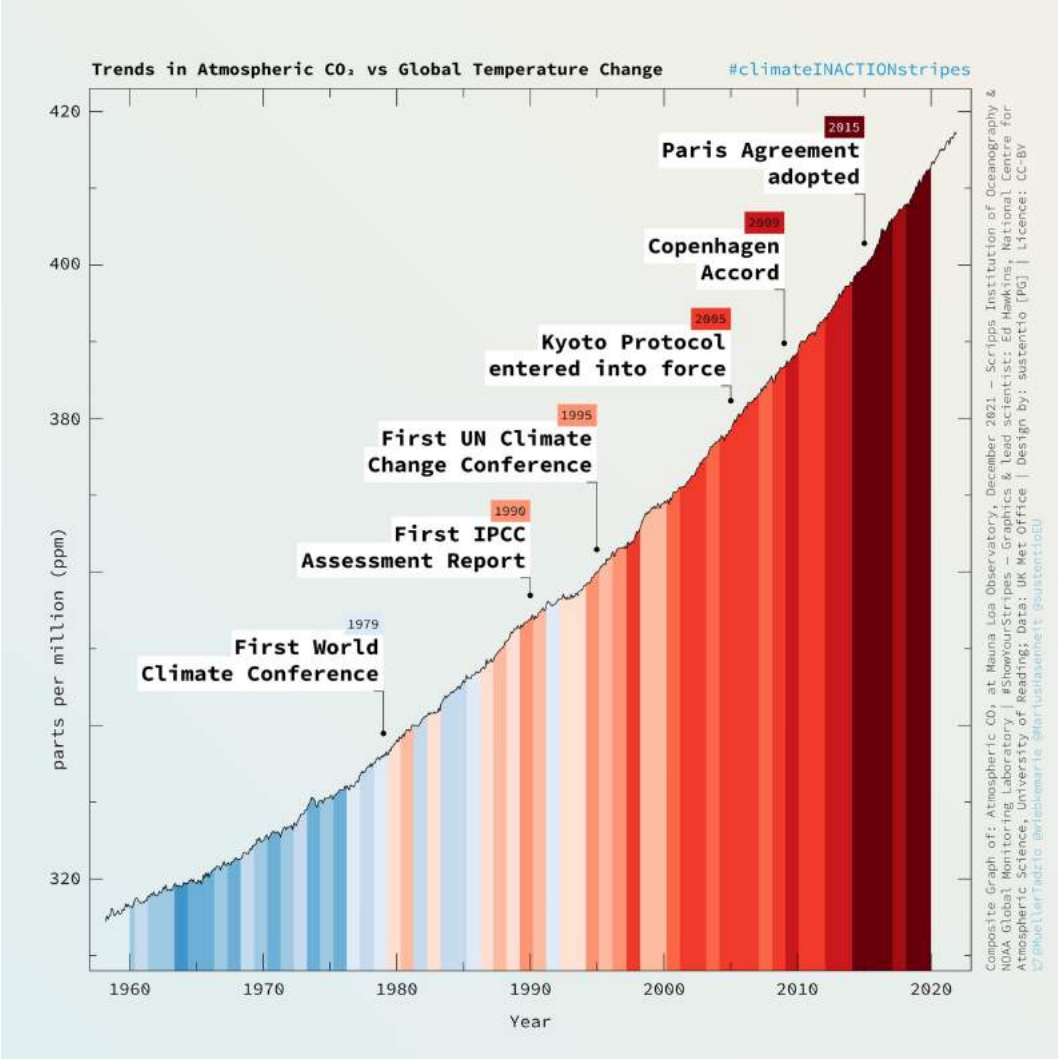
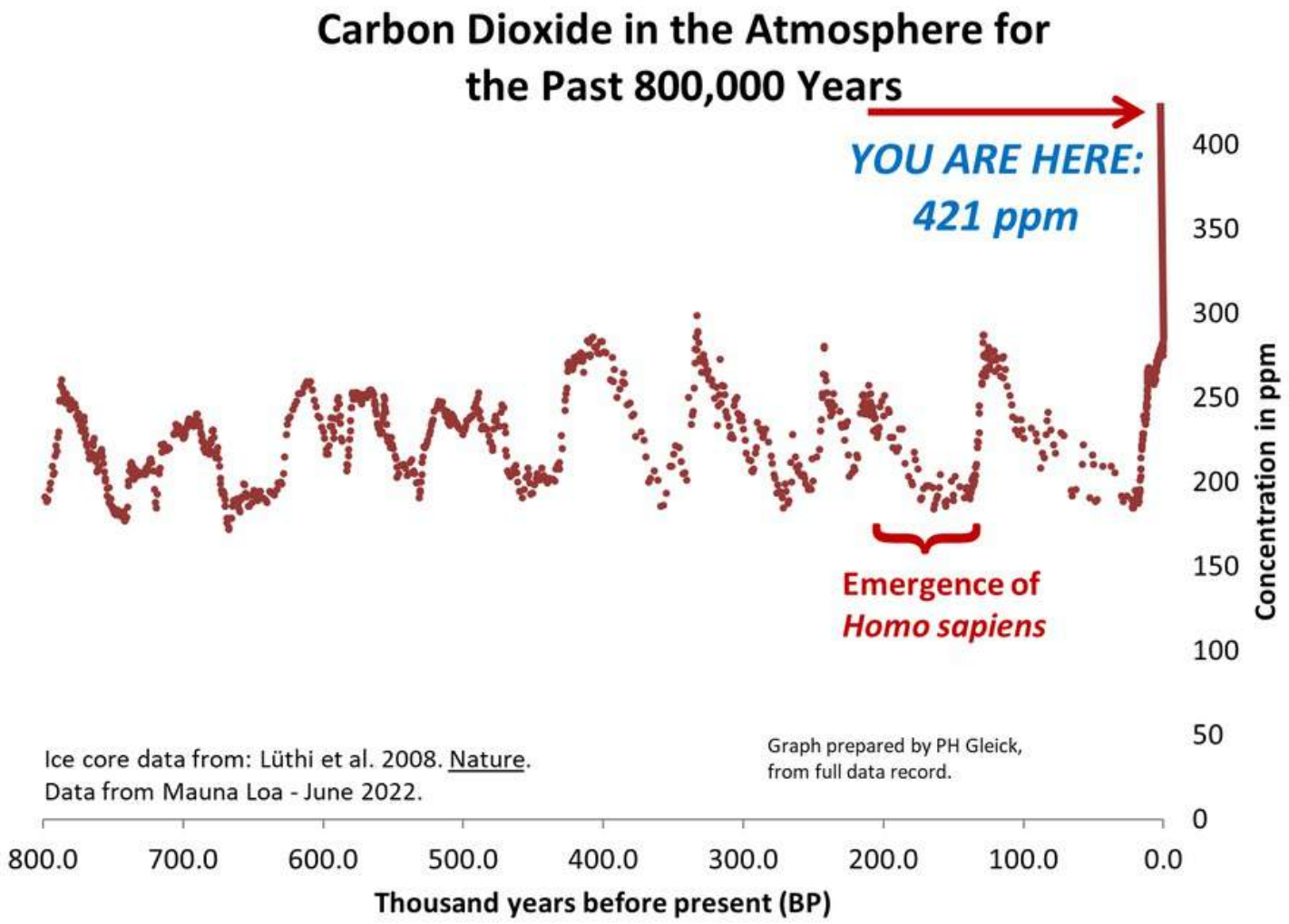
Carbon concerns






Recent data points out that the circular economy offers $4.5 trillion in opportunities to reduce waste, stimulate innovation and create jobs. New business models focused on reuse, repair and remanufacturing, in addition to sharing models, offer significant opportunities for innovation.
WORLD ECONOMIC FORUM

