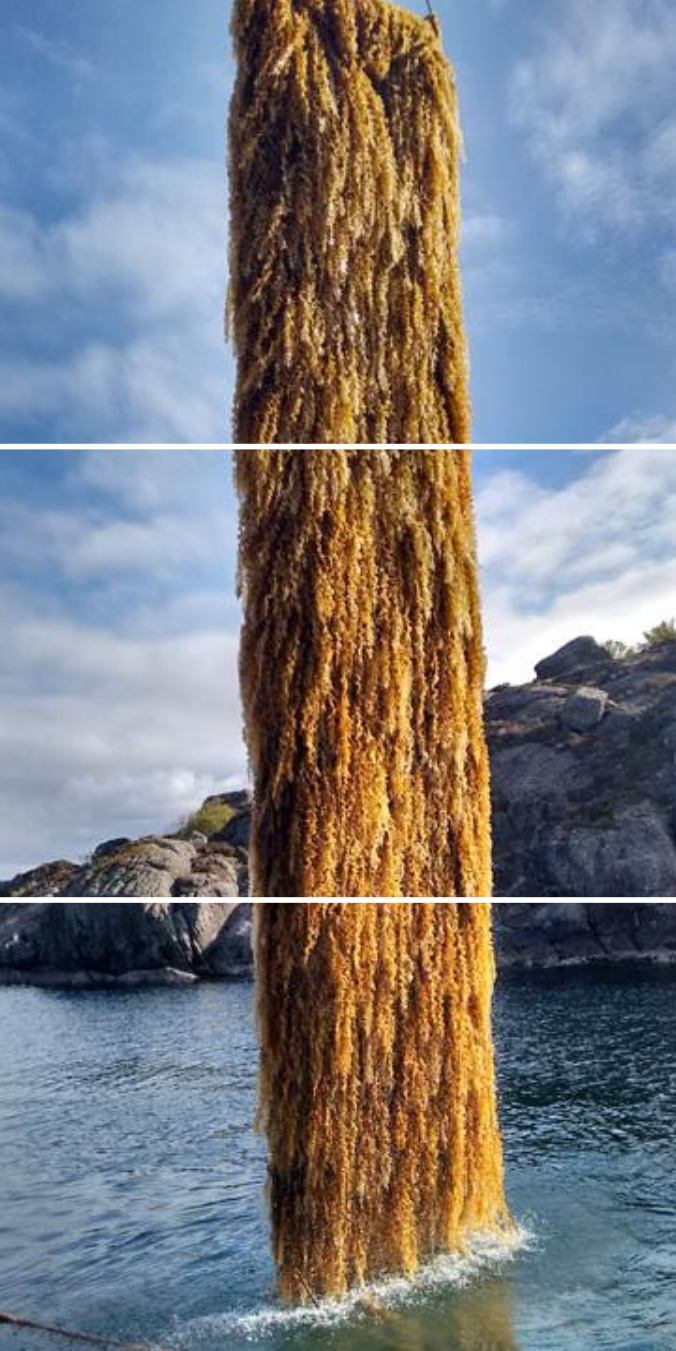




SIOEN INDUSTRIES



Op weg naar industriële zeewierkweek

Dr. Ir. Bert Groenendaal

R&D project coordinator at SIOEN Industries
CTO at ATSEA Technologies

Seaweed cultivation

No land use



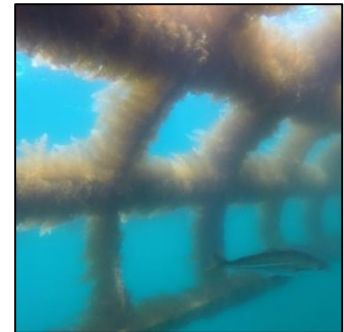
No fresh
water use

No need for
fertilizers

Nutrient
capture
(bioremediation)

CO₂
capture

Positive
impact on
biodiversity



Seaweeds: expected trends

Feedstock of the future, with wide range of applications

Drastic elimination of wild harvest

Use of biobased and biodegradable cultivation substrates

Integration with other forms of aquaculture (i.e. IMTA) and marine activities (e.g. in wind parks)

Mechanization of cultivation (i.e. seeding, harvesting, etc.)

Seaweeds - Feedstock of the future

- Human consumption (wakame, nori, kombu, etc.)
- Industrial hydrocolloids (alginates, carrageenan, agar-agar)
- Personal care, fertilizer, etc.
- Human food and animal feed supplements (bioactives/nutraceuticals)
- Biomaterials (e.g. bioplastics, textiles, etc.)
- Pharmaceuticals
- Bioremediation (e.g. IMTA)
- Biofuels

Seaweeds: expected trends

Feedstock of the future, with wide range of applications

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Today's agriculture

- ❖ Large scale agriculture
- ❖ Industrial, fully mechanized food production
- ❖ 2D and 3D



Today's seaweed wild harvest

- ❖ Large scale wild seaweed harvesting
- ❖ Industrial, fully mechanized
- ❖ Heavy impact on the sea life



