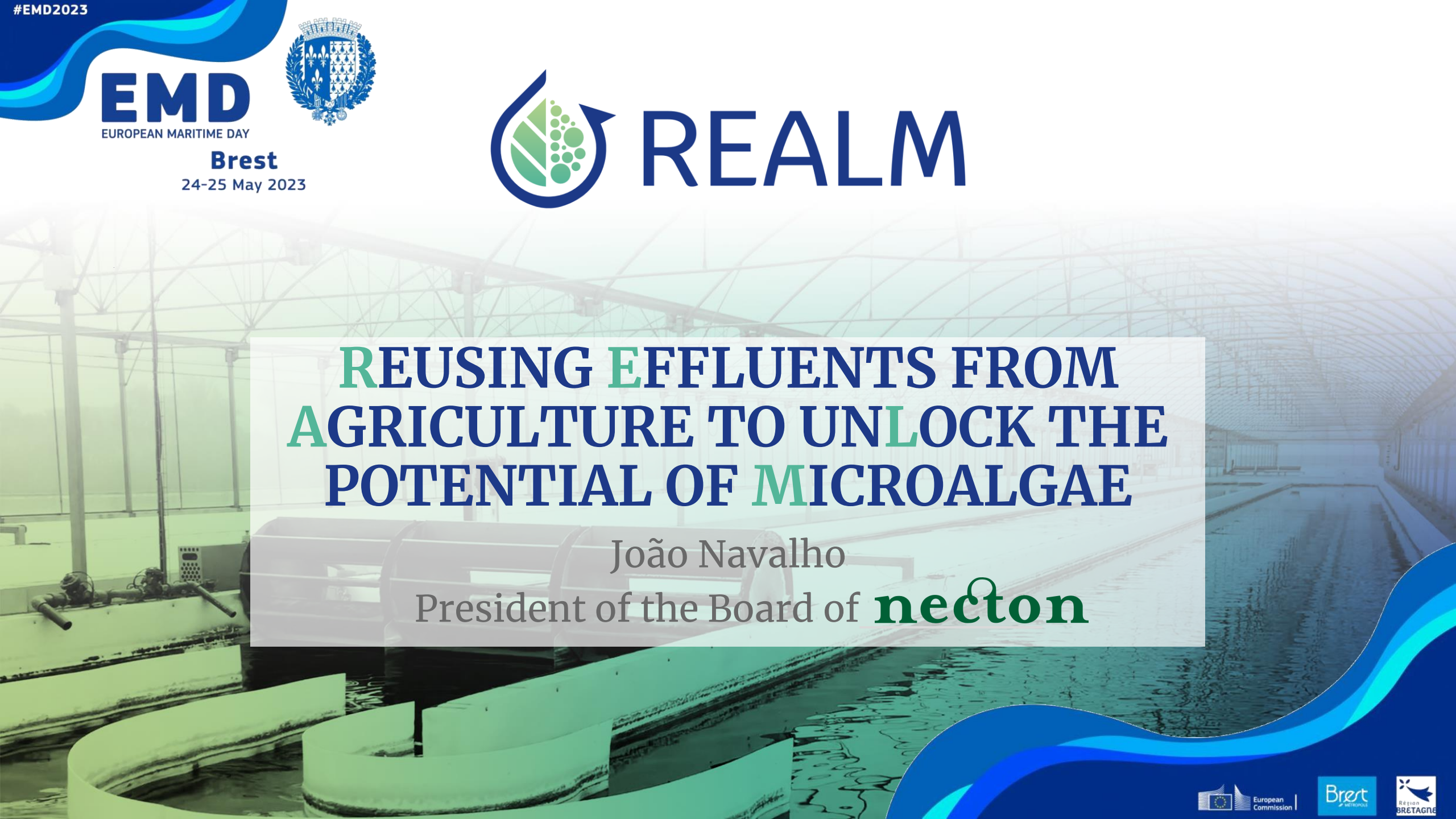
#EMD2023

EMD
EUROPEAN MARITIME DAY
Brest
24-25 May 2023

REALM



REUSING EFFLUENTS FROM AGRICULTURE TO UNLOCK THE POTENTIAL OF MICROALGAE

João Navalho
President of the Board of necton

European Commission
Brest Métropole
Région Bretagne

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- Co-founder and President of the Board at Necton S.A.
- President of the Board at Allmicroalgae S.A.
- President at Proalga – Portuguese Association for Algae Producers
- Vice President at GreenColab – Portuguese Collaborative Laboratory for Algal Biotechnology
- Member of the Industry Committee at EABA

All the expressed opinions are my own and does not bind any of the organizations I'm collaborating with

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The call

HORIZON-CL6-2021-CIRCBIO-01-09

- ✓ European Green Deal
- ✓ EU bioeconomy strategy
- ✓ Blue growth strategy

«…support the development of algae-based greener aquatic industrial products/processes and/or environmental services sustaining the health of aquatic ecosystems for a healthy planet and people.»

