VOW

SCANSHIP AS
Marine systems technology provider

ETIA S.A.S.
Land-based technology provider

SCANSHIP AMERICAS
Life cycle services

SCANSHIP POLAND
Manufacturing

ASCODERO PRODUCTIQUE
Systems and robotics

Pyrolysesystemer og muligheter

Pål Jahre Nilsen, VP Innovation
Scanship Innovation Lab, Asker

02.09.2020

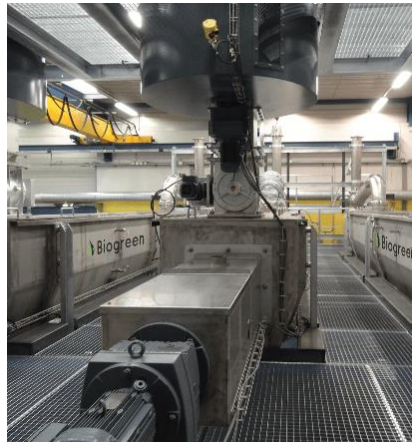
VOW

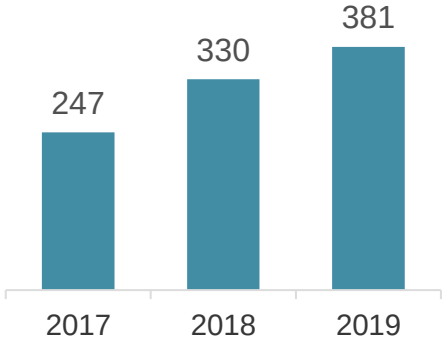
VOW AT A GLANCE

- World leading technology and solutions that bring end to waste, stops pollution and produces renewables and fossil free energy
- Customers in cruise and a wide range of land-based industries
- 140 employees, headquartered in Norway with subsidiaries in US, France and Poland
- Listed on the Oslo Stock Exchange with ticker VOW
- Scanship, Scanship Americas, ETIA and Ascodero is part of Vow ASA
- In growth with record high NOK 1146 million of orders in the backlog [1]

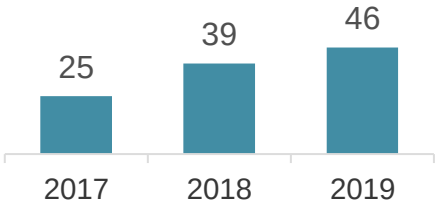
VOW

Passionate about preventing pollution and giving waste value





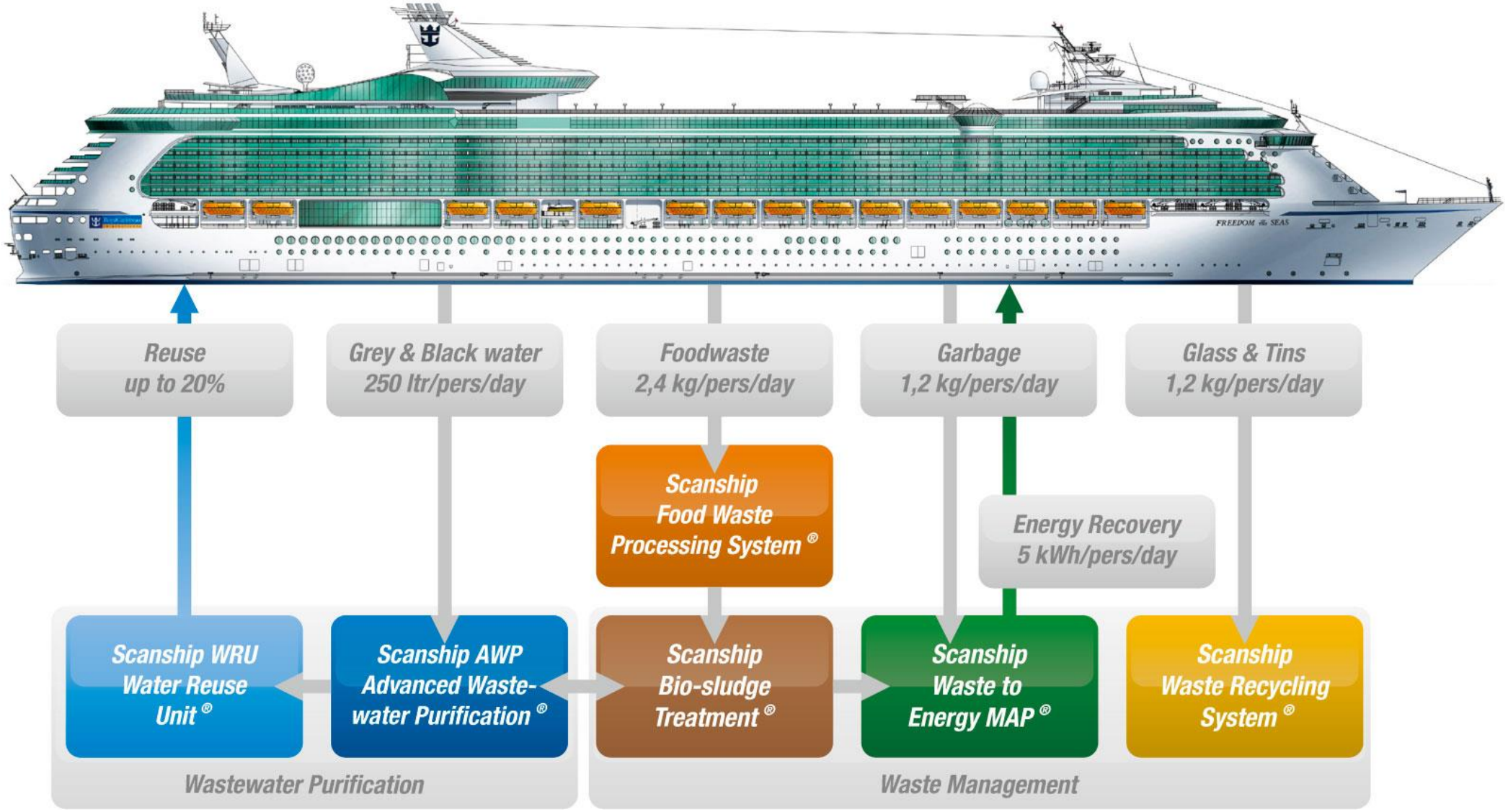
Revenues
(in NOK million)