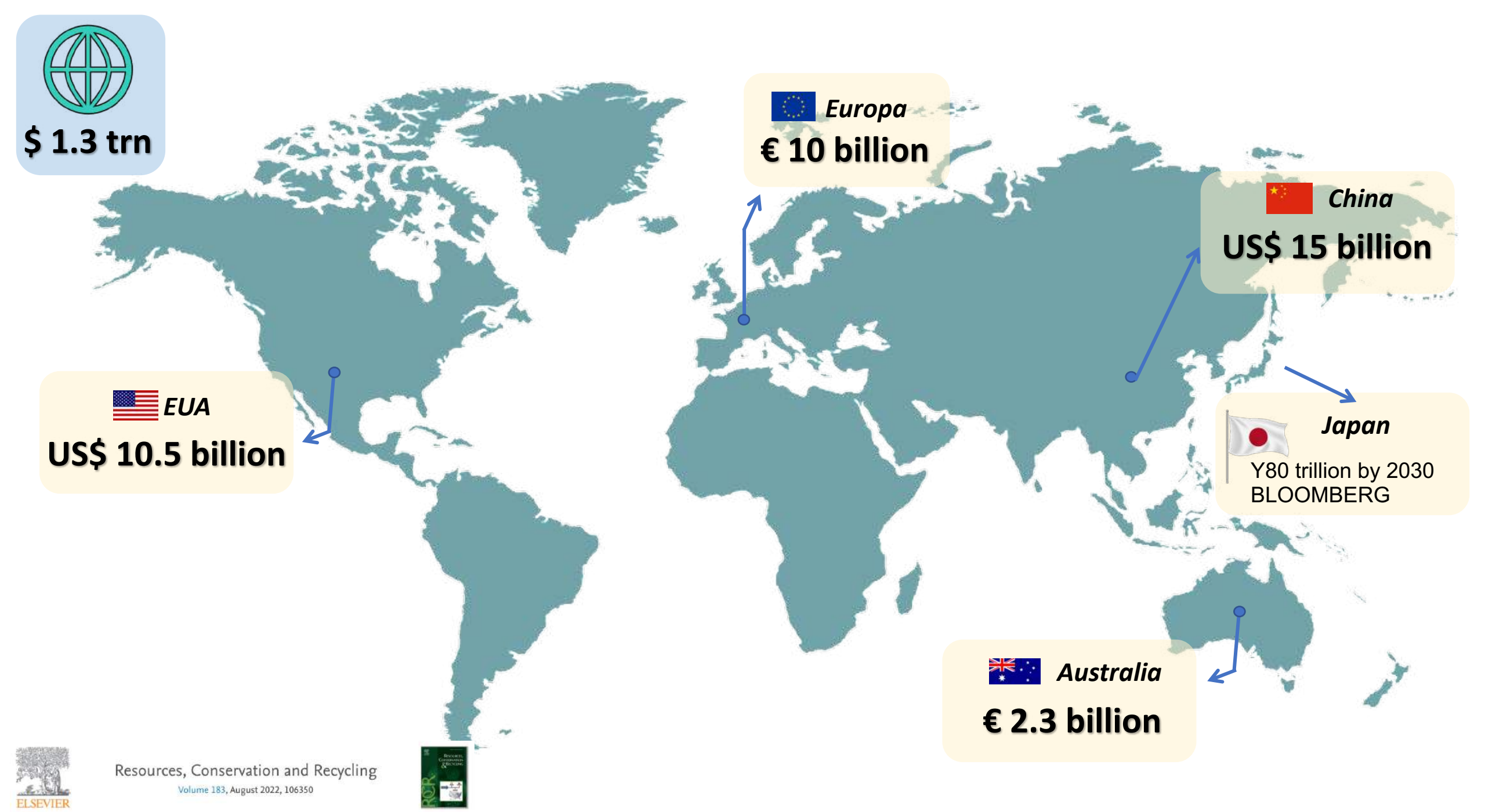
More than 100 billion tons of resources enter the economy annually - metals, minerals, fossil fuels, even organics.

Only 9% manage to be reintroduced into the economy.

The use of these resources has tripled since 1970 and is expected to double by 2050.

We would need 2 Earths to support the productive status quo.

WORLD RESOURCES INSTITUTE | 40 YEARS



Resources, Conservation and Recycling
Volume 183, August 2022, 106350

+

Residues and Energy

Tires to energy

Alternative fuels from discarded tires

Tires

Process optimization

Fractioned destilation

Bio-oil (hidrocarbons)

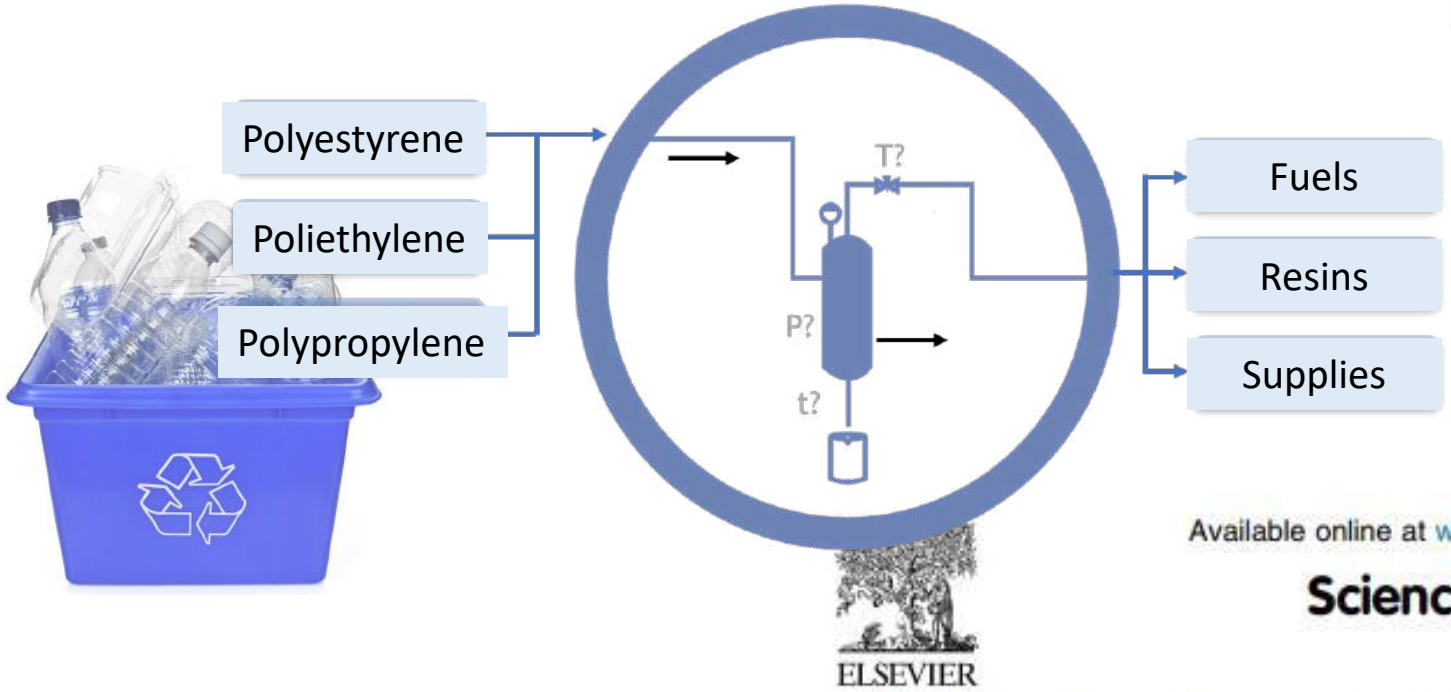
Adequation to Brazilian law

Fuel

Chemical Recycling

Decomposition of polymers in supercritical water environment

- No organic solvents;
- Less waste generation;
- Shorter reaction time;
- High yields



Available online at www.sciencedirect.com

ScienceDirect

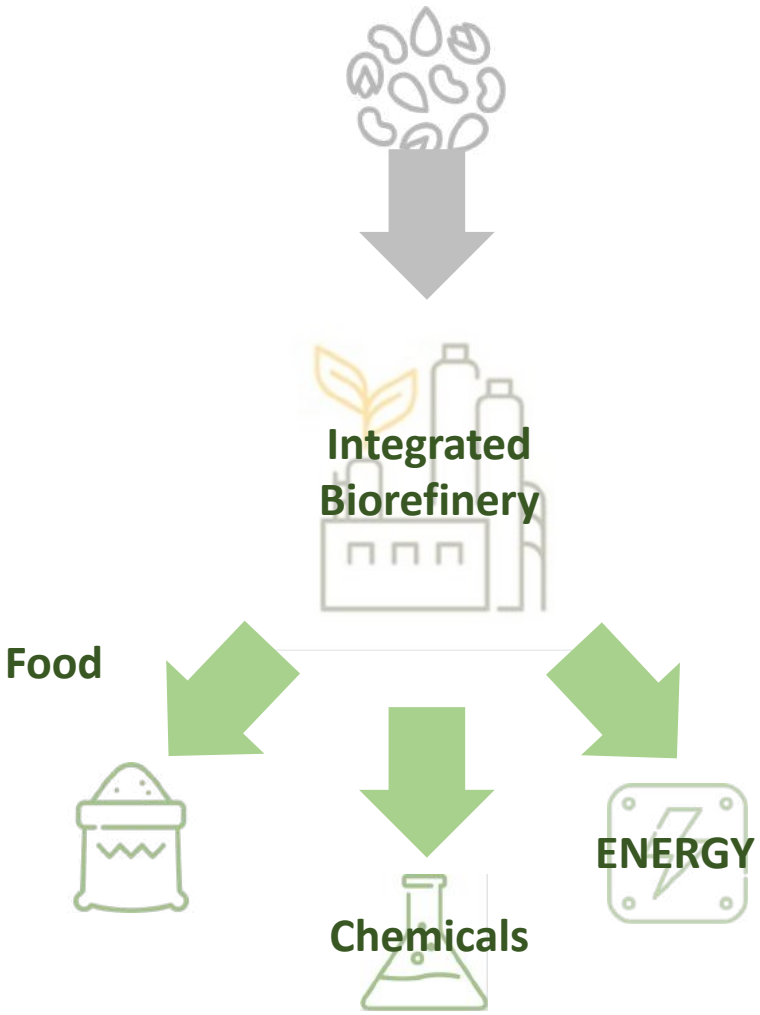
Current Opinion in
Green and Sustainable Chemistry

