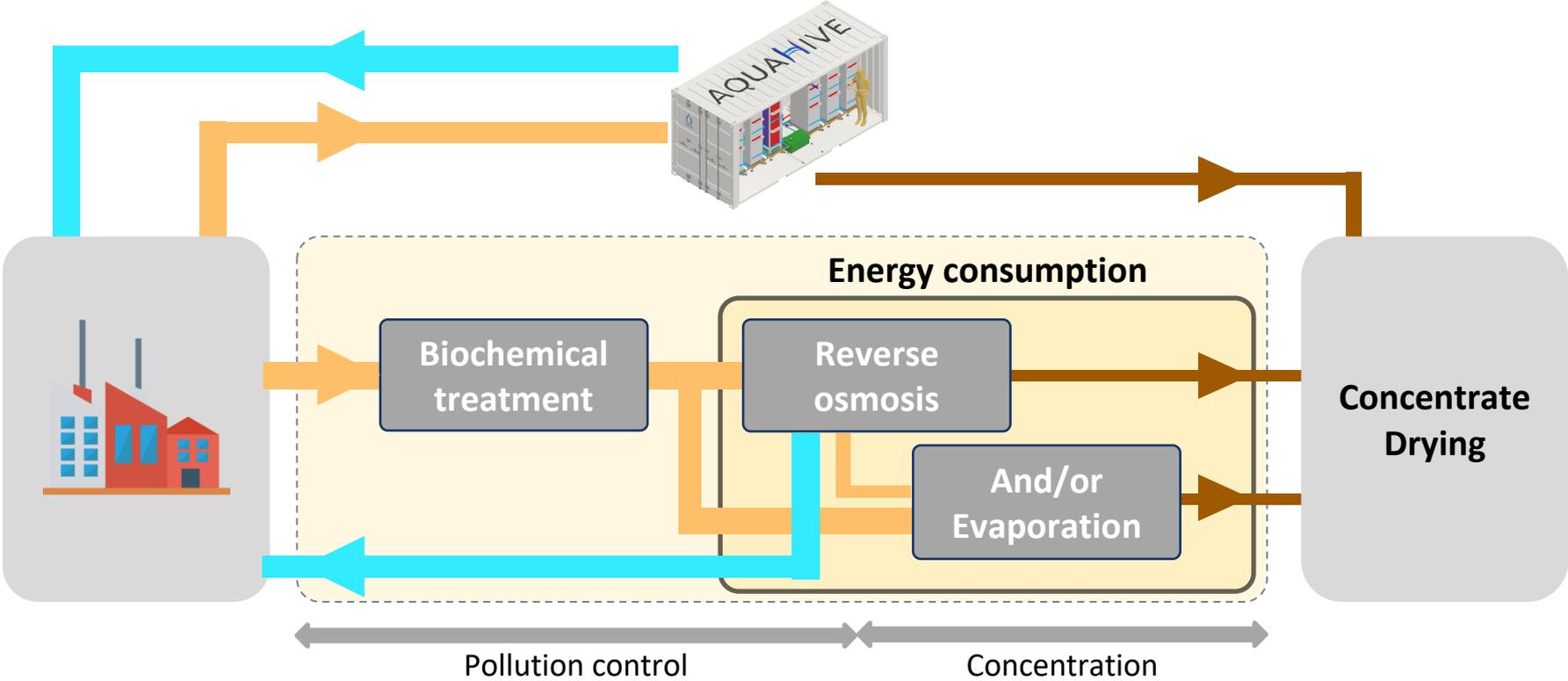
Water vapor extraction by membrane separation



FEATURES

- Filters all pollutants including **organic & PFAS**
- **Concentration of up to 80%** of polluted effluents
- **High purity** of the 1-pass outlet water: 5-9 $\mu\text{S}\cdot\text{cm}^{-1}$
- **High energy efficiency** thanks to low-temperature waste heat (from 50°C)