EBITDA
(in NOK million)

[1] Backlog reported in 1H2020 presentation

VOW

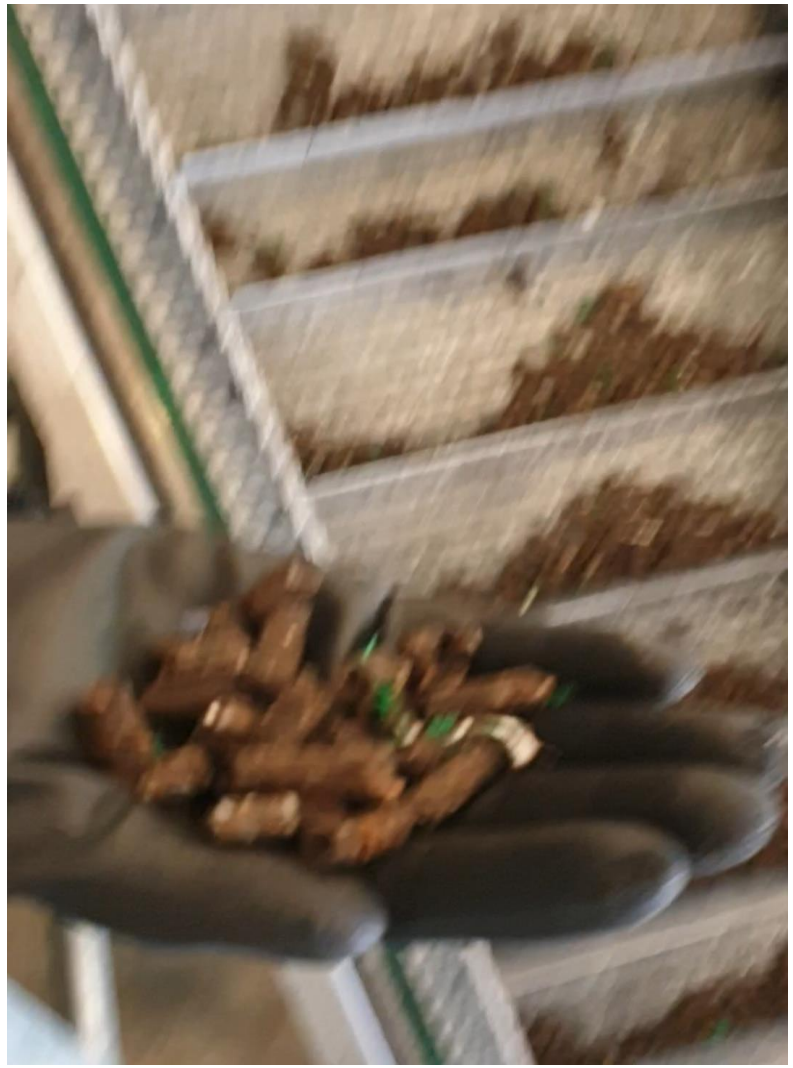

FREEDOM of the SEAS
Reuse
up to 20%
Grey & Black water
250 ltr/pers/day
Foodwaste
2,4 kg/pers/day
Garbage
1,2 kg/pers/day
Glass & Tins
1,2 kg/pers/day
Scanship
Food Waste
Processing System ®
Energy Recovery
5 kWh/pers/day
Scanship WRU
Water Reuse
Unit ®
Scanship AWP
Advanced Waste-
water Purification ®
Scanship
Bio-sludge
Treatment ®
Scanship
Waste to
Energy MAP ®
Scanship
Waste Recycling
System ®
Wastewater Purification
Waste Management