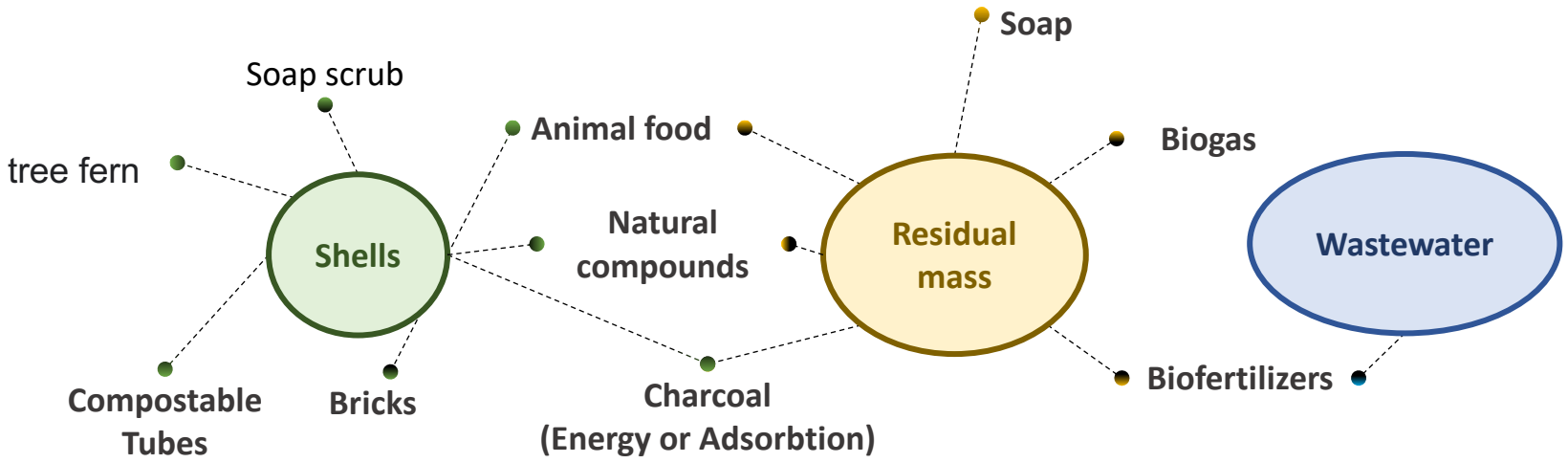
ELSEVIER

Subcritical and supercritical water for chemical recycling of plastic waste

Alex Queiroz, Giovanni B. Pedroso, Sergio N. Kuriyama and Antonio A. Fidalgo-Neto

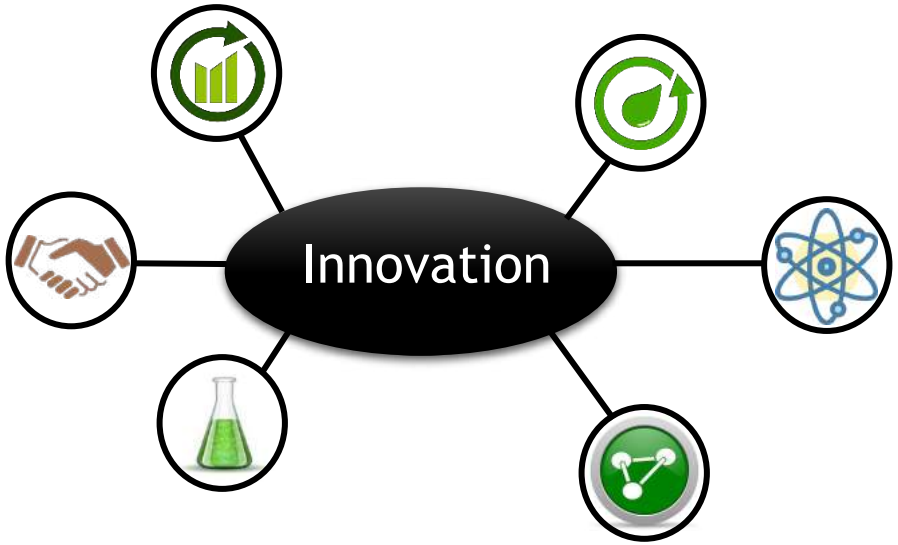
Residues from Vegetable Oil/butter Production





Waste Recovery

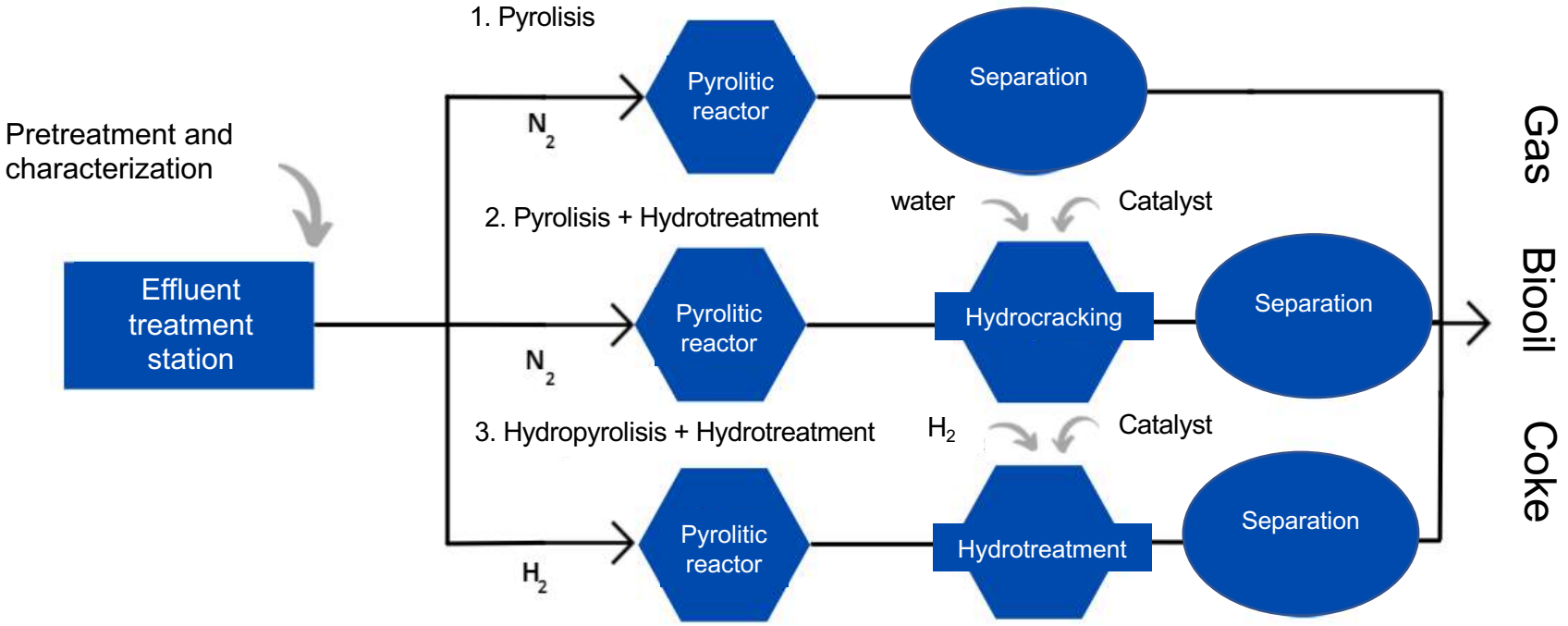
Development of disposable items from food industry waste



- Profitable solutions
- Compliance with technical specifications
- Decreased environmental impact

100% Biodegradable

Optimization of technological routes and construction of an intelligent semi-pilot unit to produce energy from urban waste