SIMPLIFYING EFFLUENT TREATMENT



OPERATIONAL LAYOUT

Container Unit



Characteristic	Unit	Value
Inflow	m ³ / jour	3,0
Distillate flow rate	m ³ / jour	2,4
Distillate quality	μS.cm-1	5-9
Concentration	Distillate/Effluent	5
Qty of modules		4
Container surface	m ²	15
Consumption (with waste heat)	kWh/m ³ effluent	1,0
Consumption (without waste heat)	kWh/m ³ effluent	160

BENEFITS

- **No chemical or biological pre-treatment** of effluent
- **Simplified membrane maintenance:** operation at atmospheric pressure and standard materials
- Capable of treating **different sources of effluent** (process water, wash water, rainwater, etc.) **without changing configuration** or membrane
- **Possible financing** with CEE and/or Water Agencies

COMPARATIVE

Technology ↗	AQUAHIVE®	Reverse osmosis	Nanofiltration / Ultrafiltration	Evapo-concentration under vacuum
Pollutants ↘	<ul style="list-style-type: none"> ✓ Low pre-treatment ✓ Easy maintenance 	<ul style="list-style-type: none"> ⚡ Complex pre-treatments ⚡ High maintenance 	<ul style="list-style-type: none"> Medium pre-treatment Average maintenance 	<ul style="list-style-type: none"> ⚡ Medium to high pre-treatment ⚡ Medium to high maintenance
Dissolved Salts / Chlorides / Salinity / SEC-SEH	✓ Highly effective	✓ Highly effective	⚠ Inefficient	✓ Highly effective
Heavy metals (Pb, Cd, Zn, Ni, Cu...)	✓ Highly effective	✓ Effective	⚠ Average	✓ Highly effective
COD / OBD 5	✓ Highly effective	✓ Effective	⚠ Inefficient	✓ Highly effective
NTK (Organic Nitrogen + Ammonia)	⚠ Volatile NH ₃ according to pH/T°	✓ Highly effective	⚠ Average	⚠ Depends on volatility
NOx (Nitrates / Nitrites)	⚠ Depends on volatility	✓ Highly effective	⚠ Average	⚠ Average
Total Phosphorus (Pt)	✓ Highly effective	✓ Highly effective	⚠ Average	✓ Highly effective
HCT (Total Hydrocarbons)	✓ Highly effective	⚠ Average	⚠ Inefficient	⚠ Depends on volatility
Organohalogens (AOX, chlorinated solvents)	⚠ Depends on volatility	✓ Effective	⚠ Inefficient	⚠ Depends on volatility
Organo-aromatics (PCBs) and Organo-polycyclics (PAHs)	✓ Highly effective	✓ Effective	⚠ Inefficient	✓ Highly effective



EQUIPPED SITE

Food alcohol distillation site

Application :

- Treatment of phlegmasses at the distillation outlet before evacuation to the treatment plant
- Circularization of pure water without organic compounds to steam generation processes

Operating Parameters

- Cold solution temperature: 20°C (supplied by the network)
- Hot effluent temperature: 60°C (already hot phlegmasses)



EQUIPPED SITE



Results and Analysis

Hot phlegmasses (55-60°C) are directed at the AQUAHIVE® pilot. After a few hours of operation, the distilled water produced by the pilot is collected and analyzed.

Parameter analyzed	Input flegmasses	Output pure water
pH	6,594	6,090
Conductivity ($\mu\text{S.cm}^{-1}$)	129,5	5,4
Chlorides (ppm)	0,14	0,07
Sulfates (ppm)	17,49	0,33
COD (mg/L)	179	<20

TIMELINE

- Data Collection Form
- Pre-study, sample analysis, technical exchanges, feasibility analysis,
- Solution brief: Selected configuration
- Site visit and quotation,



CONCLUSION

The **best solution** to **significantly reduce the treatment bill** for charged industrial effluents while **improving its water sobriety**



STEM SAS

Nous contacter :
sales@stem-tech.fr