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The idea

- Excess nutrients from the drain water of Soilless Cultures, need to be removed before discharge;
- Future policies will be based on more sustainable horticulture cultivation methods:
- Closed systems require water treatment to prevent lower crop development or diseases.

- Microalgae are an exponentially growing feedstock for many applications;
  - EU demand for algae and algae-based products is expected to increase
  - Can help to treat several types of wastewater.
  - Applications are limited by high production prices;
  - Water related activities need to adjust to more sustainable and circular economy approaches.

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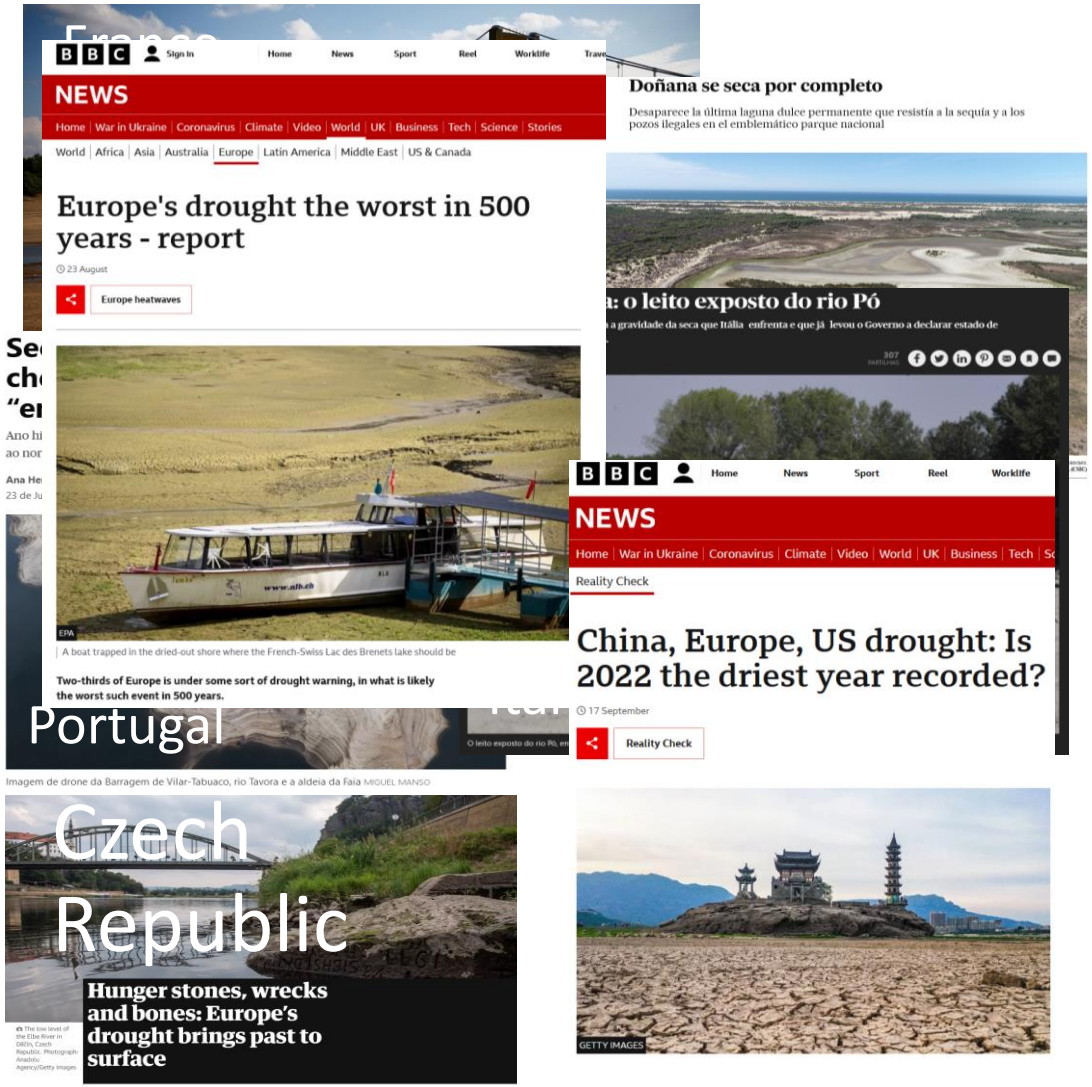
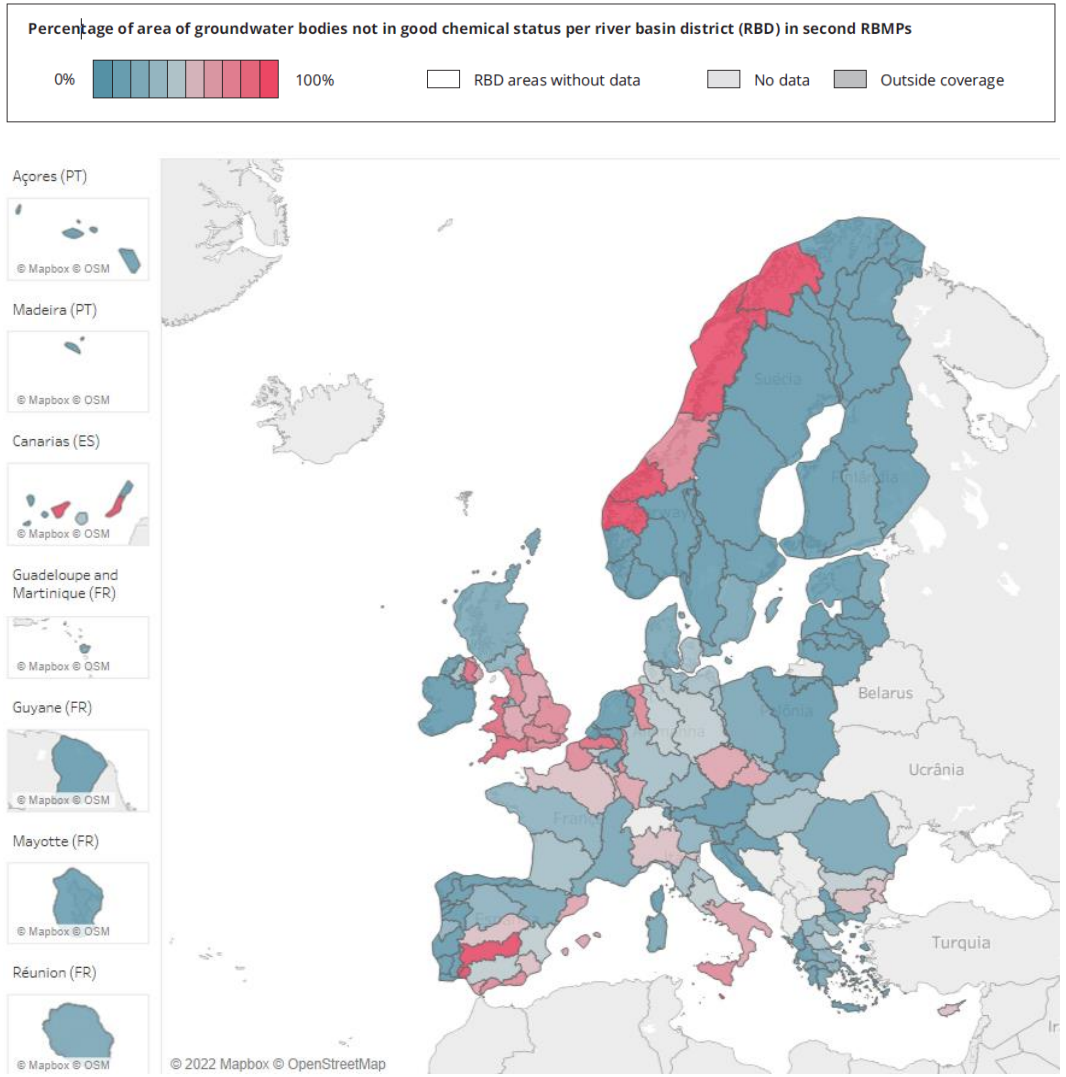
Water





