

# PureGe

Membrane bioreactors for  
wastewater treatment



# Problem

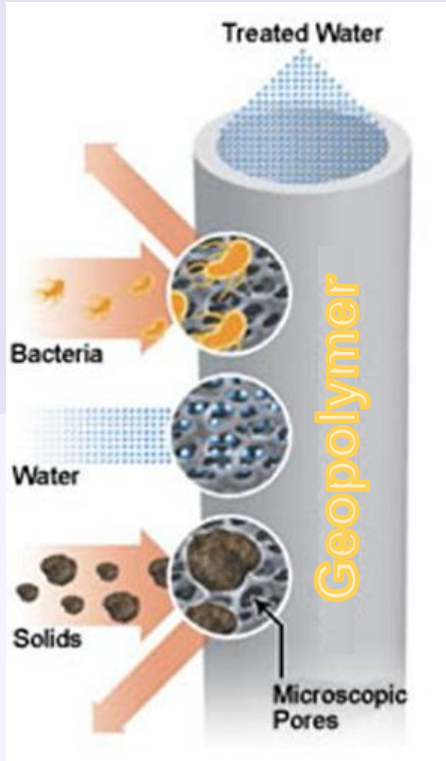


The domestic and industrial wastewater is released in nature **without appropriate treatment.**

## 2. Current MBR

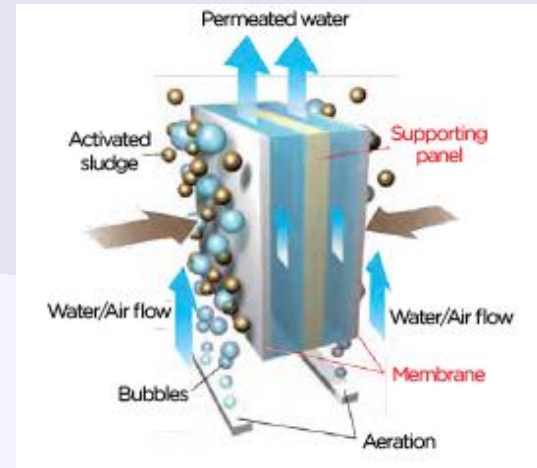
- non-recyclable MBR;
- virgin raw materials consumption;
- high energy consumption.

Ecofriendly



PureGeo

*Tubular membranes* with pore sizes ranging from macropores to nanopores will be developed through the geopolymerisation technology.



$GWP_{MBR} = 0.002 \text{ kg CO}_2\text{-eq*FU}^{-1}$  – **CO<sub>2</sub> - 70 times lower**  
 $GWP_{CAS} = 0.14 \text{ kg CO}_2\text{-eq*FU}^{-1}$

Solution

Climate

# MARKET RESEARCH

MBR MARKET, BY REGION (USD BILLION)



Source: Secondary Research, Primary Interviews, and MarketsandMarkets Analysis

# OUR SOLUTION



## Unexpensive

Low energy consumption;



## Ecofriendly

No virgin raw materials;  
Ease-to-use and ease to recycle;



## Geopolymers

Retain micro **impurities**  
and to **absorb** high amounts  
of heavy metals.

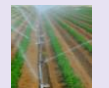


## Advantage

Make waste water suitable for  
**irrigation water.**

# MAIN COMPETITORS

	Geopolymer	Plastic	Ceramic	Polymeric
Local production	✓	✗	✗	✗
Ecofriendly	✓	✗	✓	✗
Recyclable	✓	✗	✓	✗
Durability	✓	✓	✓	✓
Price	✓	✓	✗	✓
Irrigation water	✓	✗	✗	✗



# Project RoadMap

## GOAL 2

PI rights

## GOAL 1

Technical  
fesability

## GOAL 4

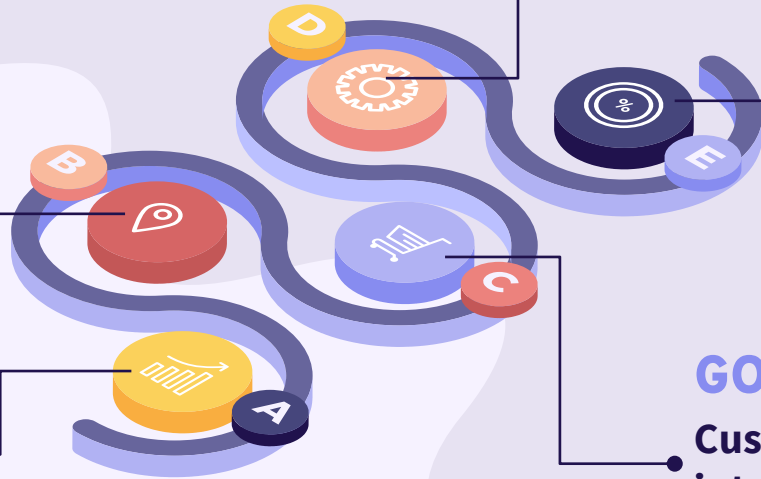
R&D - Prototyping

## GOAL 5

Hit the market

## GOAL 3

Customers  
interest



## Samples obtaining process flow

Fly ash preparing: drying and sifting

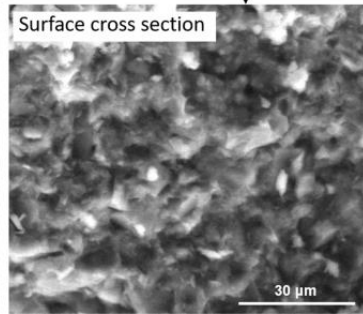
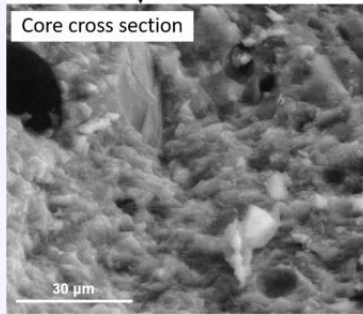
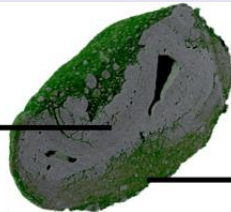
Solid components (recycled minerals) mixing

