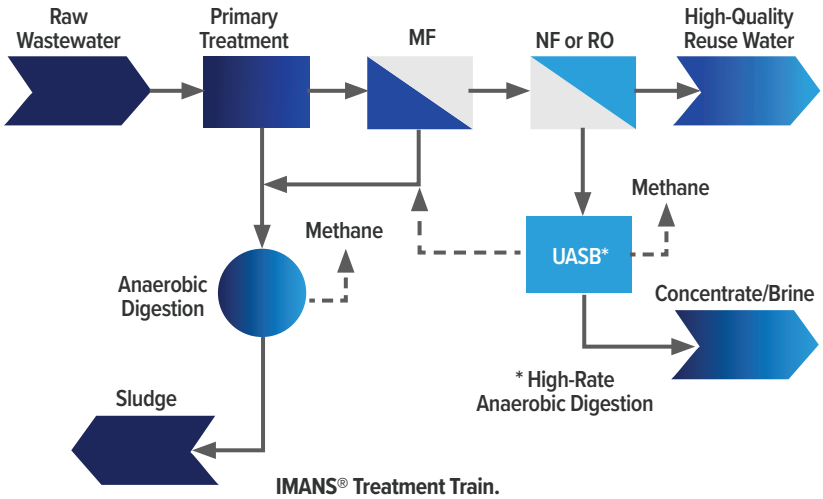
The IMANS® System

A Novel Membrane Approach for Carbon Diversion in Wastewater Treatment

The IMANS® (integrated membrane anaerobic stabilization) approach to wastewater treatment is a simple and innovative approach to treating wastewater and diverting carbon from energy-intensive processes to energy-producing processes.

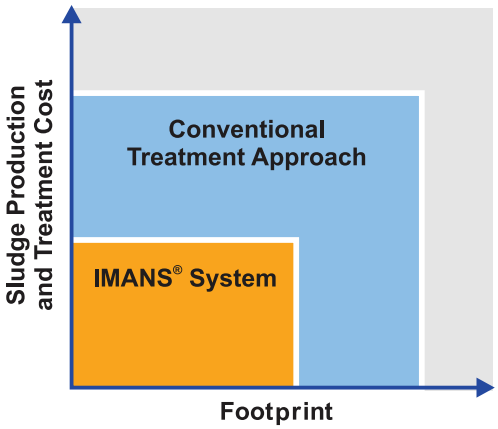
Physical separation using gravity, screens, and membrane processes produces high-quality water that can be used for groundwater recharge.

Organic-rich streams produced by carbon diversion are stabilized anaerobically, yielding energy.



IMANS® Treatment Train.

IMANS® was technically proven during an 18-month pilot test at the Orange County Sanitation District.



The IMANS® approach has a lower cost and smaller footprint than a conventional treatment approach.

Conventional aerobic biological treatment processes (including activated sludge), convert the inherent energy in wastewater (in the form of biochemical oxygen demand) into biosolids, incurring significant treatment and disposal costs.

The IMANS® approach, through eliminating the use of aerobic treatment, preserves and concentrates the inherent energy in wastewater for conversion into useful energy (methane) by anaerobic treatment.

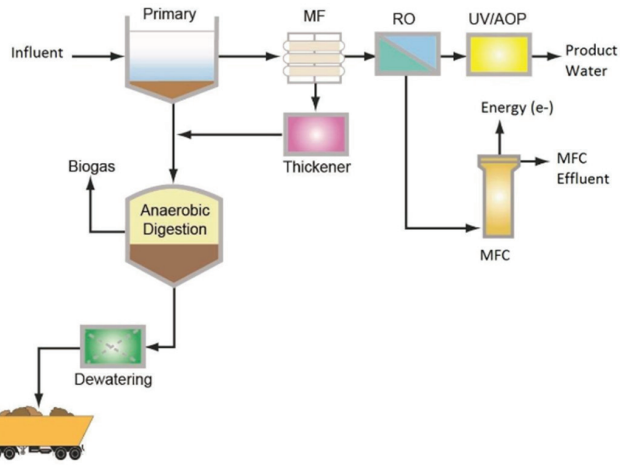
The Benefits of IMANS®

1. No activated sludge treatment.
2. Produces 50% less biosolids.
3. Generates 35% more biogas.
4. Requires 45% less energy.
5. Small footprint.
6. Less odor.
7. Diversion of carbon.
8. High-quality RO product water.
9. Lower cost.

Carollo's IMANS® consulting and research services help our clients address their wastewater treatment needs.

