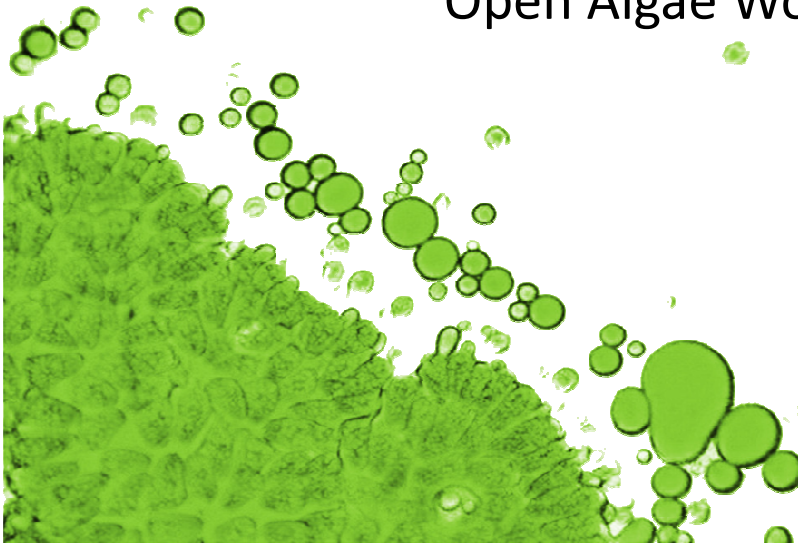




ALGADISK project: Objective and Concept

12 November 2014, Brussels, Belgium
Open Algae Workshop, EUBIA Office, Brussels

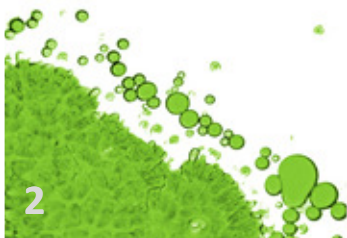


➤ ALGADISK Project is funded under the European FP7 Capacities - **Research for small and medium-sized enterprises Associations (SMEs)** scheme



➤ **Strengthen the innovation capacity of SMEs in Europe** and their contribution to the development of new technology based products and markets

➤ The **SME associations and their members are the direct beneficiaries of the project**: they outsource (subcontract) most of the research and technological activities to RTD performers and receive in return the technological know-how they need





**SME Associations /
SMEs**



RTD Partners

outsource

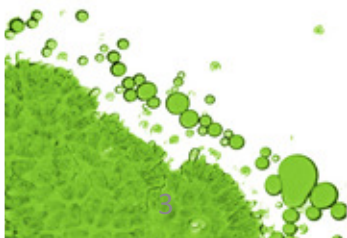


Patenting / Exploitation and
Dissemination / Marketable
product / Sell the patent /
Licensing / Get royalties etc.
= MAKE PROFIT

IPR and
knowledge
developed

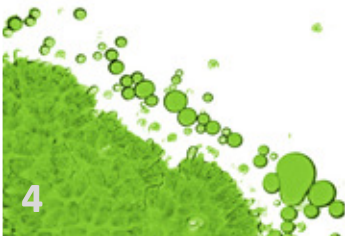


IPR transferred to SME Associations/SMEs



The aim of the ALGADISK project is to develop a modular, scalable and automatic bio-film reactor for algae biomass production, with low operational and installation costs

- 12 partners
- 7 countries (Spain, Belgium, Hungary, Slovenia, Netherlands, Turkey, UK)
- Duration: 36 months (1 January 2012 - 31 December 2014)
- 10 work packages
- Total Budget: 3 M€