H_2 projects

Química
INSTITUTO SENAI DE INOVAÇÃO QUÍMICA VERDE

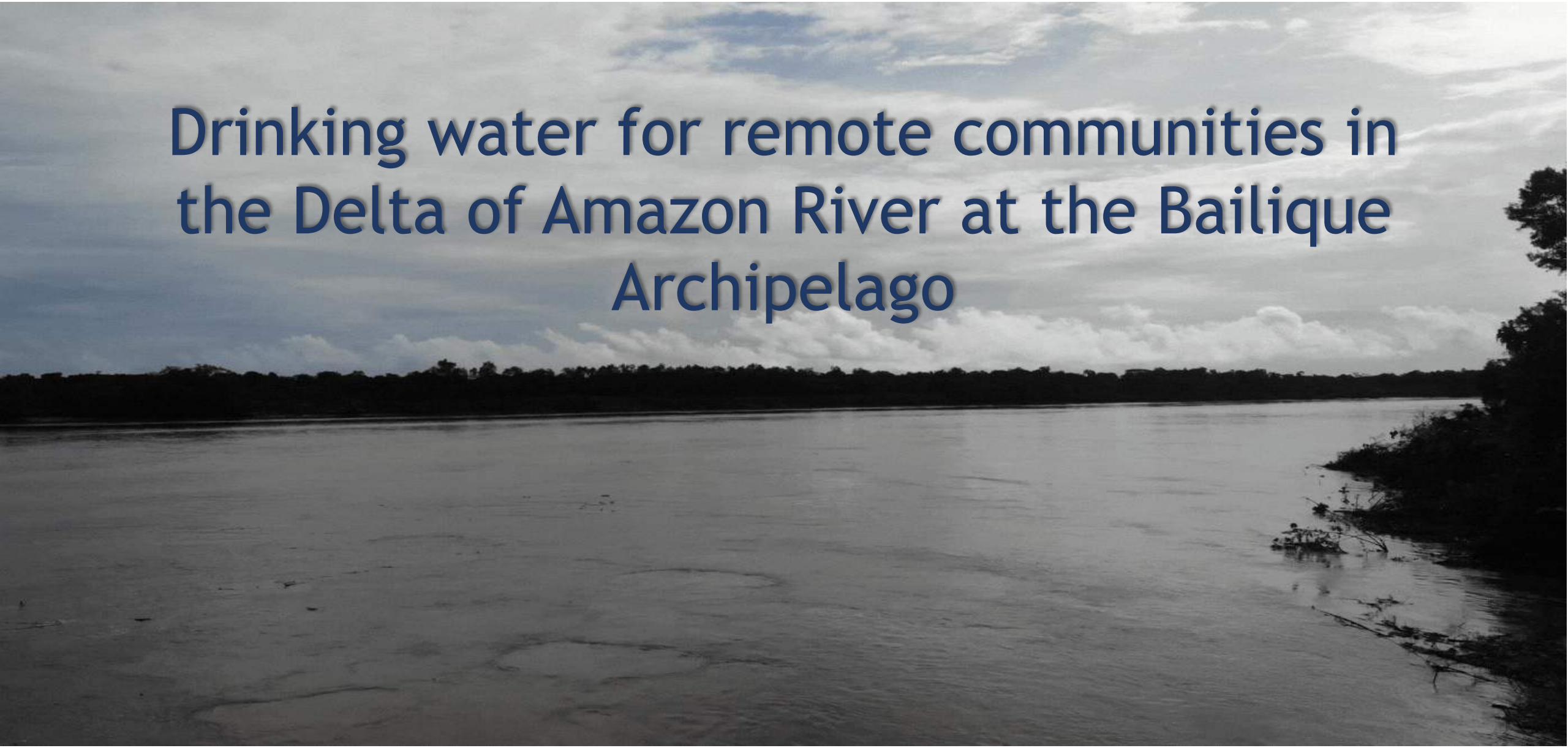
Materiais
INSTITUTO SENAI DE INOVAÇÃO Inspeção e Intergridade

Saúde
CENTRO DE INOVAÇÃO SESI

Digitais
INSTITUTO SENAI DE INOVAÇÃO Sistemas Virtuais de Produção

- LIQUID H_2 (FORMIC ACID)
- PHOTOCHEMISTRY FOR H_2
- CARBON FOOTPRINT FOR H_2 USE - SOFTWARE
- DIGITAL TWIN: ELECTRIC GENERATION COUPLED WITH H_2 PRODUCTION

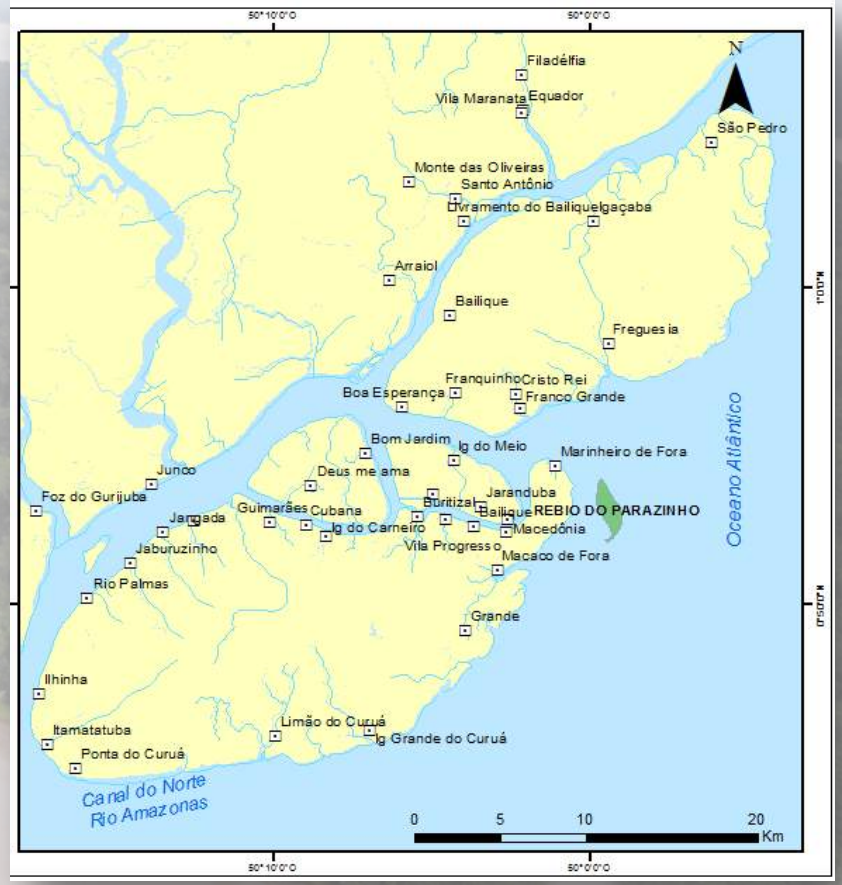
Water



Drinking water for remote communities in the Delta of Amazon River at the Bailique Archipelago

Bailique Archipelago

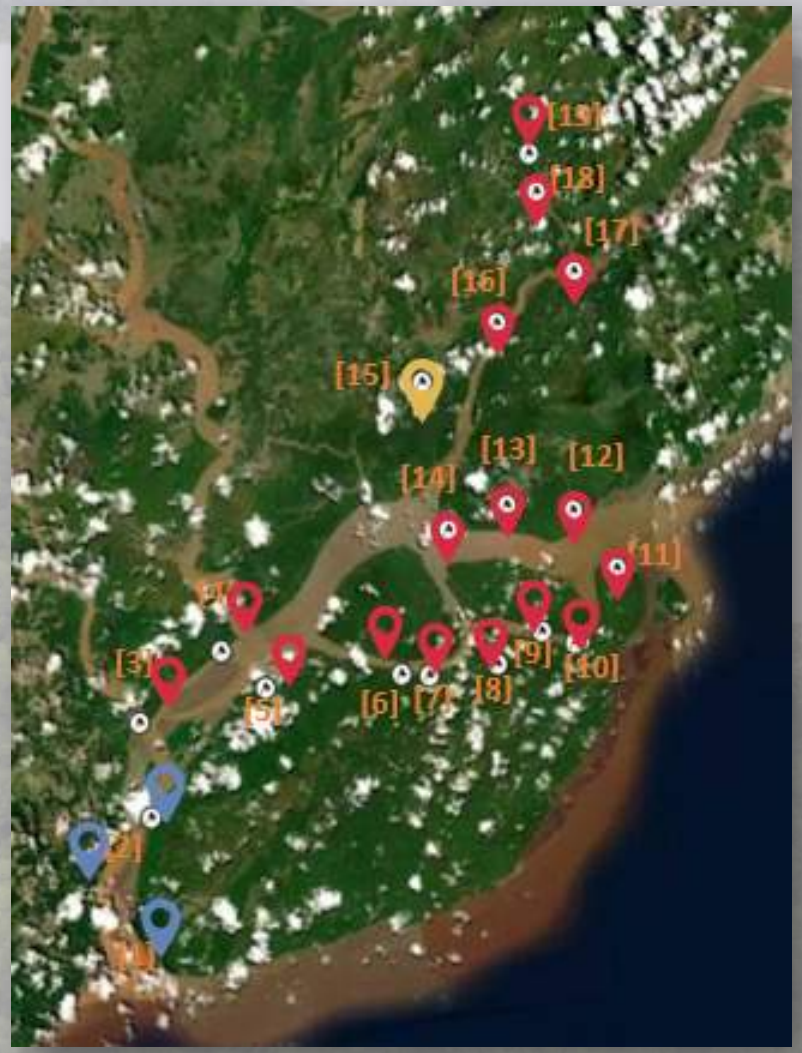
- Belonging to the district of Macapá, the Archipelago is distant 180 km from the capital and has a total area of 1,723.5 km² with access only by river.
- It has an estimated population of 13 thousand people distributed in approximately 56 communities.
- The main economic activities in the region are açaí extractivism, shrimp and fishing.



Problematic

- The **increase in salinity** of the freshwater compromises access to **drinking water** and causes a recurring water crisis;
- **Intensification** of the process of **erosion** of the land on the banks of the rivers
- Absence of studies on the environmental impact of increased salinity and forest and urban effluents modify the aquatic ecosystem in the Amazon River Delta.