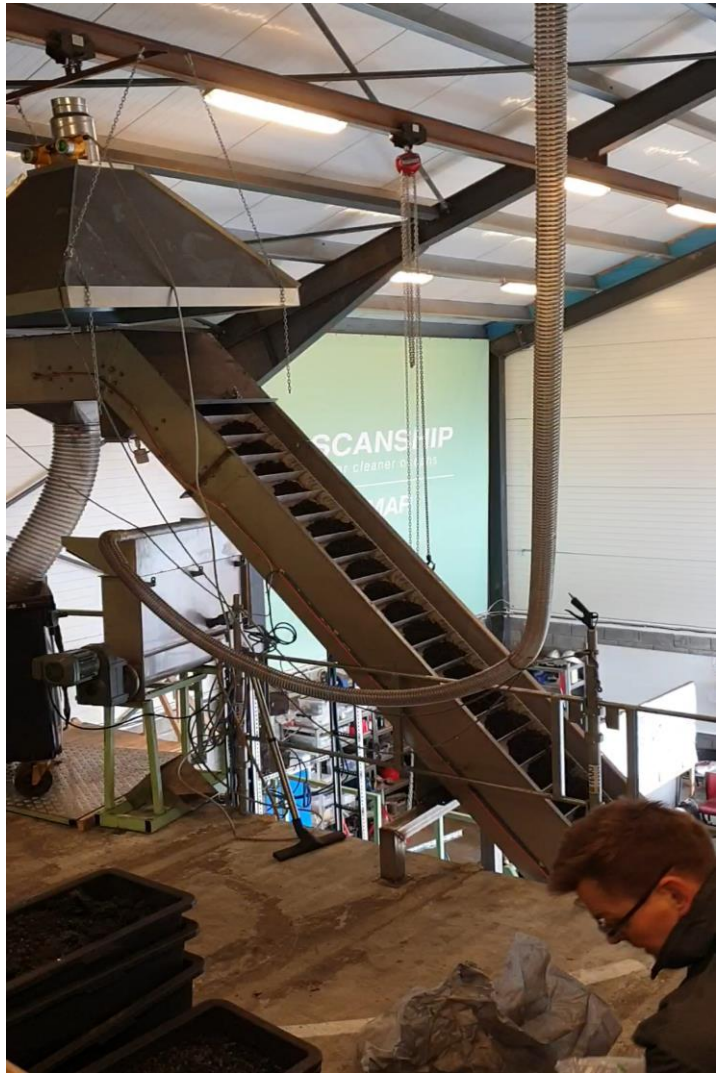
SCANSHIP
for cleaner oceans

waste to energy - carbon capture

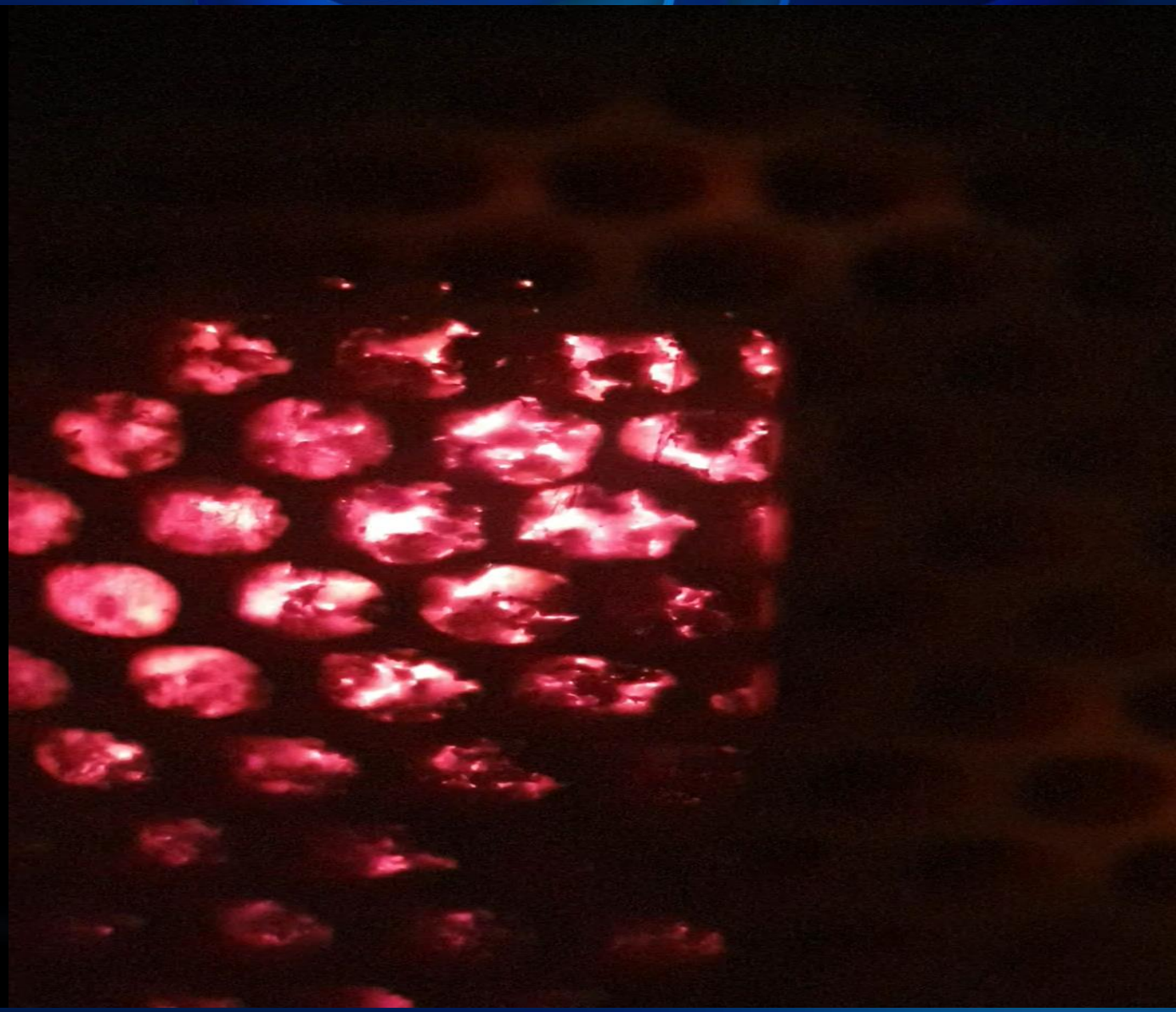
- unique microwave assisted pyrolysis
- decarbonize cruise ships :
  - shifting from incinerators,
  - replacing fossil fuels
  - producing activated carbon