Sodium hydroxide solution preparing

Raw materials and  
activator (sodium silicate and sodium hydroxide) mixing

Mold vibrating during filling

Sample drying and demolding



## Publications:

Burduhos Nergis, D.D.; Vizureanu, P.; Sandu, A.V.; Burduhos Nergis, D.P.; Bejinariu, C. XRD and TG-DTA Study of New Phosphate-Based Geopolymers with Coal Ash or Metakaolin as Aluminosilicate Source and **Mine Tailings Addition**. *Materials* 2022, 15, 202. <https://doi.org/10.3390/ma15010202>;

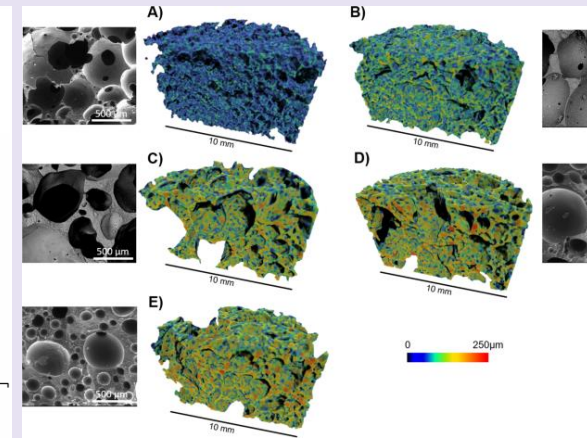
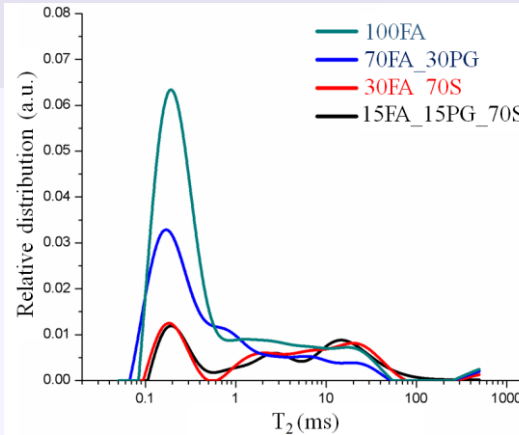
Yahya, Z.; Abdullah, M.M.A.B.; Li, L.-y.; Burduhos Nergis, D.D.; Hakimi, M.A.A.Z.; Sandu, A.V.; Vizureanu, P.; Razak, R.A. Behavior of Alkali-Activated Fly Ash through **Underwater Placement**. *Materials* 2021, 14, 6865. <https://doi.org/10.3390/ma14226865>

Luhar, I.; Luhar, S.; Abdullah, M.M.A.B.; Razak, R.A.; Vizureanu, P.; Sandu, A.V.; Matasar, P.-D. A State-of-the-Art Review on Innovative Geopolymer Composites Designed for **Water and Wastewater Treatment**. *Materials* 2021, 14, 7456. <https://doi.org/10.3390/ma14237456>

Burduhos Nergis, D.D.; Vizureanu, P.; Ardelean, I.; Sandu, A.V.; Corbu, O.C.; Matei, E. Revealing the Influence of Microparticles on Geopolymers' **Synthesis and Porosity**. *Materials* 2020, 13, 3211. <https://doi.org/10.3390/ma13143211>

DOI: 10.3390/ma14237456; DOI: 10.1038/s41598-020-64228-5

Burduhos Nergis Dumitru Doru, Vizureanu Petrică, Corbu Ofelia-Cornelia, Abdullah Mohd Mustafa Al Bakri, Sandu Victor-Andrei, Ecological Geopolymer Based on Thermal Power Plant Ash and Glass Powder from Recycled Waste for Construction Applications and Process for Obtaining It, **Patent application A/00038/25.01.2019** in România.





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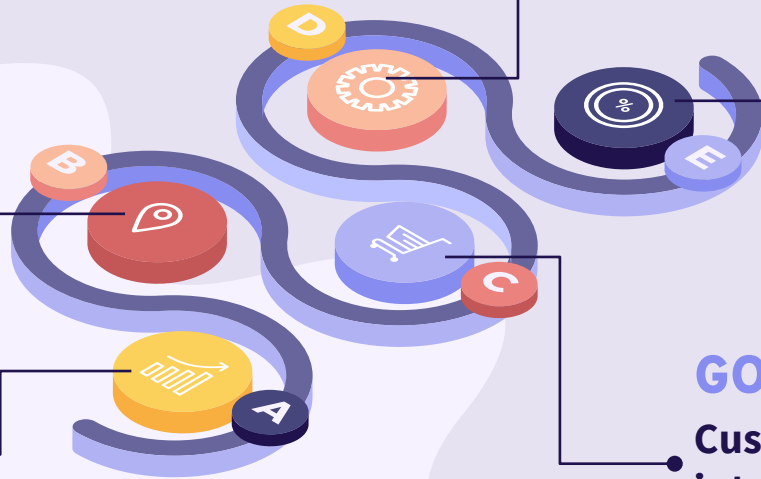
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interest



# TUIASI Team



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Doru Dumitru  
BURDUHOS  
NERGIS



PRODUCT DESIGN,  
TECHNOLOGY DEVELOPMENT

# Together, we can make the world greener...



Development partner

Commercial partner



# THANK YOU!

## Q & A

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