EXXIO S.I.l.

Italy's leading company in landfill leachate treatment based on flat-sheet membrane technology





EXXIO S.I.l.

Founded in Genoa in 1996



We develop advanced, reliable solutions for a better future

Our Mission - Blue Economy

- We promote innovative, high-performance technologies with a reduced environmental footprint
- We support companies in achieving ESG objectives and regulatory compliance
- We facilitate strategic investments that reduce operational costs and resource consumption



Exxro - Core Activities



Design, production and **management** of industrial water treatment plants.



Large-scale environmental **remediation service.**



Management and transport of waste generated by industrial processes.









Compliance & Accreditation

EXXRO is certified according to ISO 9001 and ISO 14001 standards and holds SOA OG12 and SOA OS22 qualifications. All our plants ensure:

- Full compliance with Legislative Decree 152/2006
- Adherence to the main environmental regulations









Application Fields - Water Treatment



Landfill leachate treatment



Complex industrial wastewater treatment



Sulfate removal



Desalination



Critical Challenges in Wastewater Treatment

Our solutions are designed to effectively treat wastewater with high chemical complexity, including:

- PFAS
- Chlorides
- Ammonia
- Sulfates
- Surfactants
- Boron

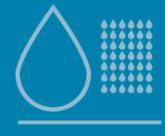




Flat-Sheet Membrane Technology

Our membranes are manufactured with flatsheet FilmTecTM DOW and assembled in our workshop in Italy and Slovenia. Available types:

REVERSE OSMOSIS



ROEX220

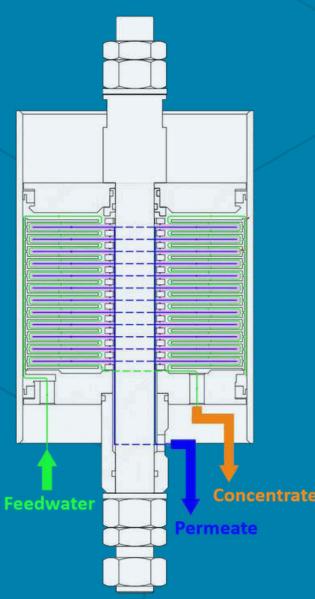
- **BW (Brackish Water)**: high permeate productivity at low operating pressure, with delayed fouling.
- **SW (Sea Water)**: combination of high productivity and high rejection, ideal for high-TDS waters.

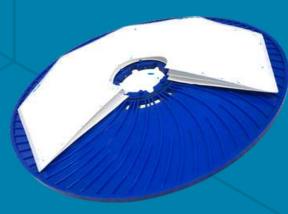
NANOFILTRATION



NFEX220

- **NF 270**: high productivity for high-flow treatments requiring high sulfate or divalent reduction in general.
- NF 90: high salt rejection, ideal for producing low-salinity water and effectively removing sulfates.





Who believed in us

| Site | m³ of water treated for day |
|---|--------------------------------|
| Malsapello MSW landfill - Rezzoaglio (GE) | 24 |
| Ca' Lucio MSW landfill – Urbania (PU) | 180 |
| Casei Magliolo MSW landfill (SV) | 35 |
| Landfill for non-hazardous special waste in Grottaglie (TA) | 100 |
| Colleferro MSW landfill (RO) | 360 |
| Basso Sinni - Colobraro MSW landfill (MT) | 30 |
| Arma di Taggia MSW landfill (IM) | 100 |
| Borgo Montello MSW landfill(LT) | 50 |
| Grumolo Delle Abbadesse MSW landfill (VI) | 50 |
| Viterbo MSW landfill (VT) | 120 |
| Landfill for non-hazardous special waste in Italcave Lot I-II (TA) | 120 |
| Landfill for non-hazardous special waste in Italcave Lot III (TA) | 120 |
| Wastewater treatment plant - Brescia (BS) | 120 |
| Novellara MSW landfill (RE) | 40 |
| Celje MSW landfill (Slovenia) | 150 |
| Landfill for non-hazardous special waste in Cero Gajke (Ptuj – Slovenia) | 60 |
| Alghero Saline Water Treatment Plant (SS) | 38,4 |
| Cairo Montenotte landfill (SV) | 240 |
| Special waste landfill in Serra Scirieddus (SU) | 50 |
| Casalpusterlengo MSW landfill (LO) | 35 |
| Parco Saurino MSW landfill (CE) | 120 |
| Rosignano Marittimo MSW landfill (U) | 150 |
| Landfill for non-hazardous special waste in Cà Asprete (PU) | 90 |
| Biofilter water treatment plant in Lonato del Garda (BS) | 20 |
| Wastewater treatment plant Polymer industry in Qualiano (NA) | 62,4 |
| Wastewater treatment plant / landfill leachate in Valli S.p.A. in Lonato del Garda (BS) | 20 |
| Maiolati Spontini MSW landfill (AN) | 150 |