Fuel Oil Consumption	≈ 2-4 % Reduction
CO_2 Emissions	≈5-7 % Reduction

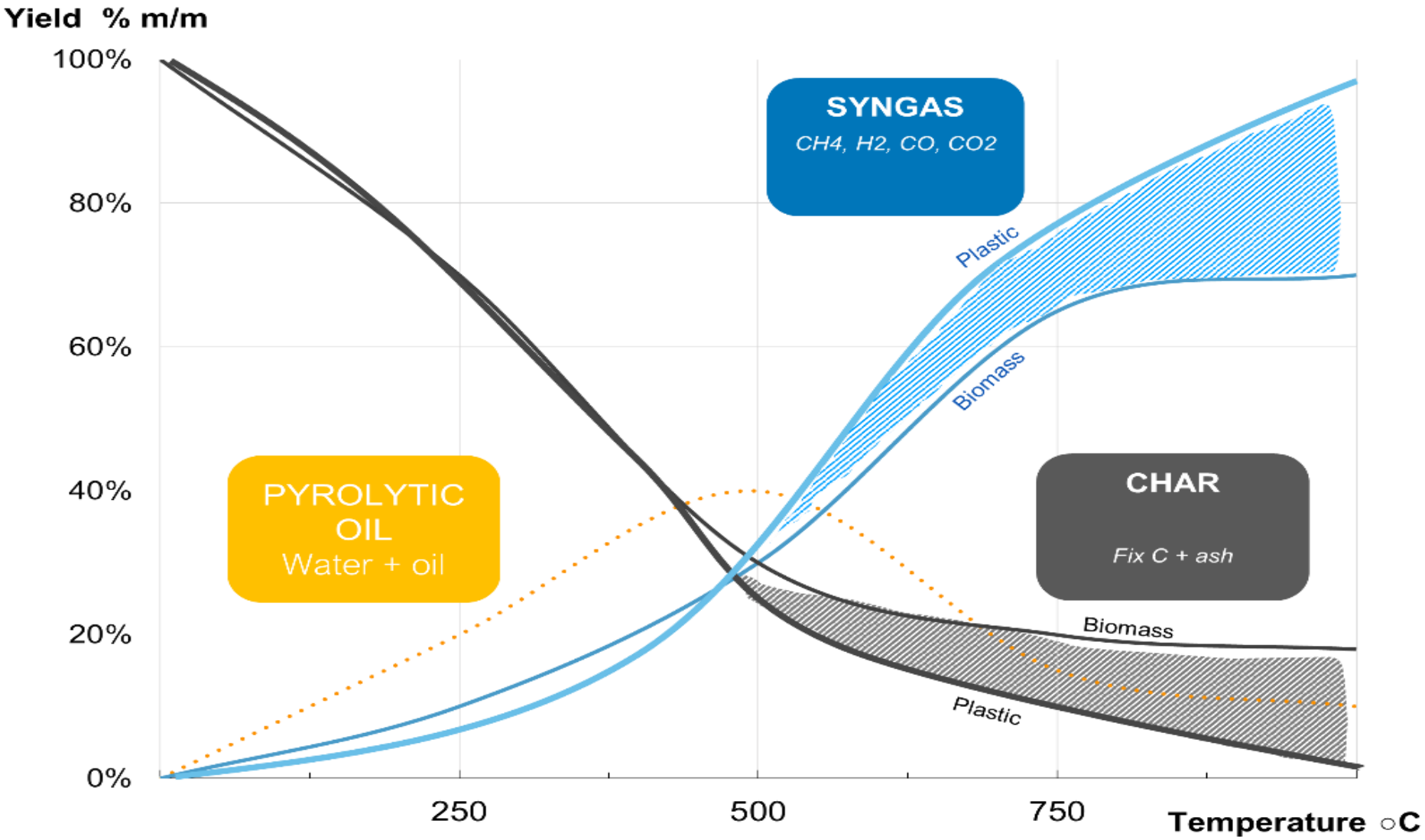



SCANSHIP

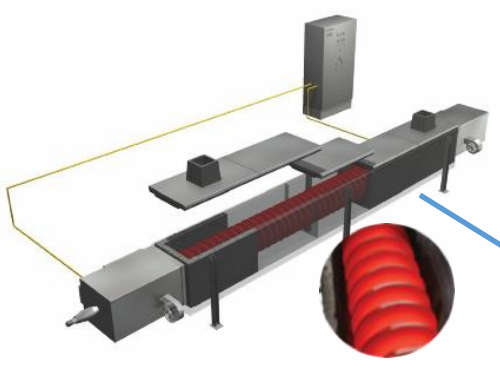
Microwave Assisted Pyrolysis - MAP



Produktkurver for pyrolyse

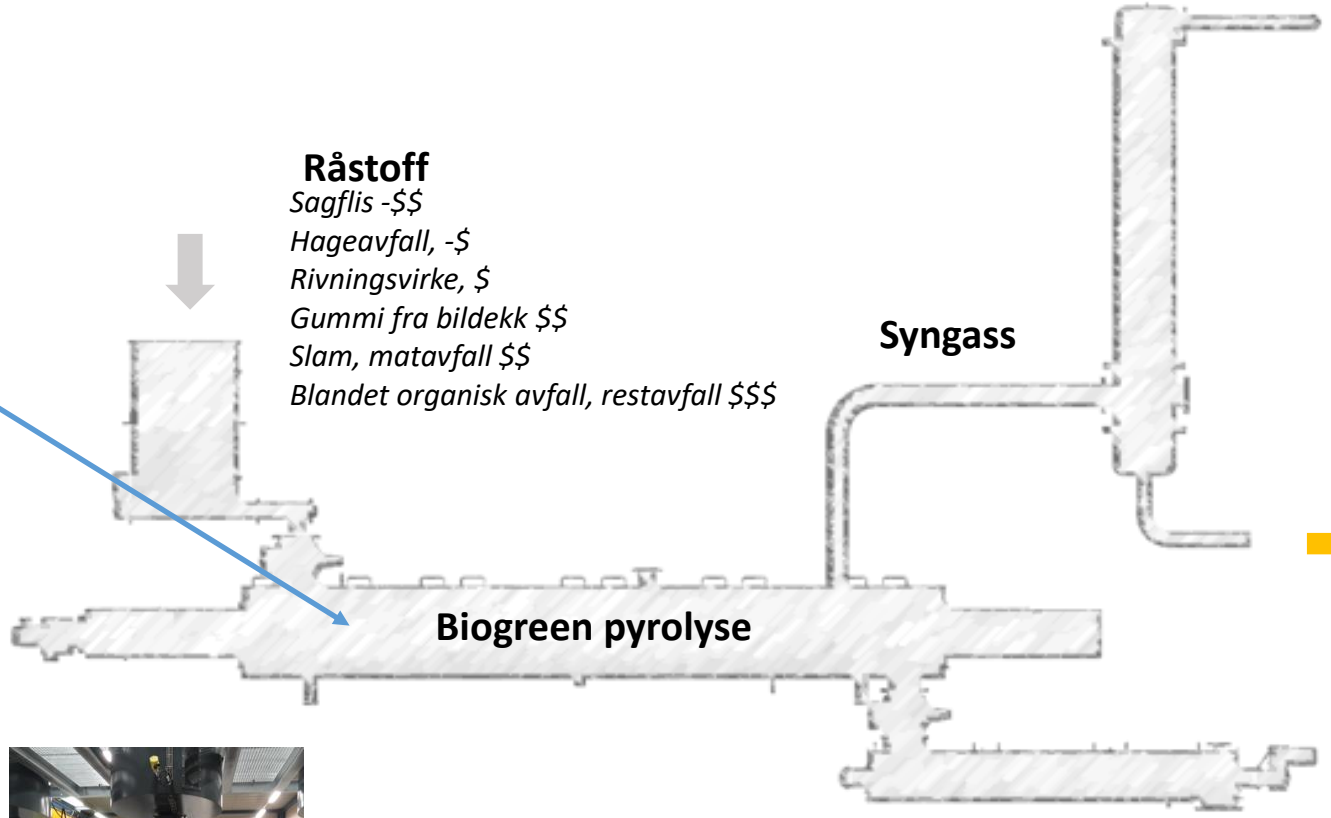


Forretningsmodell og lønnsomhetspotensiale



Multi-patentert
Elektrisk varmeskrue

Råstoff
Sagflis -$$
Hageavfall, -$
Rivningsvirke, $
Gummi fra bildekk $$
Slam, matavfall $$
Blandet organisk avfall, restavfall $$$



Syngass
Varme $
Damp $
Elektrisitet $$
Molekyler $$$$

Olje
Drivstoff $
Raffinerte produkter $$
Molekyler $$$

Kull
Energi $
Jordforbedring $
Fôr / husdyr $$
Reduksjonsmiddel $$
Absorbenter $$
Materialer $$$$

FoU piloter
scanship.no

Enheter i konteiner

Stasjonære anlegg

Kapasitet 5kg/h – 3t/h

Vi leverer industrianlegg til mange sektorer med forskjellige applikasjoner

ENERGY STORAGE
From minerals (latent heat)

BIOCOAL (CPP)
From sewage sludge

BIOCOKE (Metallurgy)
From wood biomass