Source: Results are based on the WISE-SoW database. Groundwater bodies failing to achieve good status, by RBD.

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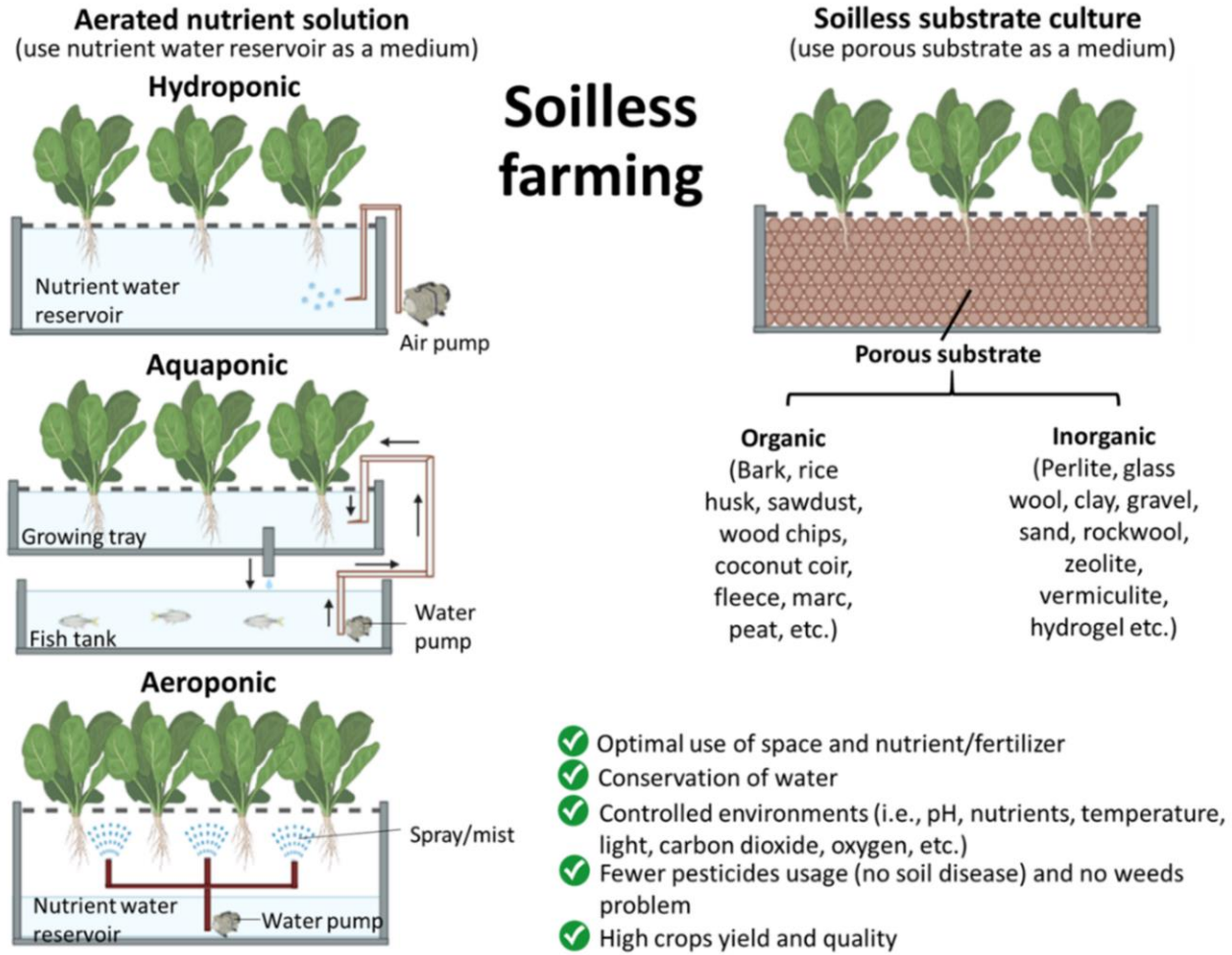
Soilless farming



- Optimal use of space and nutrient/fertilizer
- Conservation of water
- Controlled environments (i.e., pH, nutrients, temperature, light, carbon dioxide, oxygen, etc.)
- Fewer pesticides usage (no soil disease) and no weeds problem
- High crops yield and quality

Closed systems:

- ✓ Valorises the drain water
- ✓ Reduces the environmental impact
- X Requires good water quality.
- X It's not always economically viable

Maluin et al., **2021**; https://doi.org/10.3390/agronomy11061213

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Trend

With 13,000 ha under hydroponic cultivation, corresponding to 50% of the value of all fruits and vegetables grown in the country, the Netherlands has been the world leader in the use of hydroponic technology.


Photo credit: National Geographic

With >30.000 ha, Almeria in Spain forms the largest concentration of greenhouses in the world.