3 SME Associations:



European Biomass Industry Association



Spanish Confederation of Compound Feed Producers



Industrial grouping of 65 SME members in the food supplementary market

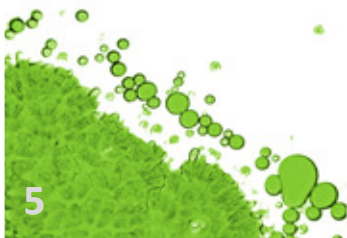
5 SME end users:



biogas fuel cell

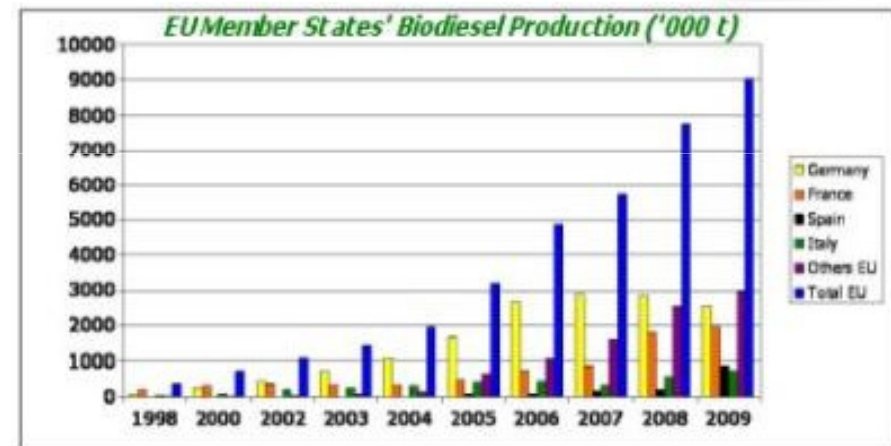
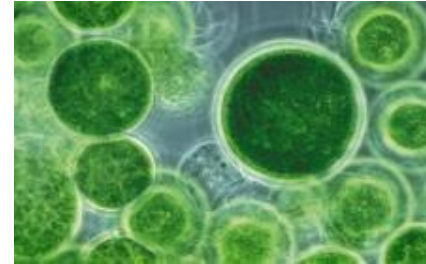


4 RTDs:



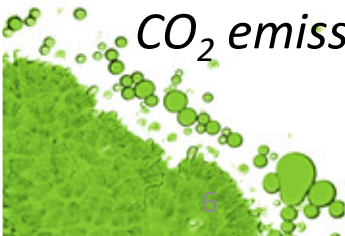
Background

- Algae can be grown using CO₂ and waste water
- Algae has many uses including energy source, fertilizers or human and animal nutrition
- Biofuel production has increased, but it is only competitive if governmental subsidies are provided.



This led to:

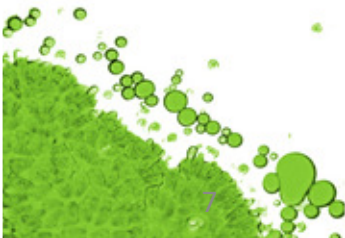
The development of a scalable, economically feasible algae production unit, capable of delivering high value algae-based products (animal and human additives, bio-fertilizer), and biomass (biodiesel precursors), while reducing CO₂ emissions from industries.



Commercial technologies use microalgae in water solution in bioreactors or in ponds

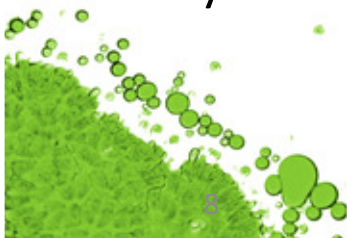
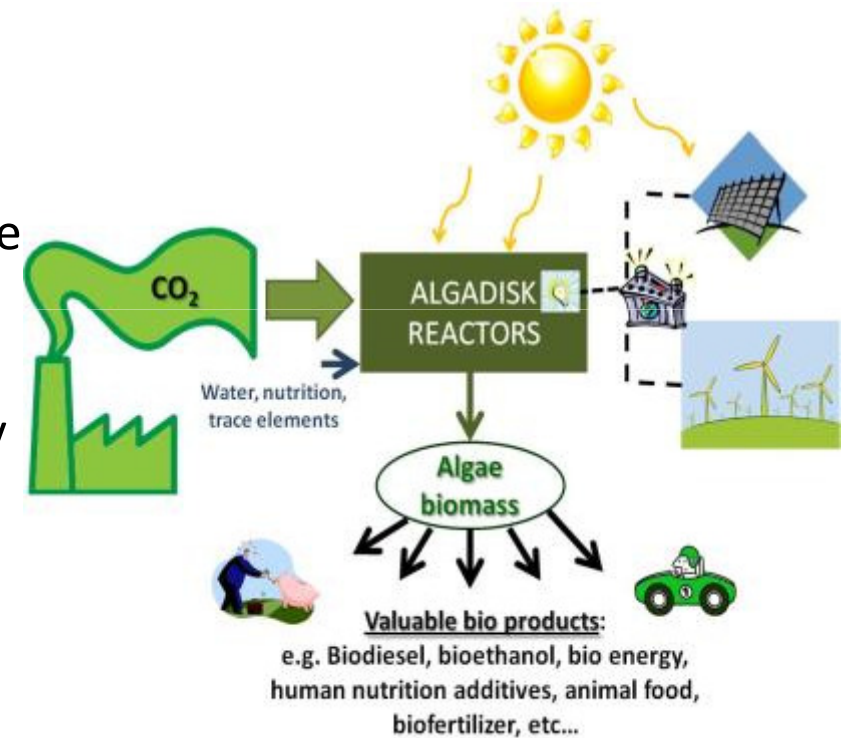
Main Drawbacks:

- Lots of water is needed for the production
- Wall growth
- Sterilization problems
- Harvesting is difficult, time consuming and inefficient
- Difficult scale-up or large land need
- Long return on investment
- **Hardly adaptable for SMEs**

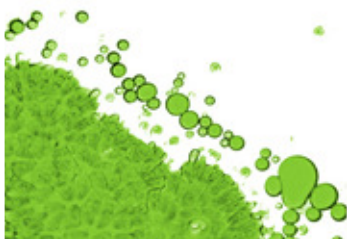


SME sector can be targeted with modular, scalable reactor system

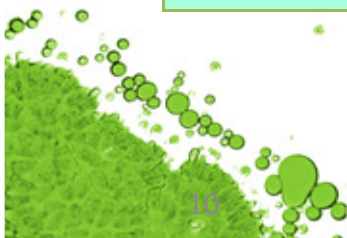
- **Innovative biofilm reactor design**
- Algae can be grown on indifferent biocompatible surfaces
- CO₂ is captured either from the gas phase directly or from the liquid phase
- Increase in CO₂ capture efficiency
- Decrease the amount of water necessary
- Automatic and continuous harvesting
- Easy scale up
- Smaller foot print
- Organic products with sufficiently high yield



- CO₂ emitting industry benefit's because of CO₂ capture and decrease of emission. In case of small scale bio source based plant (such as biogas plant), almost zero emission can be reached with the proposed system where emitted CO₂ would be transformed into valuable organic products using algae.
- Energy sector service companies would benefit in distributing the system as well as its installation and maintenance.
- Biomass producers would work up raw algae materials and transform it into valuable marketed algae based products, such as biodiesel, food and feed supplements, fertilizers and so on.
- Companies supplying reactor parts (bio-textile, motors, sensors, controllers) would benefit with improving their business.
- Companies specialized in CO₂ trading and environmental consulting.



WP No	Work Package Title	Type of Activity
WP 1	Determination of system specifications	RTD
WP 2	Alga selection and development	RTD
WP 3	Disk surface development and characterization	RTD
WP 4	Reactor design	RTD
WP 5	Prototype construction	RTD
WP 6	Prediction software development	RTD
WP 7	Validation, optimization and field test	DEM
WP 8	Training	OTH
WP 9	Foreground and IPR management	OTH
WP10	Management of Consortium	MGT