BIOCHAR (Agriculture)
From wood biomass

BIO-OIL (Agriculture & Food)
From wood biomass

BIOGAS, H_2 and BIO-CH_4
From wood biomass

H_2, CH_4 & PYROCARBON
From plastic waste

RECYCLING CARBON BLACK
From end of life tyre

Different types of solid products

Technology to optimise your product characteristics

Torrefied bagasse

Solid fuel replacement
Density 0.8 (800 kg/m3)
LHV 16 MJ/kg (vs. 13 MJ/kg raw material)

400 ^{O}C / 10 min.

Carbonised olive pomace

Solid fuel replacement
Density 0.7 (700 kg/m3)
LHV 26 MJ/kg (vs. 18 MJ/kg raw material)

550 ^{O}C / 10 min.

Hydrochar WB10

Soil amendment
Water retention 85%
Total carbon > 65%
Granulometry 0.125 - 4 mm

550 ^{O}C / 15 min.

Biochar from HT pyrolysis

Activated carbon precursor
Total carbon 91.9%
ash 5.60%
LHV 33.03 MJ/kg (vs. 19 MJ/kg raw material)

800 ^{O}C / 15 min.

Biochar as water retenter for soils or substrates

anses

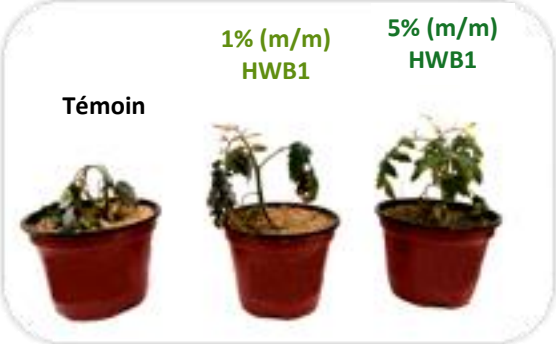
Liberté • Égalité • Fraternité
RÉPUBLIQUE FRANÇAISE