Who believed in us



Landfill for non-hazardous special waste in Italcave Lot I-II -



Cairo Montenotte landfill (SV)



Casalpusterlengo MSW landfill (LO)



Grumolo Delle Abbadesse MSW landfill (VI)



waste in Italcave Lot I-II (TA)



Borgo Montello MSW landfill(LT)



Arma di Taggia MSW landfill (IM)



Novellara MSW landfill (RE)



Landfill for non-hazardous special waste in Cà Asprete (PU)



Colleferro MSW landfill (RO)



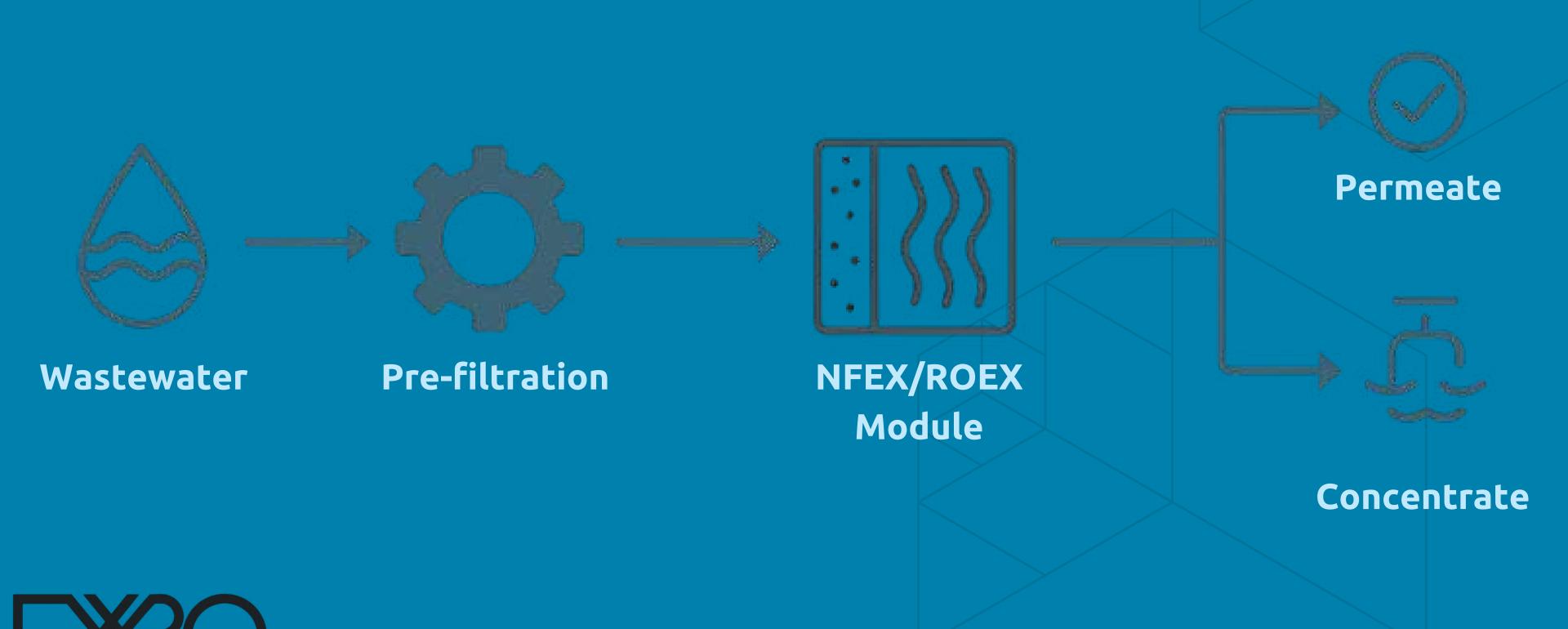


Landfill for non-hazardous special waste in Cà Asprete (PU)



Novellara MSW landfill (RE)

Process Flow



Performance Comparison

Spiral-Wound Modules

- X Low fouling resistance
- Accumulation zones and loss of efficiency
- Low initial investment but high operating costs
- \times Higher wear \rightarrow frequent replacements
- Limited performance on highly contaminated wastewater





- High fouling resistance
- Simple maintenance, complete cleaning
- Higher upfront investment but low operating costs
- Long operational life
 - Excellent performance on complex wastewater







