

CASE STUDY

VOLTEA CERTIFIED PARTNER

CASE STUDY: HYBRID VOLTEA & RO SYSTEM FOR BRINE WATER IN TANZANIA



INTRODUCTION & PROCESS DESCRIPTION

At Voltea, your business and water needs inspire us. By uniquely integrating electromembranes and pressure membranes into a single advanced system, we maximize the benefits of both technologies. This synergy not only boosts economic efficiency, but also overcomes the technical limitations that might arise if each system were used independently.

THE CHALLENGE

Water treatment projects in regions such as Tanzania face significant hurdles:

- High infrastructure costs (CAPEX): Traditional pressure-driven systems require major upfront investment.
- Energy-intensive operations (OPEX): High long-term expenses from power-hungry processes.
- Fluctuating water quality demands: A need for flexible, real-time adjustment.
- Harsh operating conditions: Variable feedwater quality and wide temperature ranges.

These challenges required a solution that could deliver sustainable water treatment while remaining cost-effective and adaptable to changing conditions.

The Solution: Hybrid Membrane System

Voltea deployed a hybrid membrane system that combined the strengths of pressure-membrane technology with our proprietary CapDI (Capacitive Deionization) electro-membrane technology.

Key features of the hybrid system included:

- Low-pressure operation – significantly reducing capital costs.
- Tunability – enabling operators to adjust water quality in real time to meet immediate needs.
- Energy efficiency – minimizing both environmental footprint and long-term operating expenses.



VOLTEA'S CAPDI TECHNOLOGY

At the heart of the system lies CapDI – a tunable and scalable deionization technology that removes dissolved salts from multiple water sources, including:

- Tap water
- Brackish groundwater
- Industrial process water

CapDI performs reliably across temperatures from 5–60°C (40–140°F) and handles challenging feedwaters with higher turbidity—all while requiring little to no chemical use. This ensures low environmental impact and sustainable operation.

CONCLUSION

The successful deployment of Voltea's hybrid membrane system with CapDI in Tanzania showcases the transformative potential of integrated membrane technologies.

By enhancing efficiency, cutting costs, and delivering sustainable water treatment, Voltea is redefining what's possible in the water industry.

THE RESULTS

The Tanzanian project demonstrated how hybrid membrane systems unlock new opportunities in water treatment:

- Reduced CAPEX through low-pressure design
- Optimized OPEX via energy efficiency and minimal chemical consumption
- Operational flexibility, with tunable water quality adapting to real-time demand
- Sustainability, by lowering environmental impact compared to conventional systems