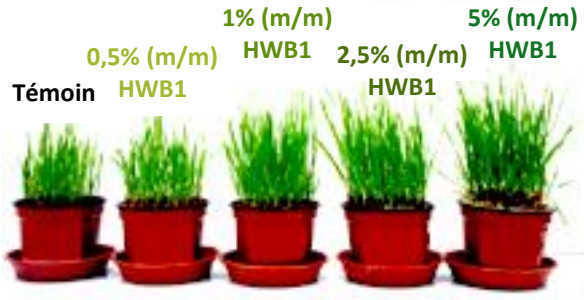
VTGREEN

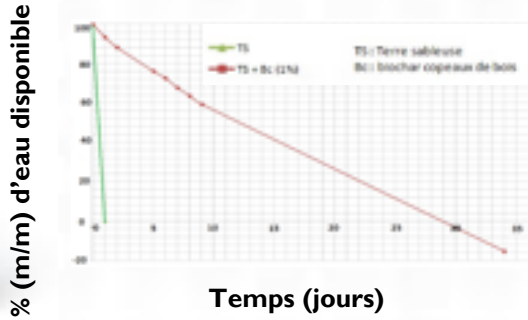
- 1st 100% biosourced water retenter
- 1st biochar authorized by the french regulation
- 1st biochar with ECOCERT certification

APPLICATIONS:

- To the soil (sowing, transplanting, planting)
- Mixed with an organic soil
- Mixed with a growing medium

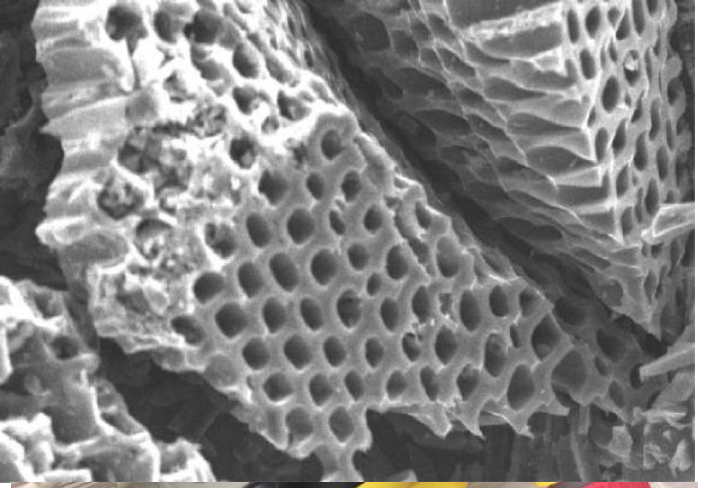


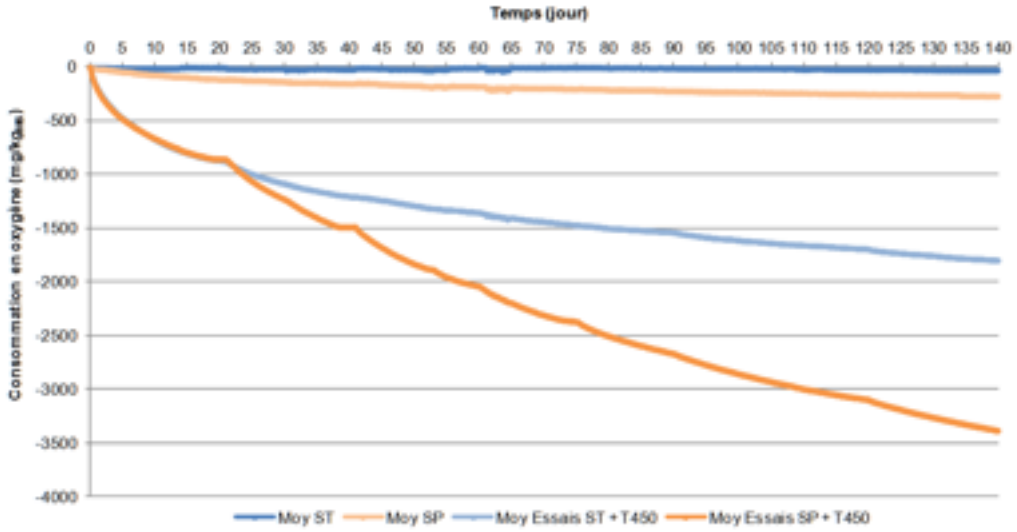




Biochar as an activator of microorganisms for bioremediation of soils contaminated by organic pollutants

