

AQUAFUELS AND EU SUPPORT TO THE STRUCTURING OF THE ALGAE BIOMASS COMMUNITY

Work perspectives for the sector and for the
European Algae Biomass Association - EABA

EBB – Raffaello Garofalo

Introducing the EABA:

- Representing the European Algae Biomass Sector
 - Aims to co-ordinate and represent the sector (industry, research and academia) at EU, national and global level
 - Headquarters in Florence, Italy
- EABA membership across Europe: 77 members as of today
 - 36 industrial members,
 - 28 scientific and
 - individual or associates (from outside EU)
- Private companies or research organisations are directly members of the EABA
 - Directly federates legal entities at EU level (no national filters)
 - Large part of reference EU academia and research
 - Multinational companies of the Agricultural processing and biofuels sectors
 - Industries from the fossil fuels and renewable energy sector
 - Engineering companies
 - Algae start-ups or algae research spin-offs

EABA membership



Membership and financial support:

The Association is **financially supported by its Members**. Membership fees are fixed by the Steering Board and General Assembly. Membership is opened to all:

As FULL MEMBERS: located or having relevant activities in Europe, i.e. in the European Union, or in a country candidate to become a part of the European Union, including the EEE and Israel, full members are subdivided in three categories:

- 1. SCIENTIFIC MEMBERS:** non-profit research institutes, universities, research and academic centres active in, with proven scientific activities, interest and/or publications in the field of algae biomass. Similar scientific legal entities coming from countries outside Europe – as defined above – can become Scientific Observers within the Association.
- 2. INDUSTRIAL MEMBERS:** companies, pilot projects, algae-biomass technology providers, research groups and final users as the case may be, that are able to produce or contribute to produce, transform or use algae biomass in Europe – as defined above. European companies or legal entities that have already established precise plans of investment in view of producing or transforming or using algae biomass at industrial level can also become Industrial Members.
- 3. INDIVIDUAL MEMBERS:** individuals or individual research fellows with proven interest in the development of the algae biomass research

SUPPORTING MEMBERS (Sponsors): Supporting membership status is reserved to Members which voluntarily support an extraordinary contribution whose level is fixed by the Steering Committee every year.

OBSERVERS (Scientific, Industrial or individual) all the legal entities or individuals that are active in the field of algae biomass and that because of the criteria detailed above and their **geographical situation outside Europe** cannot become full Members of the Association



1. Production chain concept as a basis

- Concept of interdependence among all kind of algae (micro and MACRO), seaweeds and especially all final direct or indirect uses (value-added co-products: **in volume biofuels will always remain a by-product**)

2. Promote and exploit technological excellence upstream in biomass production

- Opportunity to unlock the raw materials cap of bio-energy
- Present biofuels technologies: 80% of final price is biomass raw materials; **HERE IS THE LARGEST MARGE FOR IMPROVEMENT** – not in biofuels processing;
- Unlike most of so-called “2nd generation” technologies (e.g. BTL) most of the cost is in technology and energy of biofuels transformation process: but what about co-products value? Algae on the contrary can have very valuable co-products (also for food and protein applications)
- Key concept: bring the technological excellence upstream in biomass production (not only in biomass transformation)

The EABA what for? Regulatory aspects

Algae-based biofuels in the EU legislative framework

- EU Directive on Renewable Energies
(minimum legal binding target of 10% in every Member State for biofuels)
 - Need to establish **DOUBLE COUNTING** for algae : key national implementation
 - No CO² emission default value for algae-based biofuels exists – **JEC work**

- EU Directive on Fuel Quality: premium to low carbon fuels
- European fuel norms (CEN): EABA work on normalisation with EC Commission – mandate in preparation
- Algae-based biofuels and other chemicals under REACH
 - No EINECS entry available for any green chemical derived from algae
- Other EU and national legislations
 - Taxation rules of Directive 2003/96, Algae under CAP, Animal Feeding, food norms, novel food Directive, etc.

If no initiative at these levels is taken algae risk to remain a theoretical promise and not become a pragmatic opportunity

Future work for EABA and the EU Algae biomass community

Algae-based biofuels in the EU legislative framework

- The use of fossil CO₂ in algae cultivation may raise a problem under the EU Directive on Renewable Energies
 - ❑ If algae are grown using CO₂ of mineral origin some doubts have been raised upon the genuine biomass nature of the final product (biofuel?)
 - ❑ Definition itself as algae as biofuel needs to be defended (if CO₂ is sourced from the air or from a chimney there is no difference: is even more efficient from a chimney)
 - ❑ EABA position: algae biomass does not capture the CO₂ used in cultivation and no capture-credit has to be given (but no penalty either!)
 - ❑ Need for European lobbying campaign to defend the biomass nature of algae cultivated also with CO₂ of mineral origin

Work perspectives. Regulatory aspects

Algae-based biofuels in the EU legislative framework

- Defining the frame for LCAs and GHGs balances of algae-to-biofuels production pathways
 - GHG and energy balances under RED Directive
 - Definition of balances and LCAs for various algae strains
 - When the first algae biofuel “default values”?

Future perspectives: start dealing with individual algae species

Although an holistic approach is necessary politically we need to start talking about strains.