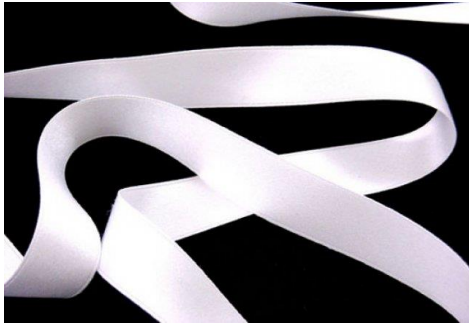
Today's seaweed farms

- ❖ Large scale seaweed cultivation
- ❖ Manual and 1D



Innovative cultivation substrates

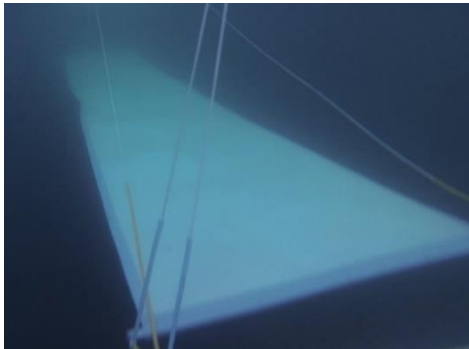
- ❑ Advanced textiles for seaweed cultivation
- ❑ Patent pending technology
- ❑ Available as:



AlgaeRibbon



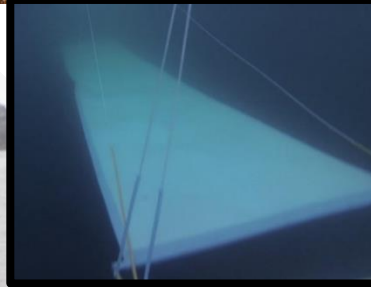
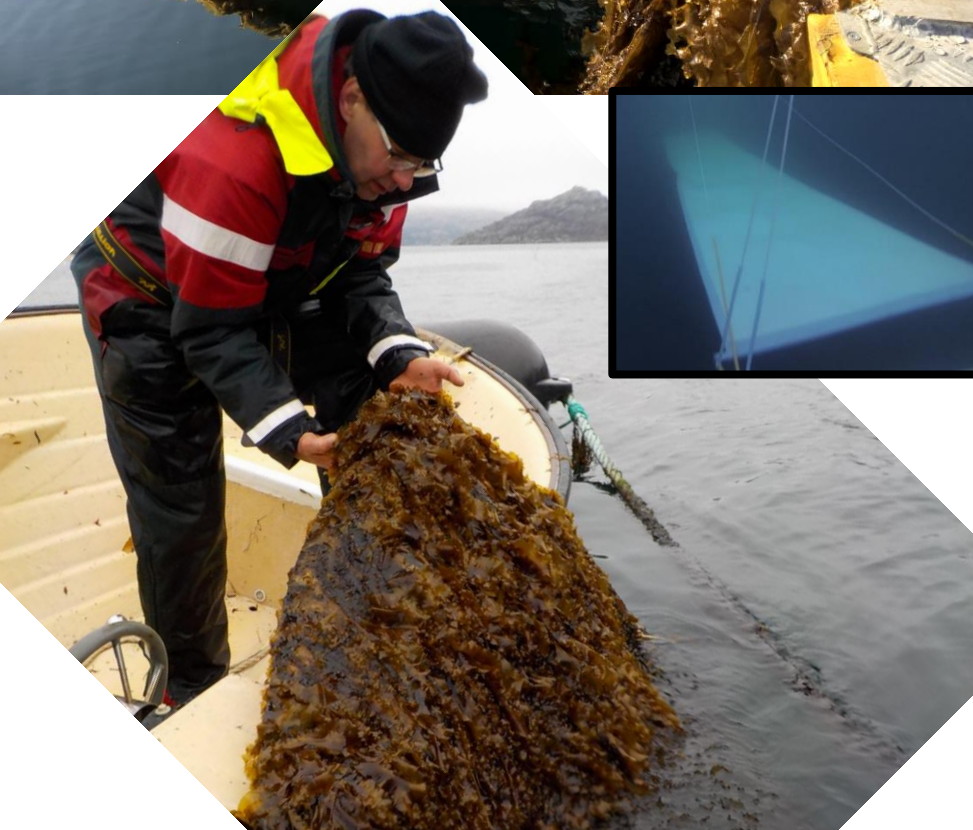
AlgaeRope



AlgaeSheet



AlgaeNet



Some photos and video ...

Seaweed test farm in Norway ...



Minifarm in Spain

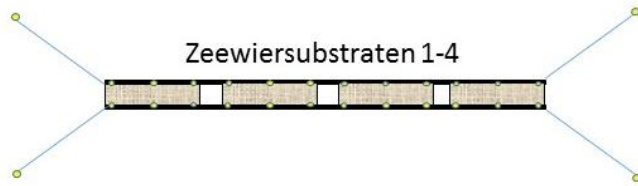


Farms around the world

- Brown seaweeds (kelp)
 - *Saccharina latissima*
 - *Alaria*
- Red seaweeds
 - *Cottonii*
 - *Spinosum*
 - *Gracilaria*
 - *Gelidium*
 - *Irish moss*



Minifarm in Nieuwpoort



Longline 1 voor platte oester & Sint Jakobsschelp

Longline 2 voor platte oester & Sint Jakobsschelp

Longline 3 voor nearshore mossel



In May 2018 we harvested the first cultivated Flemish sugar kelp

“Top product” according to the Flemish seaweed chef Donald Deschagt (Le homard et la moule, Bredene)