Photo credit: Yann Athus-Bertrand

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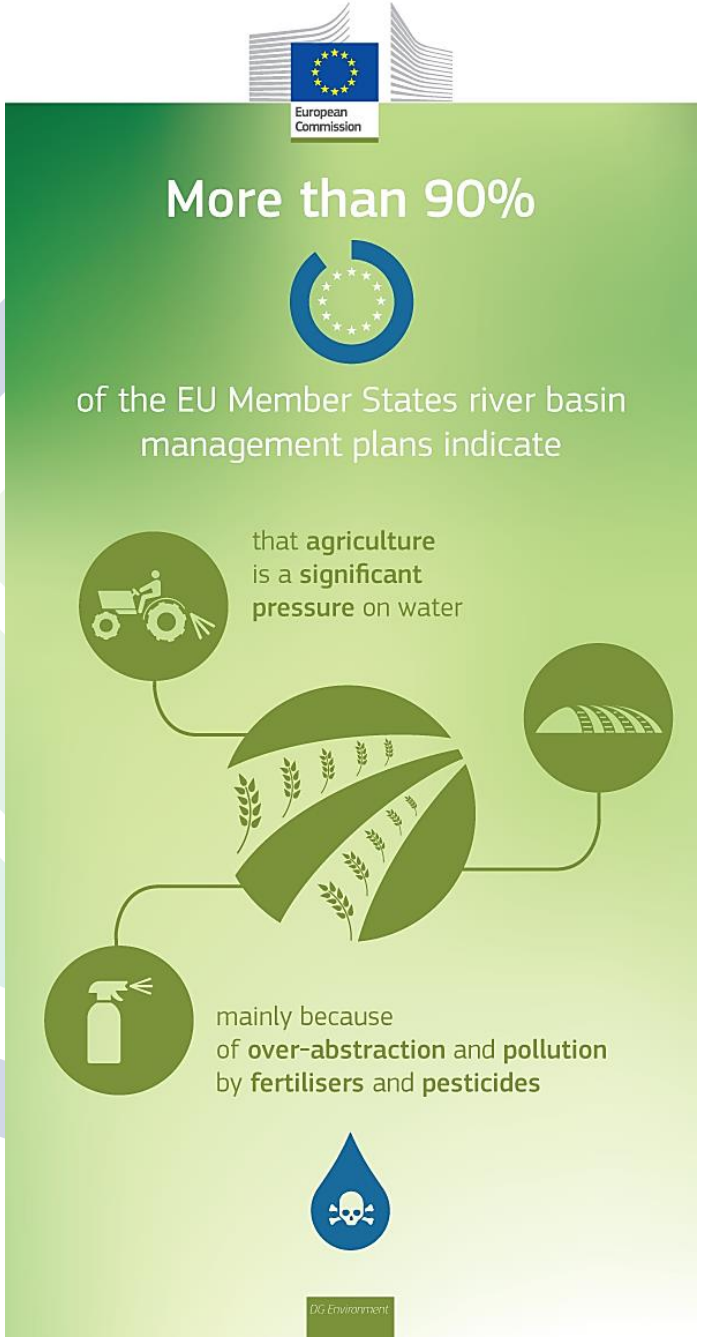
Policies

As a major source of pollution, agricultural pressures on water resources need to be addressed to ensure the full implementation of current legislation but also the adoption of more sustainable ways to produce and use chemicals:

- Good water management
- Improvement on the sustainability of the horticultural model

✓ **An increase in legal limitations to the rejection of drainage is expected.**

✓ **To further limit nutrient releases, more stringent limit values to treat Nitrogen and Phosphorus will be progressively applied**



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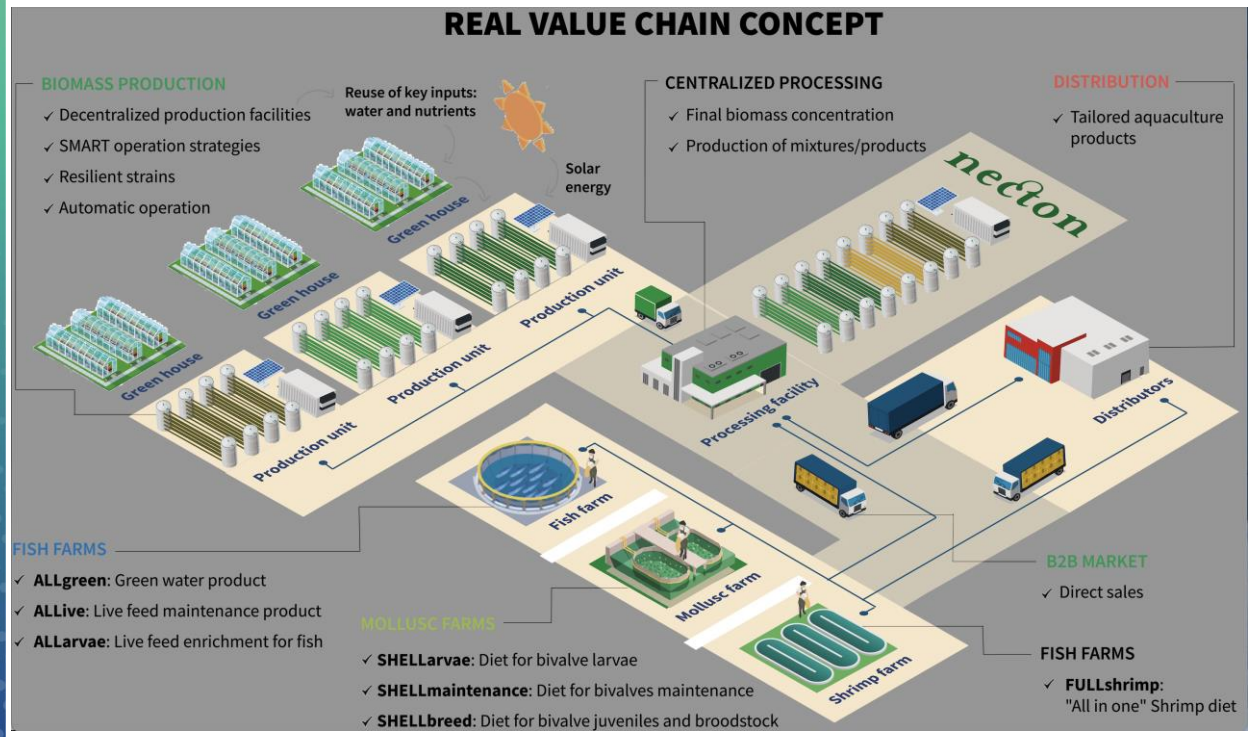
THE HURDLE TO OVERCOME