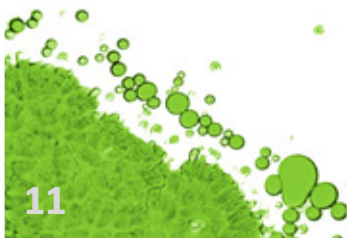
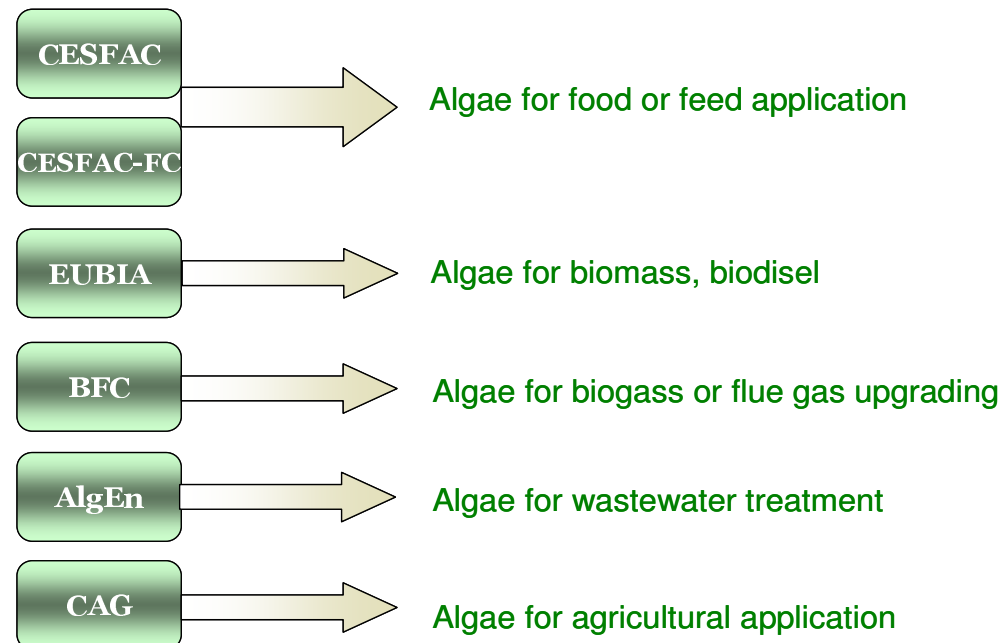


WP 1 Determination of System Specifications: understanding of the market needs as well as to define the technical parameters of the ALGADISK reactor system.

Survey and in-depth interviews

WP 2 Algae selection and development: choosing an optimal algae strain for biofuel or other valuable products production

The algal biomass in which SMEs are interested in



WP 2 Algae selection and development:

Key criteria for algae selection

Tolerance for 30-35°C temperature

Biofilm forming ability on surface

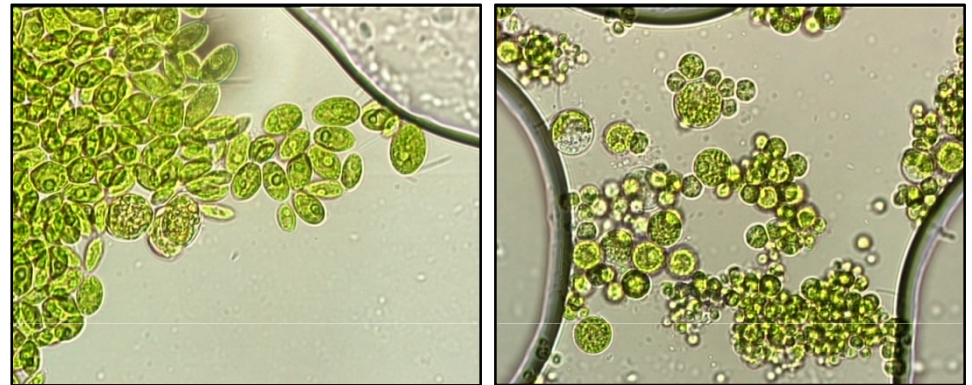
High CO₂ uptake and productivity,
(3 g of dry biomass L⁻¹ day⁻¹)

Valuable biomass

(fatty acid, carotenoids, vitamins)

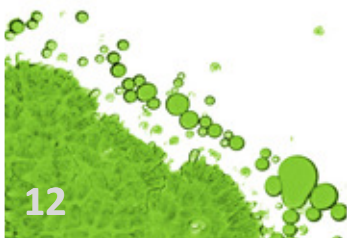
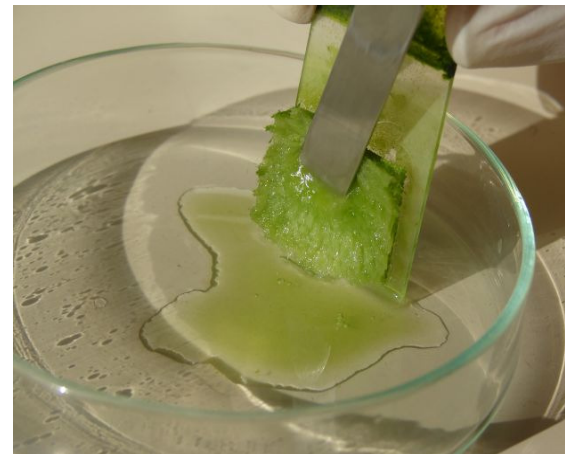
Special strains for seawater application