Treatable Parameters Comparison of landfill leachates

| Parameter | Maximum treatable value with ROEX220 module | Maximum negotiable value with coiled spiral |
|---------------------|---|---|
| Conductivity | 40.000 μS | 20.000 µS |
| COD | 20.000 mg/L | 8.000 mg/L |
| BOD | 10.000 mg/L | 7.000 mg/L |
| Ammoniacal Nitrogen | 5.800 mg/L | 1.500 mg/L |
| Suspended Solid | 400 mg/L | 50-80 mg/L |



Advantages of EXXRO Module

- **High efficiency**: up to 99% pollutant removal and total removal of PFAS
- Energy savings: lower operating pressures
- Minimal maintenance: robust, easily regenerable membranes
- Modular structure: fast intervention in case of failure
- **Sustainability**: Reduced waste production and disposal costs

Significant reduction in operating costs





Applications

Landfills (MSW)



Chemical industry



Marine sector





Manufacturing



Food industry



Textile



Cosmetics



Pharmaceutical



Residential

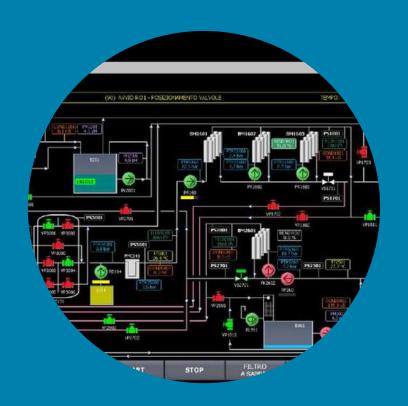


EXXRO Services



Modular and Flexible Units

- Reefer-type insulated containers
- Skids in AISI 316L stainless steel



Control Software

Siemens PLC and software for automation and monitoring



Pilot Plant

Preliminary tests with pilot plant and specialized technician







EXXRO Technical Support

- Dedicated technical assistance
- Emergency service
- Scheduled maintenance
- On-site intervention in Italy and abroad
- In-house spare parts warehouse
- Specific chemical detergents

Guaranteed SLA (Service Level Agreement) and response times



Official Articles and Publications



Case Study — S.A.BA.R. (Reggio **Emilia**)

The plant treats 15,000 m³/year of leachate and produces 10,000 m³/year of clean water (68% recovery), reducing the need for external transport.

Maiolati Spontini, nuovo impianto di depurazione percolato Sogenus. «Passo avanti per ambiente e territorio»



Maiolati Spantini Plant -Sogenus.

50.000 m³/year treated, **35.000** m³/year recovered (70%). Operating cost reduced by **50**– 60%, eliminating over 1100 tanker trucks annually.



Official Articles and Publications

EMERGENZA PFAS NELLE DISCARICHE E NELLE ACQUE

Le sostanze perfluorosichiliche, appunto Pfas, sono una famiglia di acidi in forma liquida molte apgressivi che se smaltiti illegalimente o non correttamente nell'ambiente, penetrano facilmente nelle faide acquifere e, attraverso l'acqua, raggiungoro i campi e i prodotti agricoli, contaminando gli alimenti, le acque potabili, le acque di falda, e i percolati di discarica

Queste sostanze, vengono usate prevalentemente dallindustria, ad esempio nella filiera di concia delle pelli, nel trattamento dei tappeti, nella produzione di carta e cartone per uso alimentare, per rivestire ie padelle antiaderenti e nella produzione di abbigliamento tecnico per le loro caratteristiche oleo e idrorepellenti.

Gli effotti sulla salute sono in fase di analisi, certamente con decorso di lungo periodo e si evidenziano alcune prime correlaziori con patologie, sopratutato legate a sistema endocrino. Studi stanno indagando inoltre la possibile correlazio tra queste sostanze e le patologie fetali e gestazionali.

La loro struttura chimica gli conferisce una particolare stabilità termica, rendendoli resistenti ai principali processi na degradazione. Per questo è necessaria un'<u>attenzione particolare per lo smattimento</u>.

Alla luce delle prime evidenze, che hanno interessato soprattutto la regione Veneto, il Consiglio dei Ministri ha dichiarato stato di emergenza per i Pfas proprio nelle province venete, emanando ordini operativi per il montoraggio di Pfas nei percettal delle discariche e nelle acque sosterranee.

OSMOSI INVERSA PER IL TRATTAMENTO DEL PERCOLATO CONTAMINATO DA PFAS

nuovi prodotti e soluzioni per l'ambiente, ha messo a fattor comune il proprio know how e sta realizzando per una discari di Vicenza un impianto per il trattamento di percolato di discarica contaminato da PFAS

Le analisi condotte sul percolato della discarica hanno rilevato la presenza della somma di PFC (sommatoria del differenti valori PFAS contenuti nel percolato analizzato) pari a µg/laz che dopo il trattamento con osmosi inversa è risultata pari a µg/laz.