Directly to Electrical Power

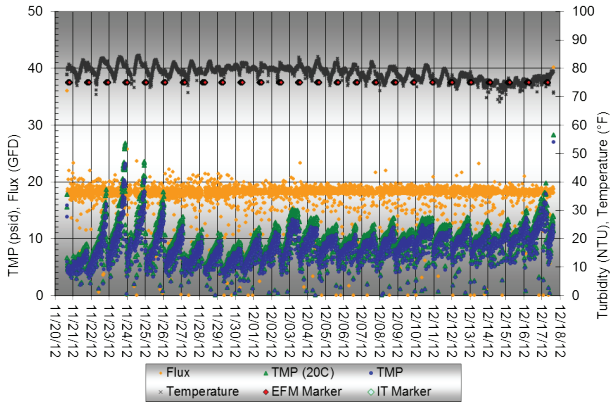
Replacing the high-rate, up-flow anaerobic sludge bed process with a microbial fuel cell provides a direct power source derived from the diverted wastewater organics.

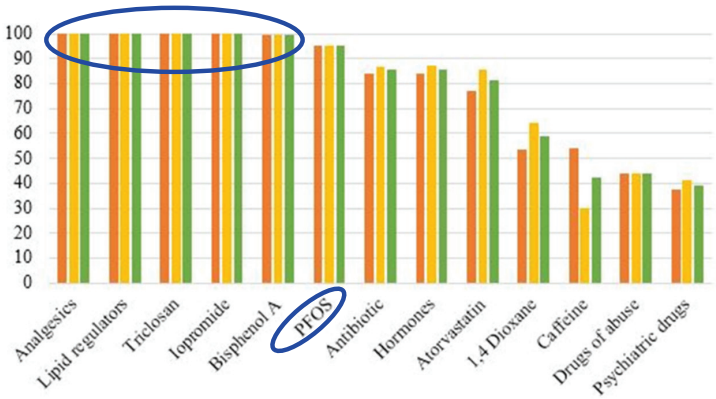


Pilot Results

Testing conducted in 2012 – 2013 showed repeatable performance of PvDF microfiltration membranes and 4-week intervals between chemical cleans.

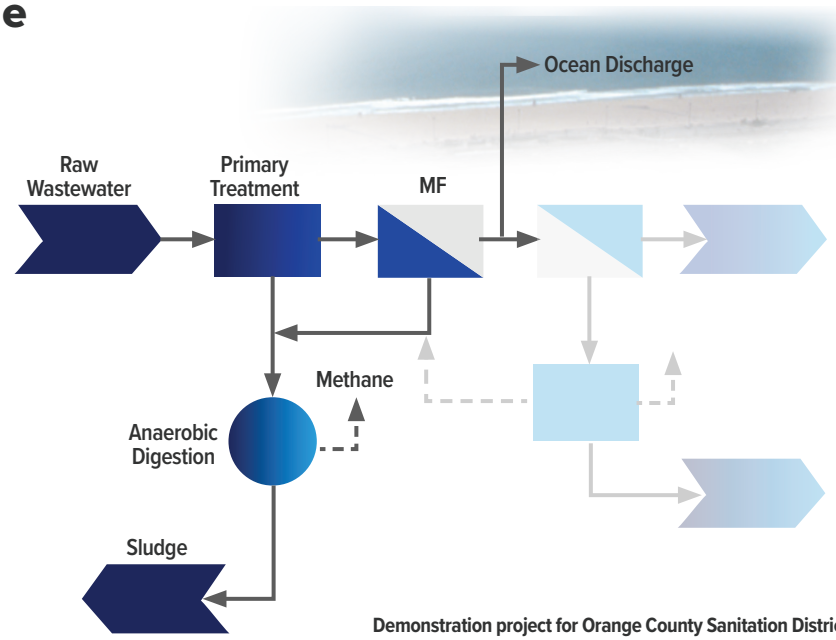
Further piloting in 2016 – 2018 tested microbial fuel cells on RO concentrate and confirmed high COD removal and direct energy production. Testing also showed excellent removal of chemicals of emerging concern (CECs) – including PFOS.





IMANS® for Ocean Discharge

Two years of testing, using a full-scale submerged microfiltration system, demonstrated the long-term performance of the membranes and the high-quality effluent produced, which may be suitable for ocean discharge.



Demonstration project for Orange County Sanitation District.

For additional information on this treatment approach, visit www.carollo.com, or contact Graham Juby at gjgjuby@carollo.com.