Isolation of strains

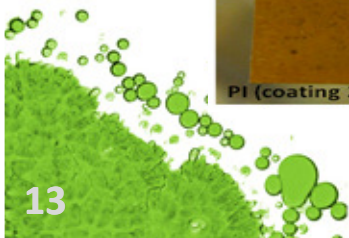
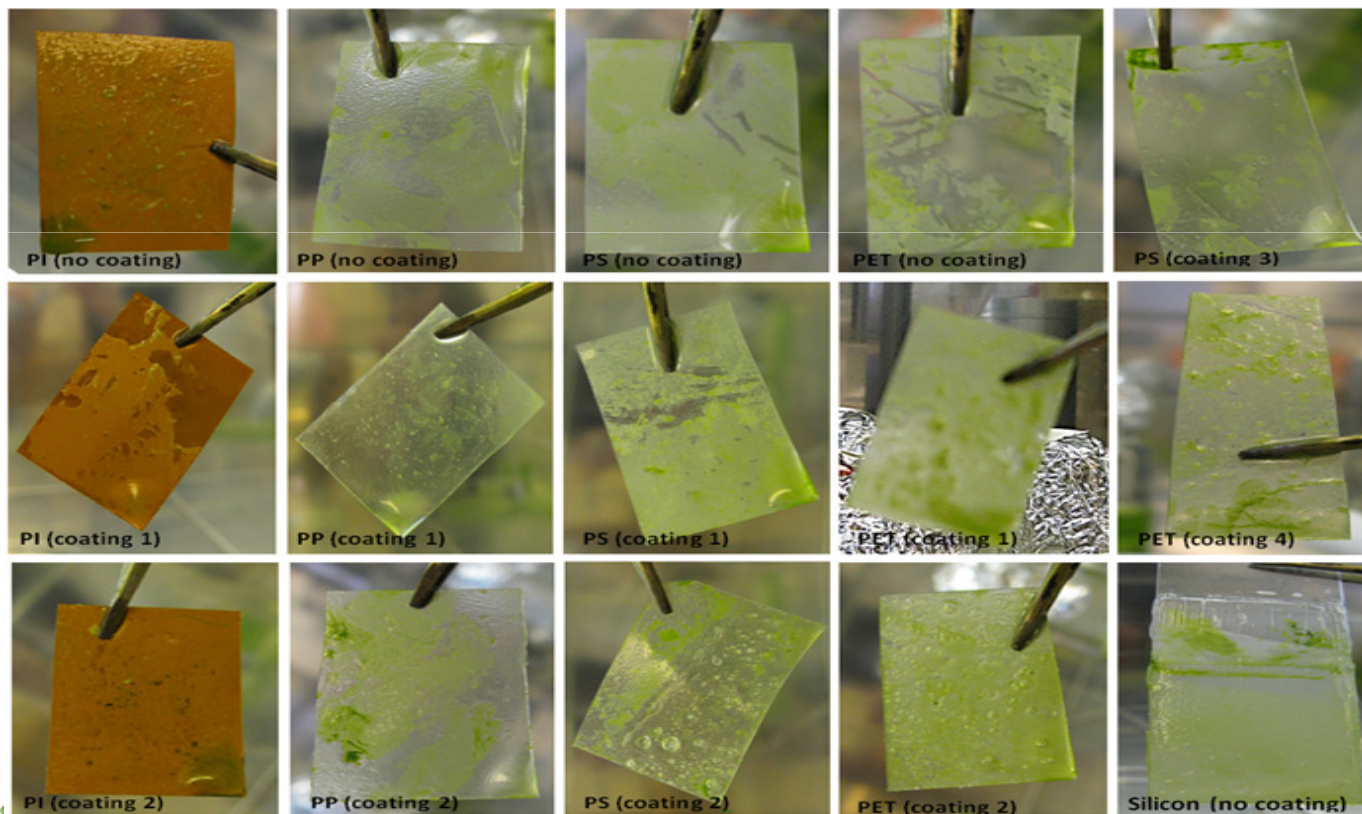