L'impianto per il trattamento dei percolato, progettato con la tecnologia ad osmosi inversa, prevede tre stadi di trattamento ed ha una capacita complessiva di so my 'giorno di percolato di discarica trattato. Dalle analisi ottenute de test effettuati si puo evincere che l'abbattimento degli inquinanti risutta ottre i do". Case Study — PFAS (Vicenza)

Reverse osmosis plant treating PFAS-contaminated leachate with 50 m³/day capacity **and 100% PFAS removal.**



dissalazione

Resta il nodo dei residui da smaltire. La proposta: mischiare la salamoia con le acque civili

🗎 24/05/2023 Eliana Miraglia (montaggio di Thomas Tumbarello)

Itre al **risparmio** d'acqua, la **siccità** si può combattere con il riutilizzo delle **acque grigie** o **reflue** opportunamente depurate.

Normalmente le tecnologie utilizzate sono a osmosi inversa e filtrazione, o a membrane piane.

Un'azienda genovese nata 30 anni partendo dal percolato di discarica, ha brevettato un macchinario molto versatile e compatto che utilizza membrane più resistenti e performanti. Il procedimento è fisico e non chimico, quindi non prevede additivi.

RaiNews – TV Segment:

Feature on EXXRO's compact, high-performance membrane systems for purification and desalination, including an interview with Ezio Saturno (EXXRO).



And a lot more...

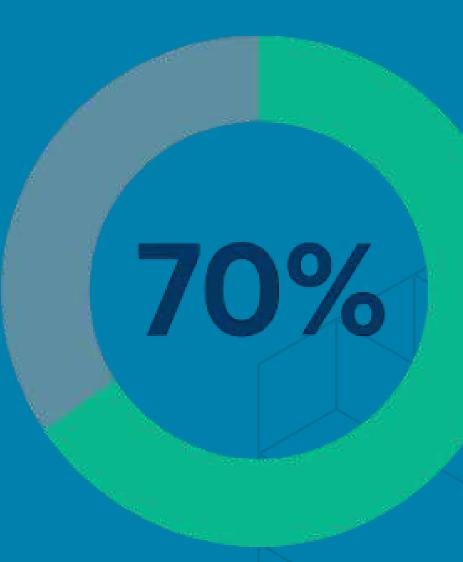
Achieved Results



869.484 m³/year of water treated



608.638 m³/year of water recovered



Water recovered

20.287





1.217.277 kg of CO₂

emissions avoided



R&D with Leading Partners



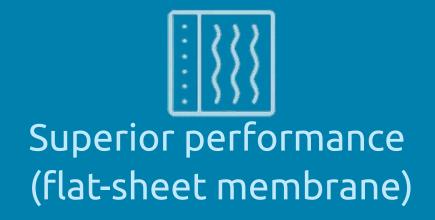




Active collaborations to develop high-efficiency solutions for complex wastewater treatment.



Why Choose EXXRO













Over 30 active sites



Contact Us

- Request a preliminary water analysis
- Request a customized quote
- Book an on-site pilot test



Over 30 installed plant across Italy and Slovenia



Operational Headquarters

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Email

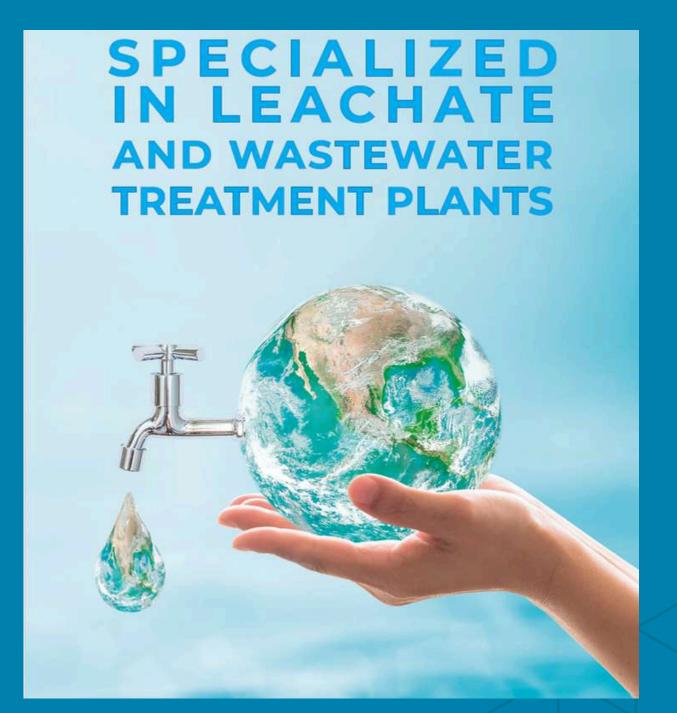
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We give new life to water

THANKYOU