Technical Visit



Main objectives

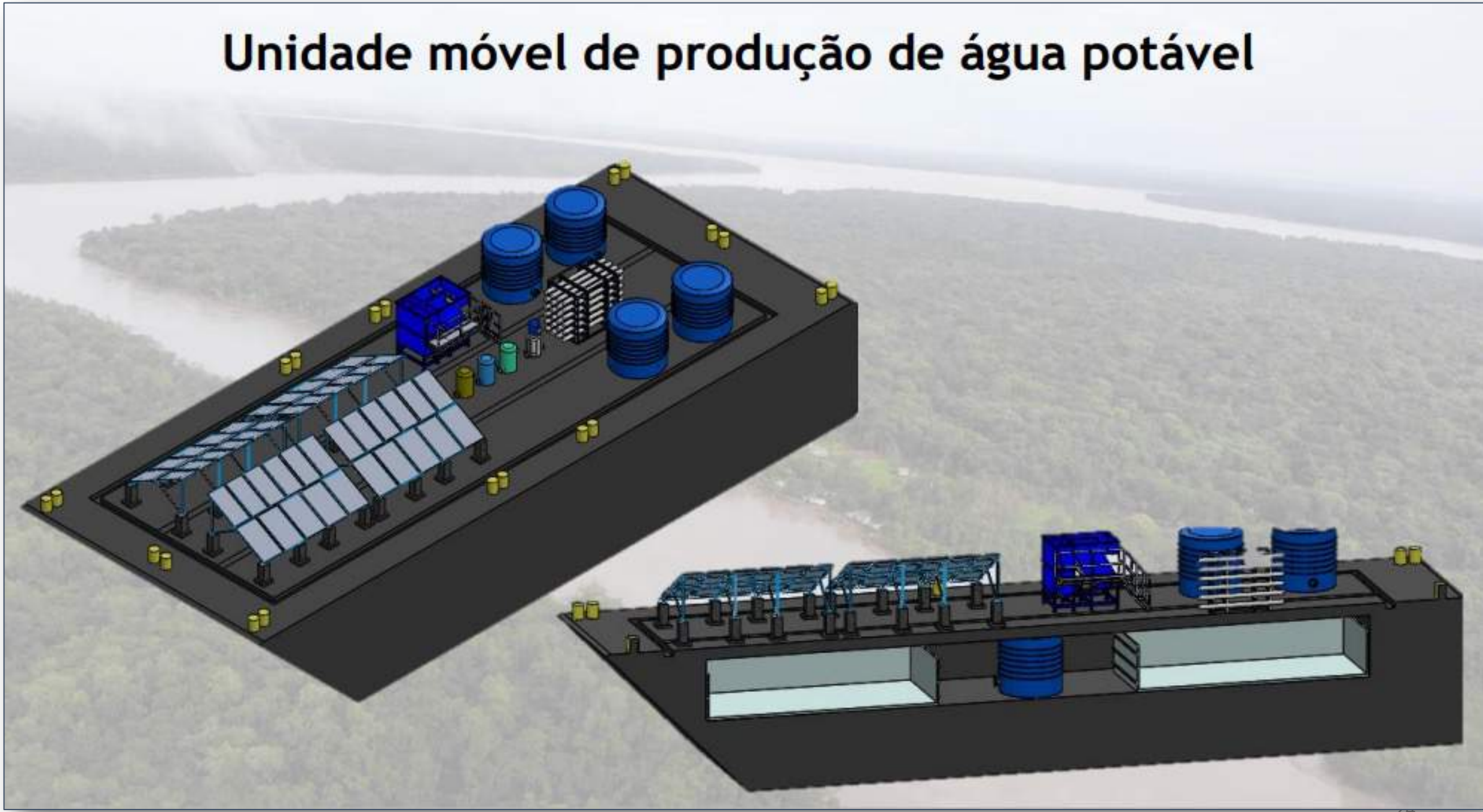
Providing drinking water to the remote communities

Engage the population in monitoring the waters of the Archipelago

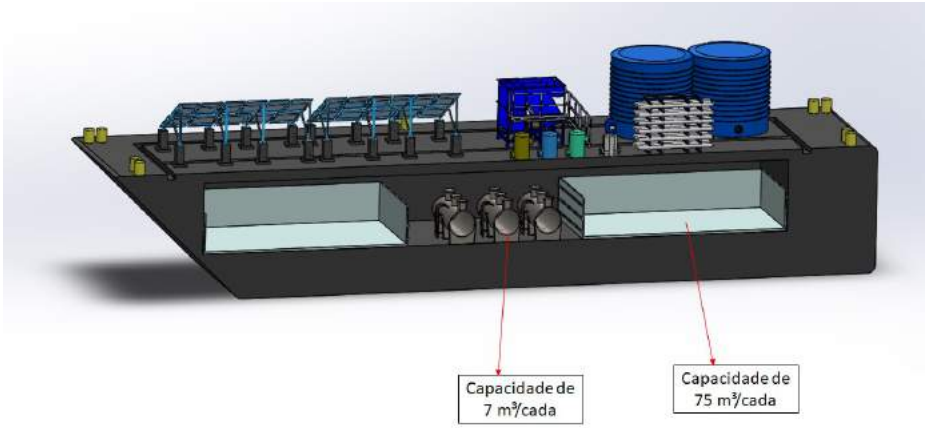
Improve socioeconomic development through technical and scientific training of the population