Pictures from BAYBIO

Growth on surface

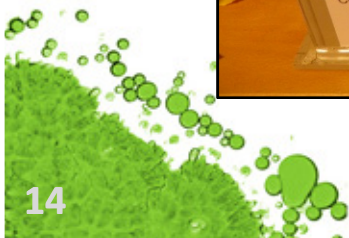
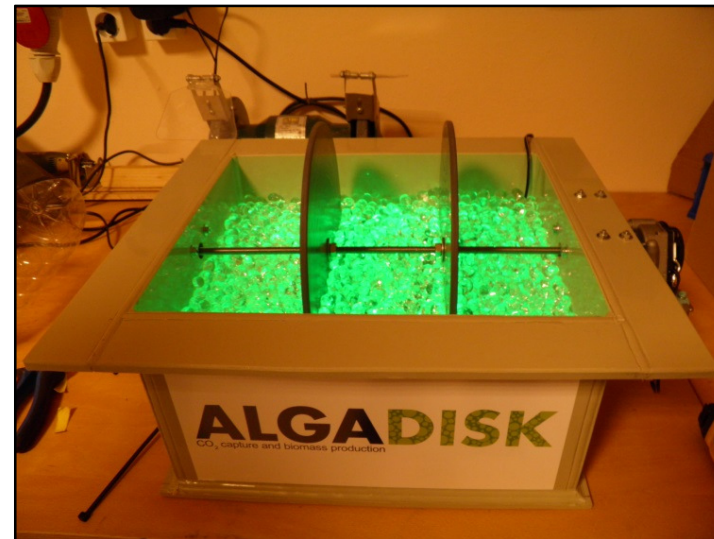
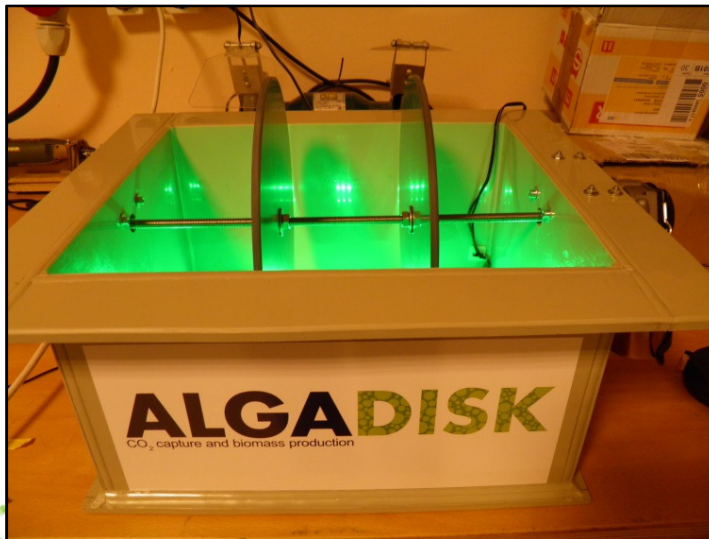


WP 3 Disk surface development and characterization: development of surface coating material and characterization of the coating material and the coated surface



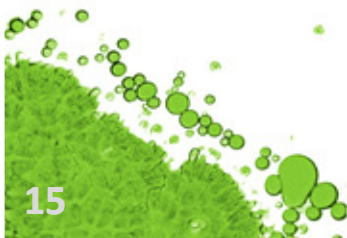
WP 4 Reactor design:

- Calculate the energy balance
- Design the sensing and control system
- Develop the automatic harvesting system
- Produce a full mechanical engineering design
- Design the supporting energy system and corresponding accessories

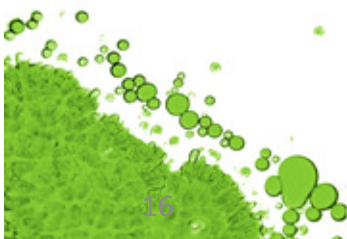


WP 5 – WP 7:

- **Prototype design** and construction
- Design of **supporting energy system** and accessories
- **System integration and installation** at end user facility in Spain
- **Prediction software** development including a database
- Field tests, **optimization and validation**



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Thank you for your attention!

www.algadisk.eu

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