MICROALGAE PRODUCTION COSTS

- Real costs are far above what is stated in the literature. Lack of a common basis for cost calculation and comparison.
- Labor, energy and CO_2 are by far the major costs.
- Most companies are small and micro size, **scale is missing for cost reduction**, though the BIG scale is taken!
- Yeld is low, to many un-optimized steps.
- Strains are rustic, not optimized for intensive production.
- Contamination crashes are frequent leading to high non-productive times.
- Multispecific production facilities are much less efficient and that impact hardly in the costs.
- CAPEX is very high; production equipment are expensive, as well DSP equipment and all the necessary instruments and control tools.

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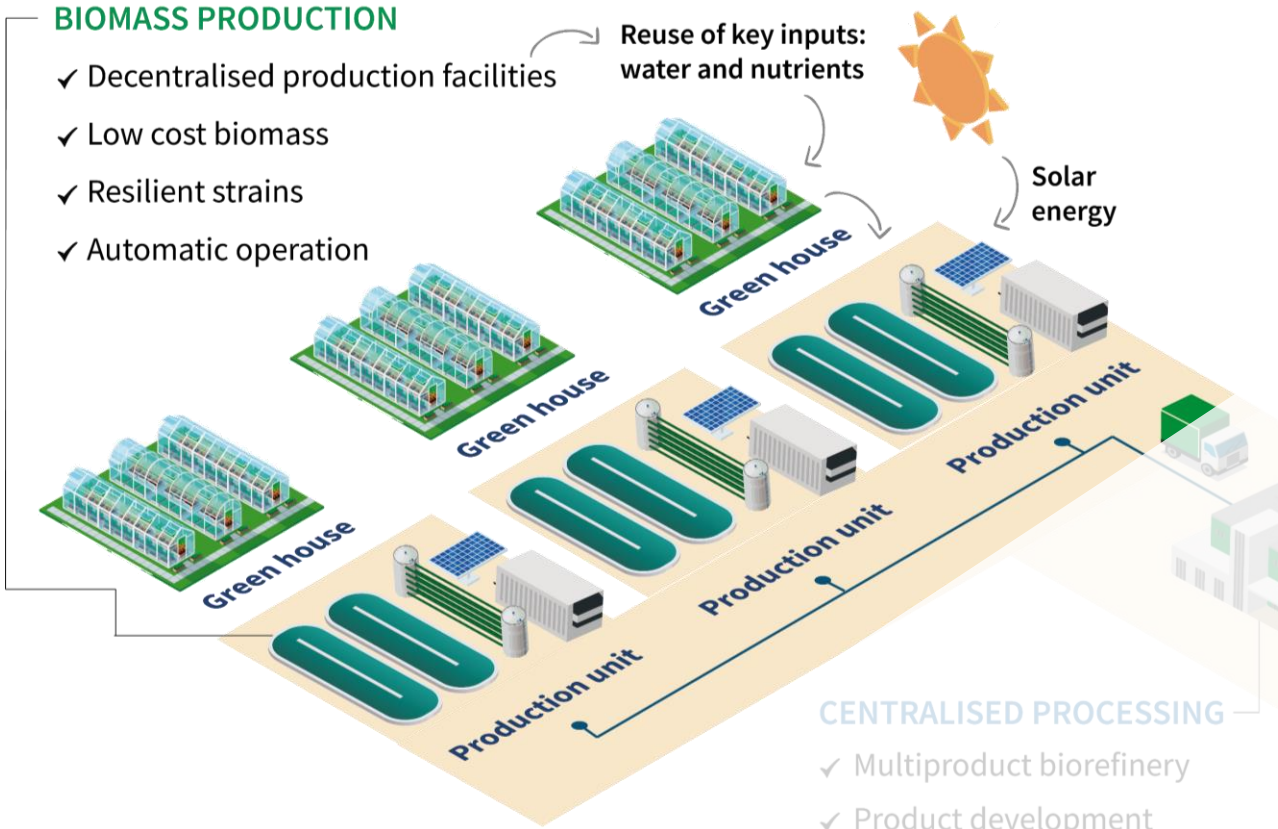
The concept