Understand the effects of intensified salinization on the local ecosystem

Unidade móvel de produção de água potável



FRESH WATER PRODUCTION UNIT



Treatment of Produced Water for Reuse

Challenges O&G

Member of the Produced Water Club of the National Engineering Laboratory TÜV SÜD

INSTITUTO SENAI DE INOVAÇÃO QUÍMICA VERDE

PRODUCED WATER FROM O&G

Oil production generates around

1,000,000 Water Liters /day

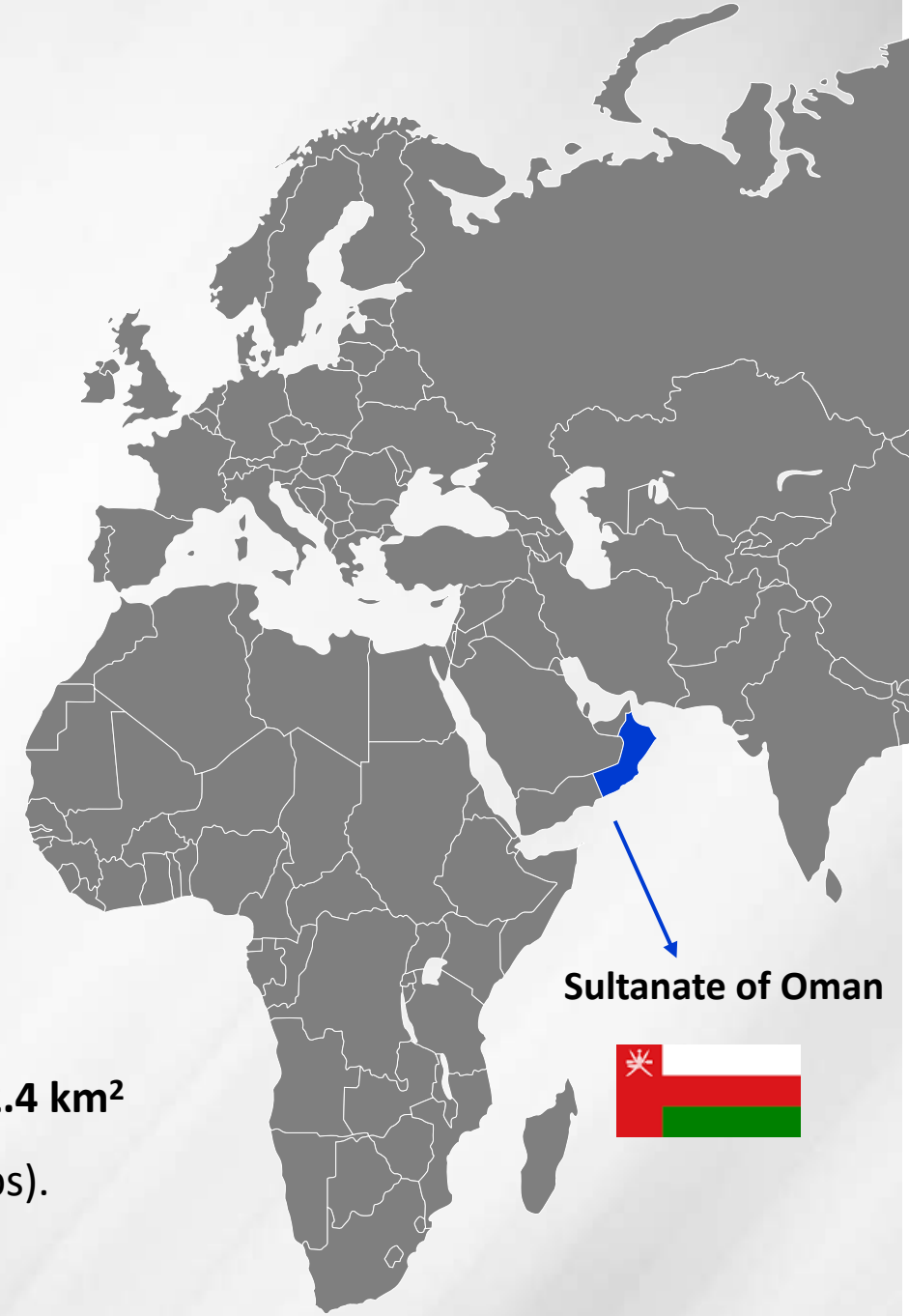
Produced Water treatment without

well-defined metrics or standards

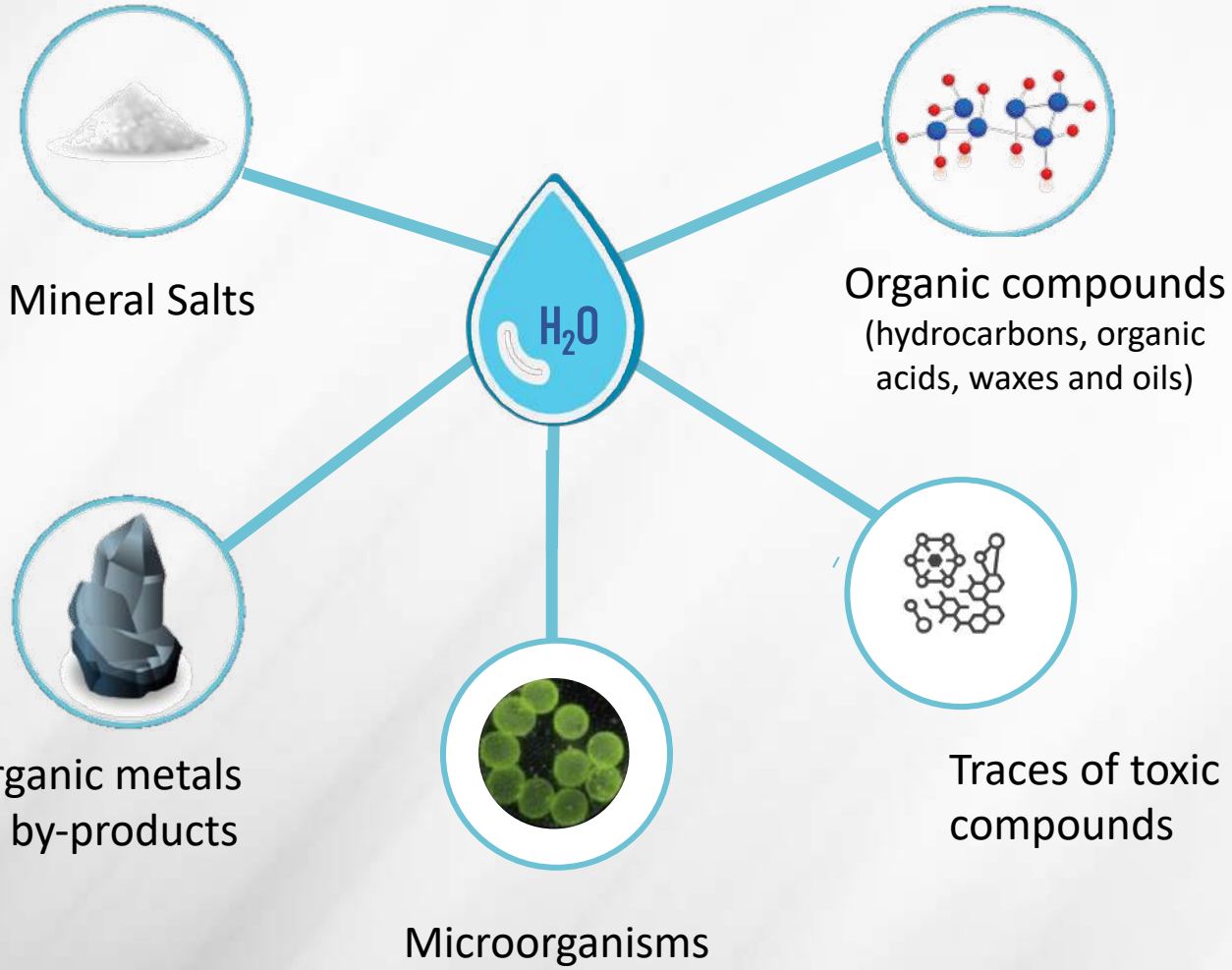
Produced Water treatment improvement

Produced Water Reuse - **irrigation** of an area of about **2.4 km²**

(eucalyptus, cotton, aloe, castor bean, among other crops).