SCANSHIP for cleaner oceans



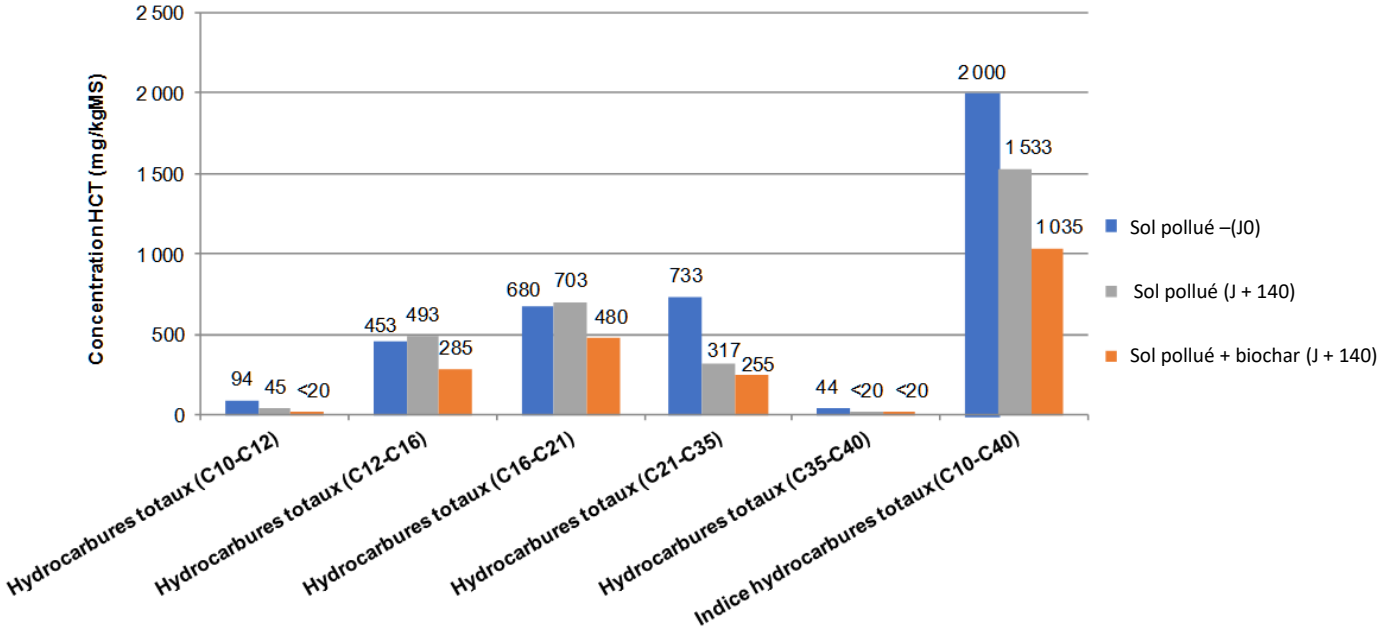


Sol témoin

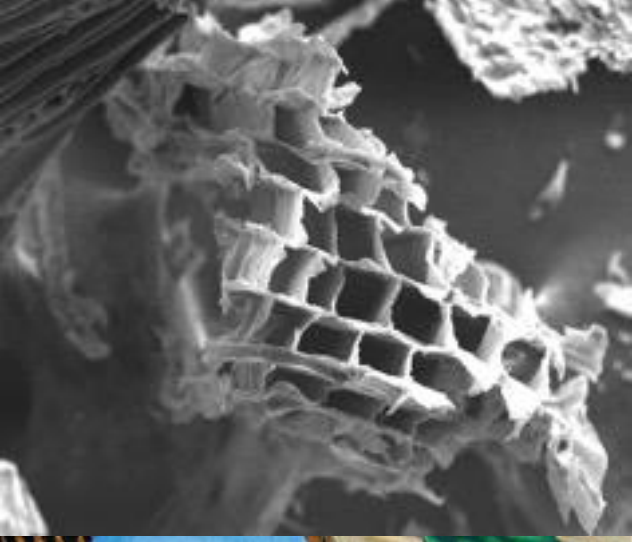
Sol pollué

Sol témoin + biochar

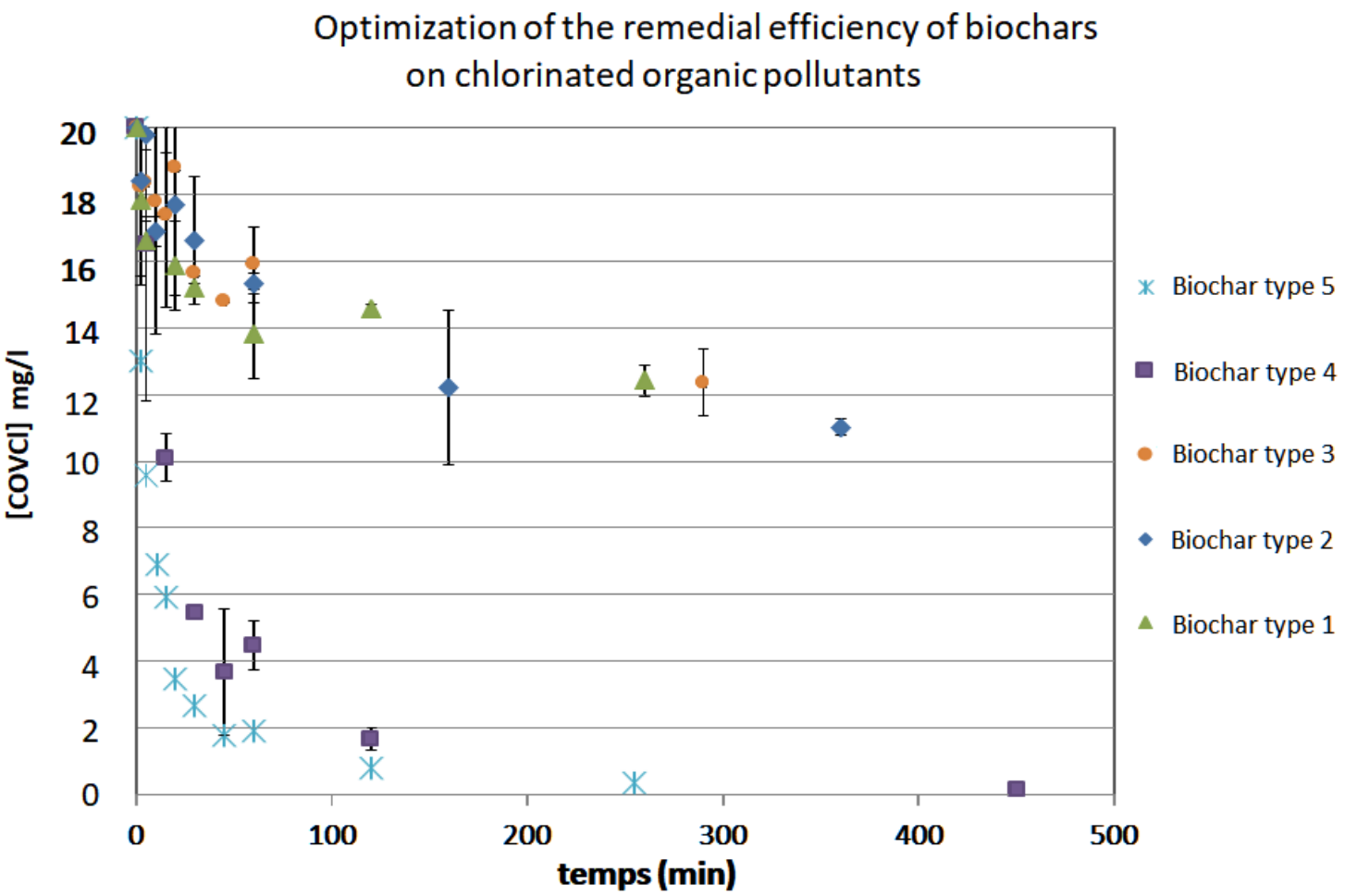
Sol pollué + biochar



ETIA ECOTECHNOLOGIES



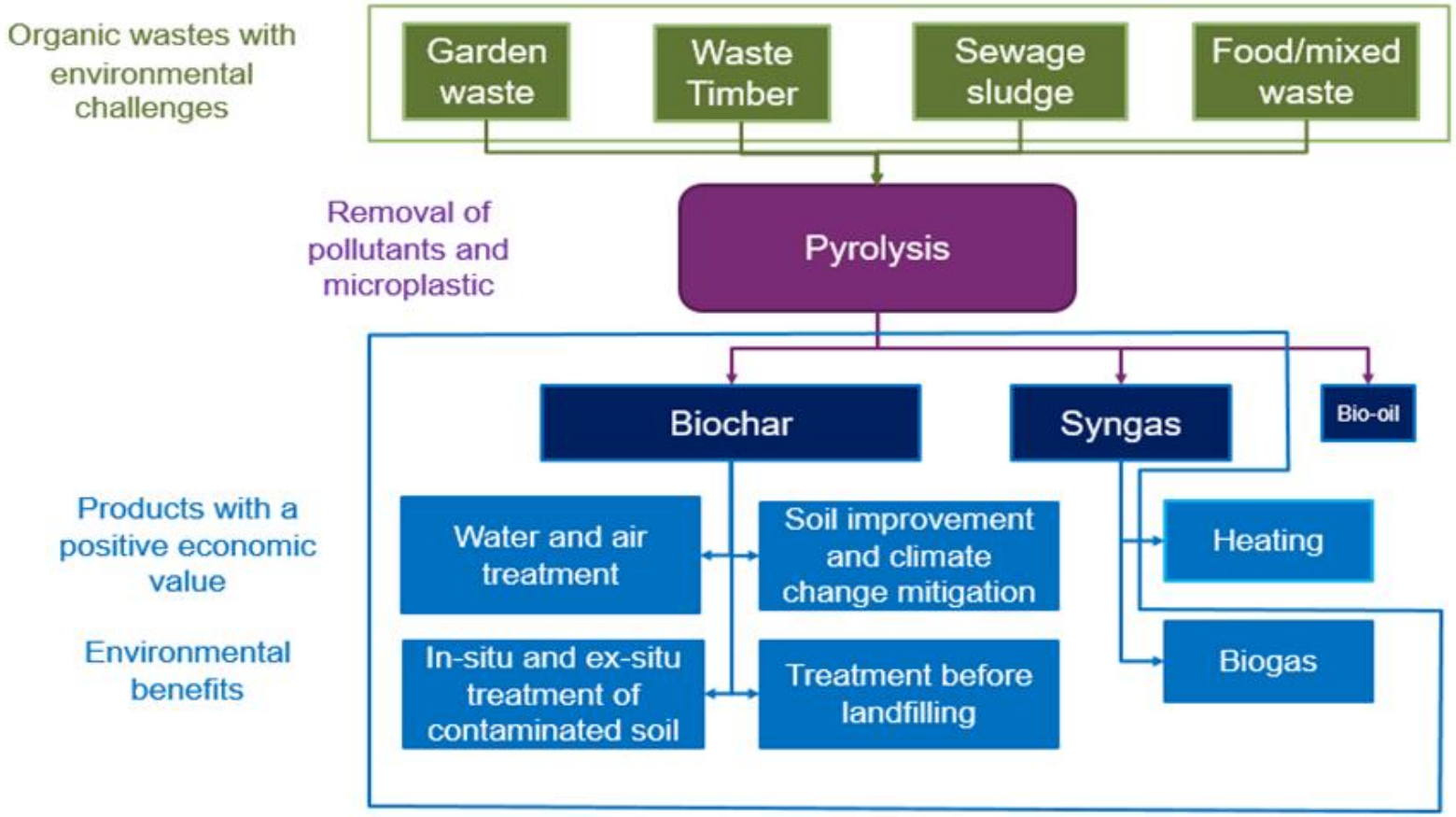
Biochar as sorbent for contaminated water treatment



SCANSHIP
for cleaner oceans

Bia-X - Valorization of Organic Waste - R&D project

19MNOK, 4yrs, NGI, SINTEF, LINDUM, Clairs, Mivanor, VEAS, Scanship



Plastavfall blir til strøm med vårt pyrolysesystem