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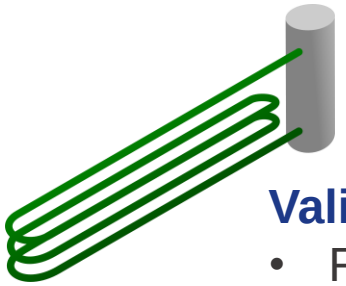
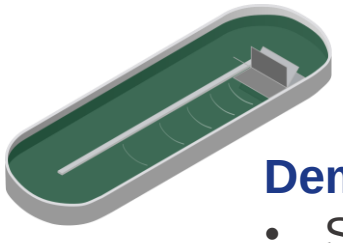


Validation facilities:

- Finland
- Netherlands



Demonstration facilities:

- Spain
- Portugal

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Consortium

Universities

WAGENINGEN UNIVERSITY & RESEARCH

UNIVERSIDAD DE ALMERÍA

UCA Universidad de Cádiz

UNIVERSITY OF TURKU

UNIVERSITY OF TWENTE.

Non-profit

OnePlanet Research Center

GreenCoLab

ESCI

imec

S²AQUA

Companies

Biorizon biotech

GRUPO LA CAÑA

necton

DECERNA

phycoworks

HUBEL Verde

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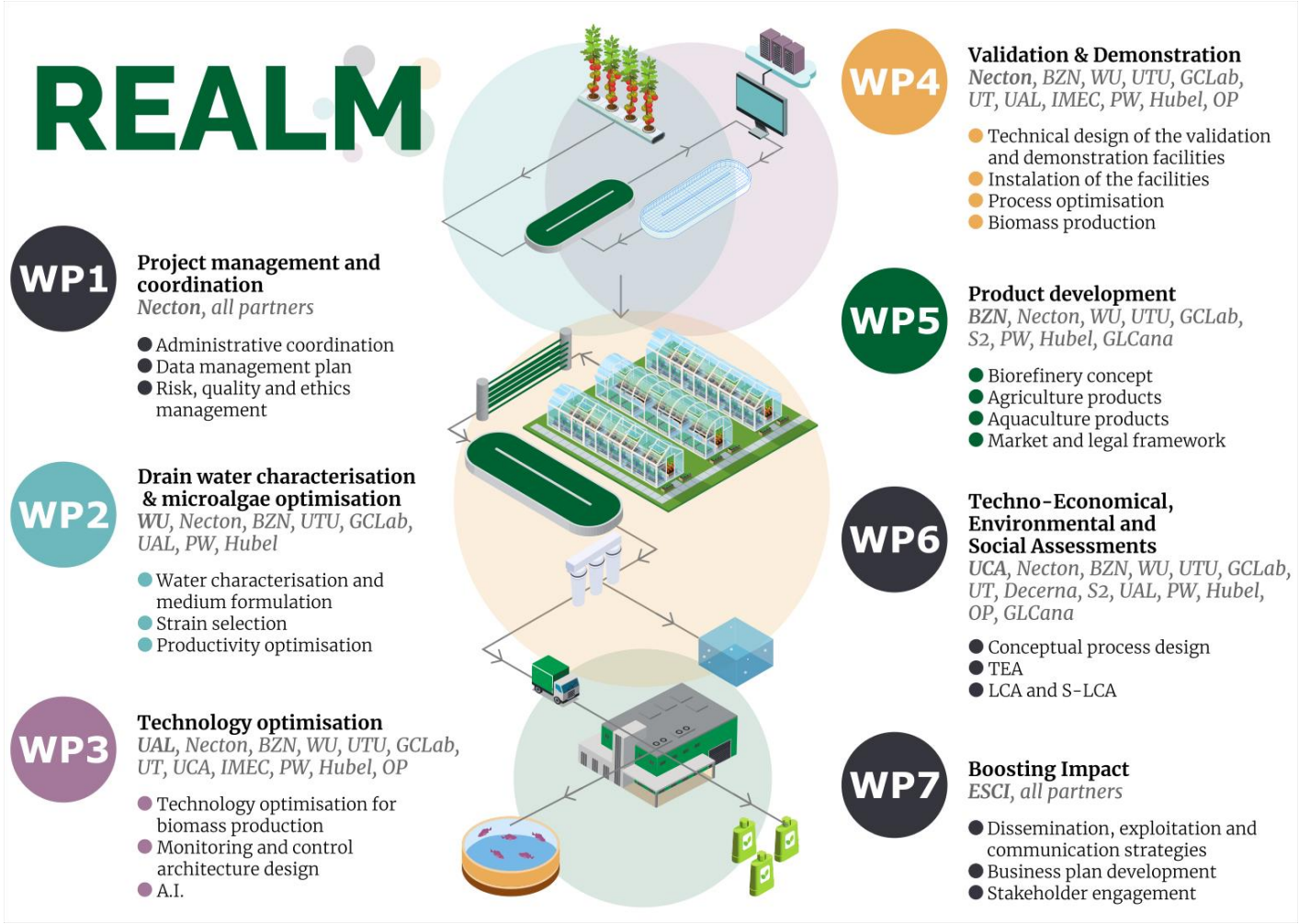
Work plan