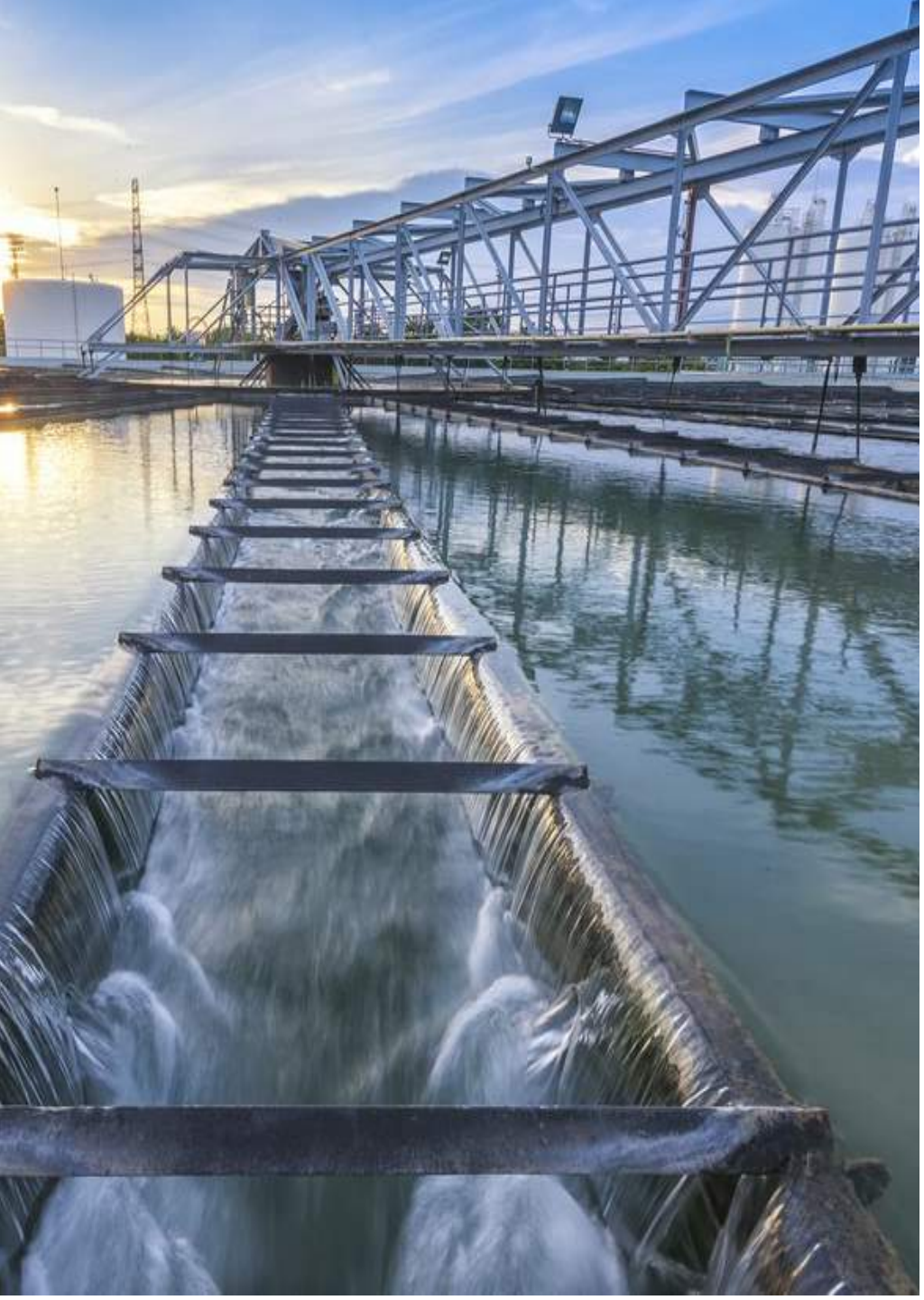


PRODUCED WATER FROM O&G



Water quality

Reuse application



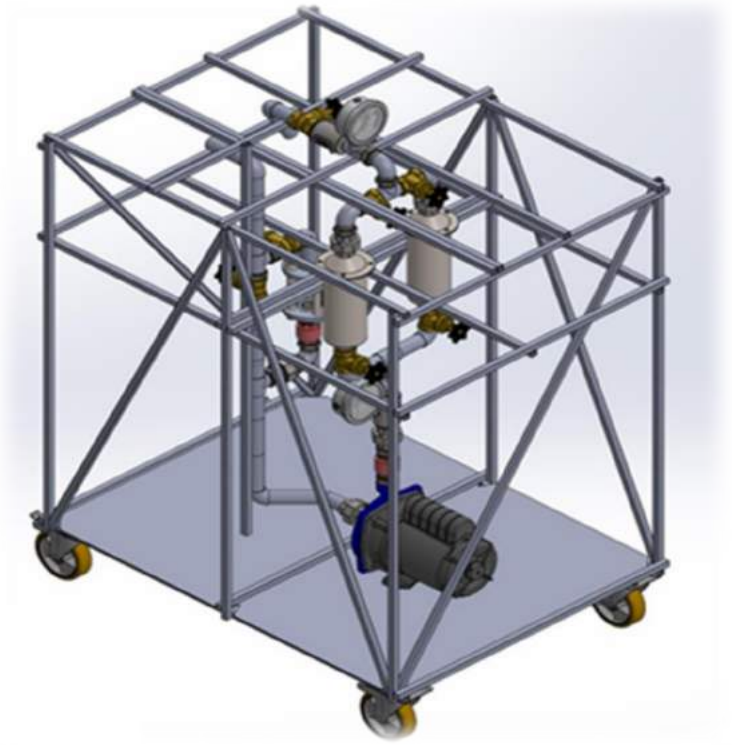
Technologies

- Polymeric materials for physical-chemical treatment
- Technologies for ultra and nanofiltration
- Advanced oxidation processes
- Reverse/reverse osmosis
- Bioremediation
- Technologies for removing recalcitrant organic compounds

New Technologies/materials

Natural Fiber to Clean oil-contaminated water

Filtration system based on renewable source material for oily water treatment



- Optimization of the formulation of absorbent polymeric materials;
- Optimization of absorptive capacity;
- Remediation reactor design;
- Evaluation of the recovery of absorbent materials

Biosolvit
SOLUÇÕES EM BIOTECNOLOGIA
The Biosolution Company

NATUPALM

Materials from Natural Sources

New packaging from natural substrates

Development of a paper bottle with barrier properties obtained by coatings based on biodegradable materials for the food industry

- **Coating formulations** based on biopolymers's mixtures to improve barrier properties like *mechanical resistance*, *hydrophobicity*, *moisture barrier*, and others.

- **Paper based in non wood sources -** Development of innovative cellulosic pulp

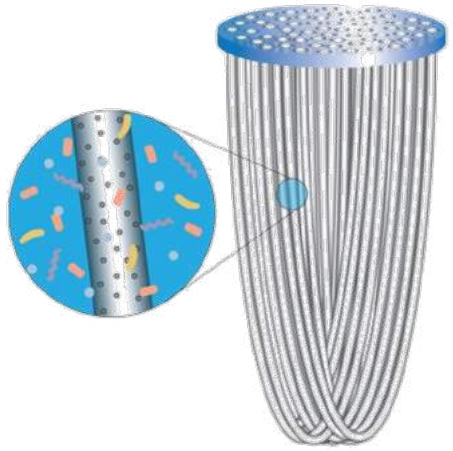
WASTEWATER TREATMENT

Production of ultrafiltration module with hollow-fiber membranes

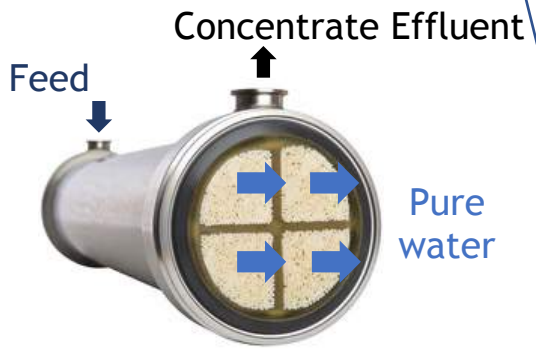
Efficient treatment strategies dedicated to each effluent

Development of a new hollow fiber synthesis process

Process design for maximized effluent efficiency



parallel coupling



Tangential flow

economically viable

High efficiency

High permeate movement

high durability

Effective for different effluentss

Business and opportunities

EMBRAPII

Empresa Brasileira de Pesquisa e Inovação Industrial

INSTITUTO SENAI DE INOVAÇÃO QUÍMICA VERDE

UNIDADE EMBRAPII

TECNOLOGIAS EM QUÍMICA VERDE

ABOUT UNIT ISI QUÍMICA VERDE

SITE: https://www.firjan.com.br/senai/empresas/competitividade-empresarial/meio-ambiente/default.htm

CONTACT: Antonio Augusto Fidalgo Neto

EMAIL: aaneto@firjan.com.br

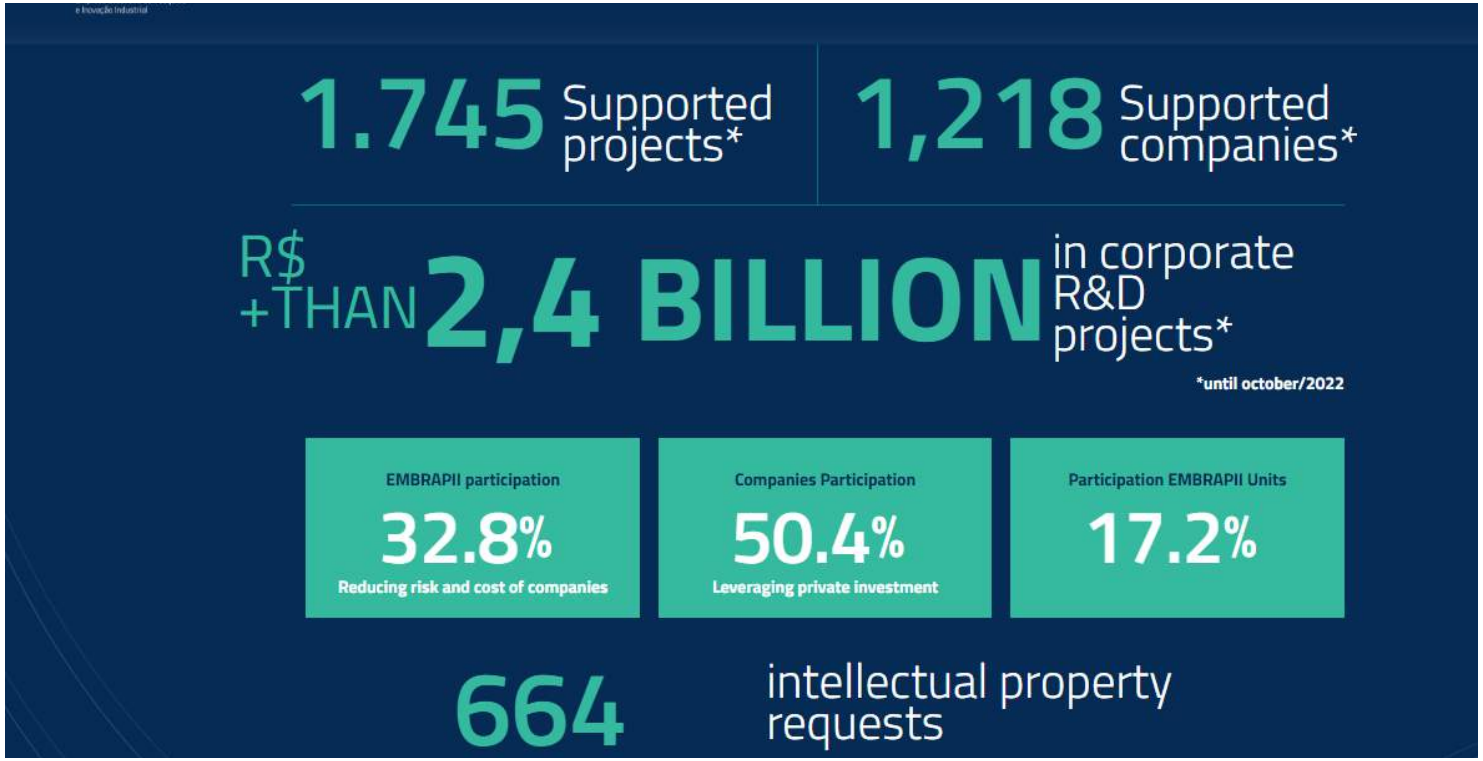
TELEPHONE: 21 3978-6101

ADDRESS: Rua Moraes e Silva, 53 – Bloco 9 – Maracanã

POSTAL CODE: 20271-030

CITY: Rio de Janeiro

STATE: RJ



INSTITUTO SENAI DE INOVAÇÃO QUÍMICA VERDE

UNIDADE EMBRAPII
TECNOLOGIAS EM QUÍMICA VERDE

HOW CAN YOUR COMPANY PARTNER WITH EMBRAPII?

- The company negotiates the project directly with the EMBRAPII Unit
- Approval and direct hiring between the company and EMBRAPII Unit
- The resources are available in the EMBRAPII Units
- Continuous flow: at any moment, your company can carry out projects, without waiting for a bid
- In a few months, the developed products collect taxes in values higher than that invested by EMBRAPII in its development

Subsidized fund up to 50%

NETWORKS

Rede MCTI/EMBRAPII de INOVAÇÃO EM BIOECONOMIA

The Oil-Club

https://www.oil-club.co.uk/

REDE MCTI/EMBRAPII DE INOVAÇÃO EM GRAFENO

Vale do Genoma

Rede SENAI Biologia molecular

ISC3

INSTITUTO SENAI DE INOVAÇÃO QUÍMICA VERDE

UNIDADE EMBRAPII TECNOLOGIAS EM QUÍMICA VERDE

Funds

Rede MCTI/EMBRAPII de INOVAÇÃO EM BIOECONOMIA

Bioeconomy network – EMBRAPII/MCTI

eureka innovation beyond borders

Eureka call

Bioeconomy International submission platform

Bioeconomy International Call

Finep INOVAÇÃO E PESQUISA

FINEP Conecta

Basic Funding Alliance

Basic fund aliance – bioeconomy network

cornet

CORNET Call

INSTITUTO SENAI DE INOVAÇÃO QUÍMICA VERDE

UNIDADE EMBRAPII TECNOLOGIAS EM QUÍMICA VERDE

Who are we?

INSTITUTO SENAI DE INOVAÇÃO QUÍMICA VERDE

Applied Science Partnership Opportunities

International Strategic Partners:

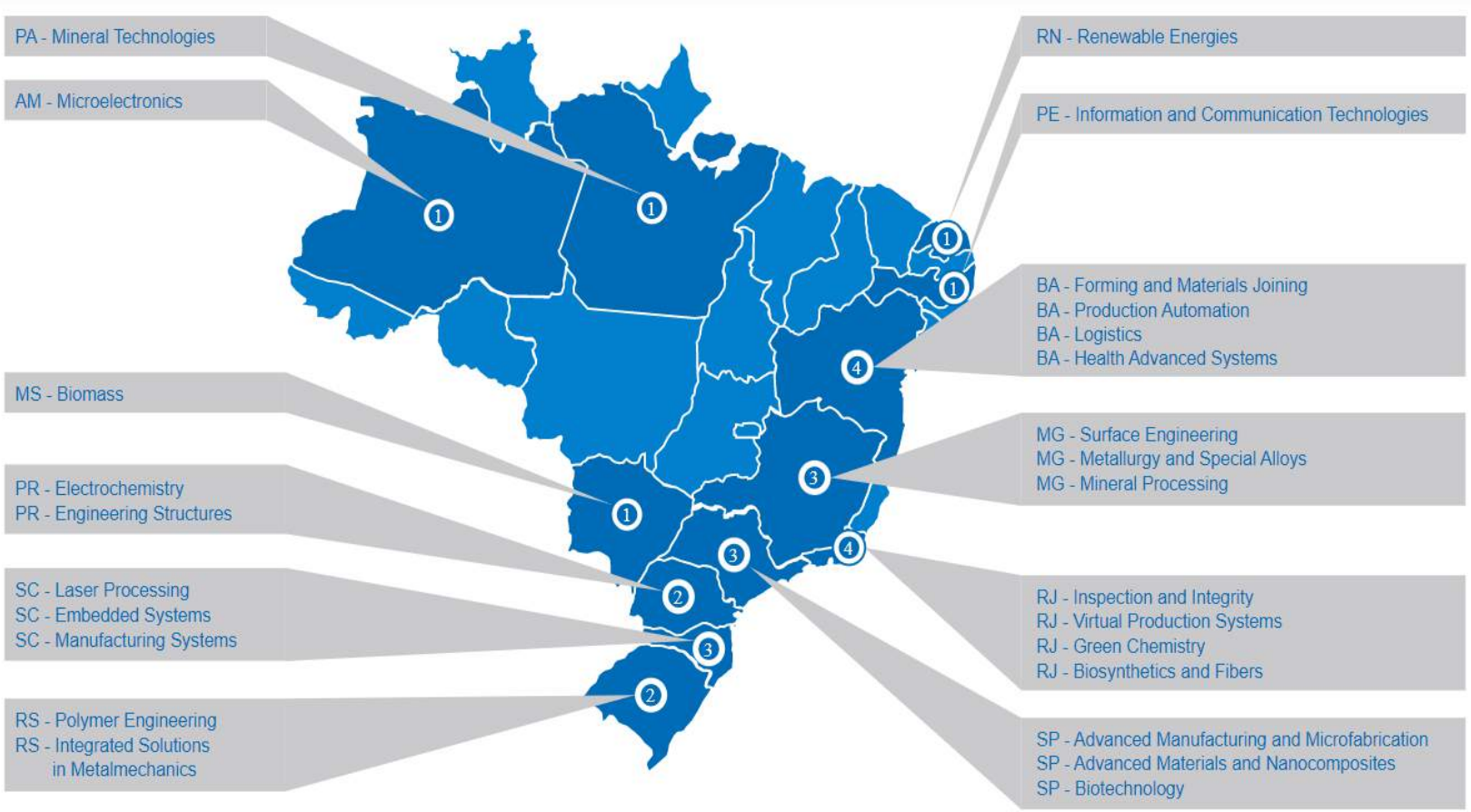
Massachusetts Institute of Technology

Fraunhofer

RI.SE Research Institutes of Sweden

SENAI's Innovation Institutes

SENAI
Serviço Nacional de Aprendizagem Industrial
PELO FUTURO DO TRABALHO



SENAI AT A GLANCE:

- The largest private network for research & innovation services in Latin America
- 26 Innovations Institutes, established in 2012
- 1.000 researchers
- More than 1.500 projects with the Brazilian Industry;
- More than R$ 2 billions in projects portfolio, CAGR of 40% in the last 7 years;

International Strategic Partners:

Massachusetts Institute of Technology

Fraunhofer

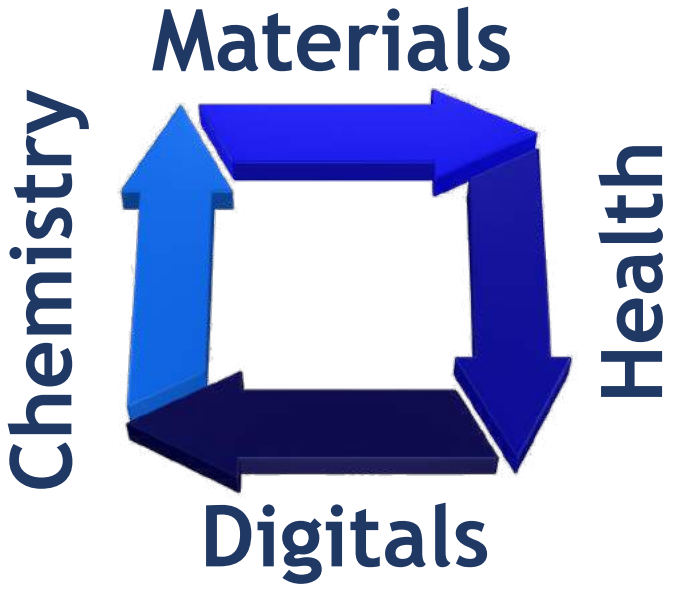
RI.SE Research Institutes of Sweden

INSTITUTO SENAI DE INOVAÇÃO

Firjan SENAI

SENAI Innovation Institutes' Network

Rio de Janeiro Branch



- **Green Chemistry**
- **Inspection and Integrity**
- **SESI Occupational Healthy**
- **Virtual Production Systems**

RESEARCH LINES

INSTITUTO SENAI DE INOVAÇÃO QUÍMICA VERDE

Green Analytical Chemistry

Chemistry and Sustainability

Oil & Gas and Petrochemical

Technologies for treatment and use of soil and wastewater

Biorefinery

Biosensoring, Biotechnology and Molecular Biology

Chemistry 4.0

INSTITUTO SENAI DE INOVAÇÃO QUÍMICA VERDE

MISSION

We are an **applied research institute** with the mission of contributing to the **improvement of the Brazilian Industry** through **the exchange of research, development, innovation** and **technological transfer**

High Qualified Research Team

High Tech Chemical Laboratories

Professional R&D Management

FACTS & NUMBERS
2016 - 2022

INSTITUTO SENAI DE INOVAÇÃO

International Partners

National Partners

anp
ANEEL
UNIDADE EMBRAPII

INSTITUTO SENAI DE INOVAÇÃO QUÍMICA VERDE

INSTITUTO SENAI DE INOVAÇÃO Inspeção e Intergridade

INSTITUTO SENAI DE INOVAÇÃO Sistemas Virtuais de Produção

CENTRO DE INOVAÇÃO SESI

Antonio Fidalgo, PhD

Chief-researcher

Fone: 21 998943659

e-mail: aaneto@firjan.com.br

International Strategic Partners:

Massachusetts Institute of Technology

Fraunhofer

RI.SE Research Institutes of Sweden

UNIDADE EMBRAPII TECNOLOGIAS EM QUÍMICA VERDE

anp Agência Nacional do Petróleo, Gás Natural e Biocombustíveis

Member of CISQ Federation

RINA IQNet

CERTIFIED MANAGEMENT SYSTEM

ISO 14001 - ISO 45001

EMS-8580/I OHS-4340