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Expected outcomes

Less than
15mg/L of total nitrogen
left in the drainwater

More than
8 new products
for agriculture and aquaculture

Capturing
CO_2
directly from the air

Reducing
Freshwater
consumption

At least
50% less energy consumption
in microalgae production

Less than
10€ production costs
for microalgae per kg dry weight

Up to
30% more biomass
produced

In 2026
the REALM business model
will be ready for replication

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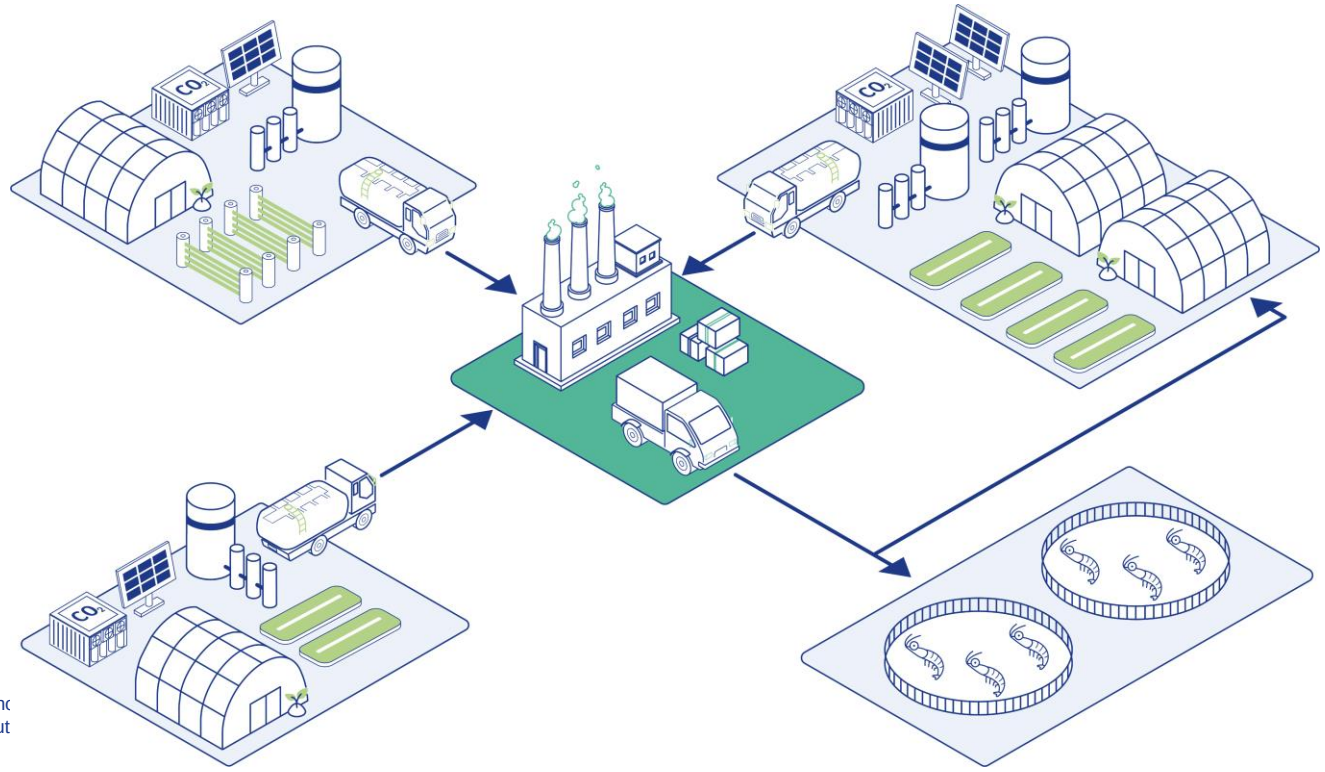
Expected outcomes

- **Reduce technical bottlenecks of algae cultivation**
- Upscale and demonstrate the **techno-economic viability of algae-based cultivation**
- Provide scientific evidence on **environmental benefits** and on **risks**.
- **Provide market knowledge** to align the development of new algae products to the uses and needs of various sectors.
- Support the development of innovative, competitive and sustainable agricultural production with better management of natural resources.



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The people

necton

http://realmalgae.eu/

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Thank you for your attention

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realmalgae.eu

REALM algae