- Developing specific knowledge about algae strains
- Raise awareness on the differences existing among various strains
 - ❑ different taxonomy
 - ❑ different metabolism and growth (and applicable technologies)
 - ❑ different final products biofuels and co-products)
- Select in priority sea water species
 - ❑ avoiding competition with agricultural limited water resources (food/feed impact)
 - ❑ but not commonly agreed to focus research only on sea water (excluding rivers or lakes)
- Define energy and GHG balances on a per strain and per biofuel basis
 - ❑ long term and comprehensive work to be prepared and achieved

EABA future action: Need for Algae standards and specs?

Need and perspectives for Normalisation in algae biomass and algae based biofuels

- Defining the frame for LCAs of algae-to-biofuels production pathways
 - ❑ Definition of common measurement units
 - » Productivity indicators (per surface measure, etc.), lipid production per day, ...
 - » Wet weight definition etc.
 - ❑ Standardised analytical methods
 - » Ph levels
 - » Resistance to temperature ...
 - ❑ Specs defining algae biomass and of its quality
 - » Contaminants limitation, etc.
 - » Biomass origin and nature of the product
 - ❑ Algae based biofuels quality requirements (depending on kind of biofuel)
 - » Resistance to oxidation
 - » Impurities limits, etc.

EABA – New EU Catalogue of Feed materials

- New EU Catalogue for feed labelling, final publication in May 2011
- General objective: improve transparency and information along the feed chain
- EABA obtained 6 new entries for “algae”, “algae meal” (generic approach) for the Catalogue’s first update

EABA action – New EU Catalogue of Feed materials

6 new entries for feed materials produced from algae

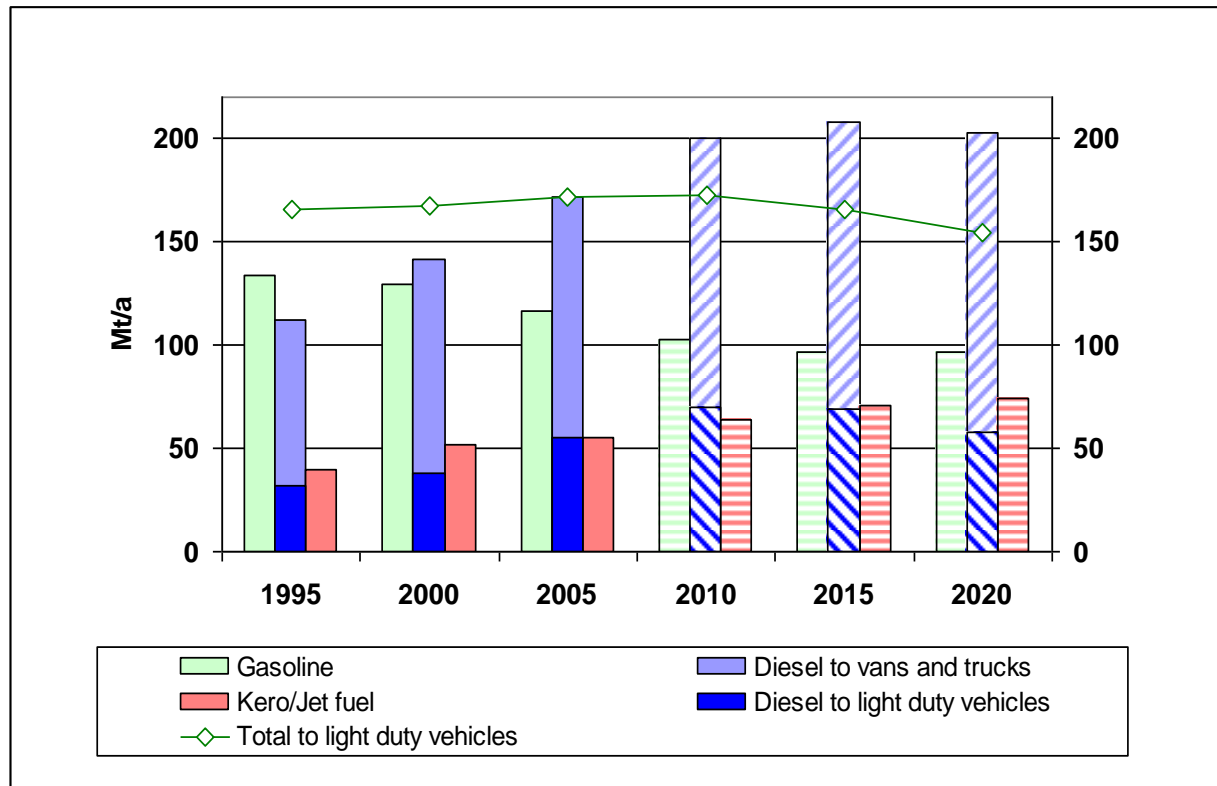
Name	Description	Compulsory declarations
Dried algae	Product obtained by drying algae. This product may have been washed to reduce the iodine content.	Crude protein Crude fat Crude ash
Algae meal	Product of algae oil manufacture, obtained by extraction of algae.	Crude protein Crude fat Crude ash
Algae	Whole or enriched algae live or processed, regardless of their presentation, including fresh, chilled or frozen algae.	Crude protein Crude fat Crude ash
Algae extract	Watery or alcoholic extract of algae that principally contains carbohydrates	none
Seaweed meal	Product obtained by drying and crushing macro-algae, in particular brown seaweed. This product may have been washed to reduce the iodine content.	Crude ash
Algal oil	Oil obtained by extraction of algae.	Moisture if > 1%

Future perspectives - EABA

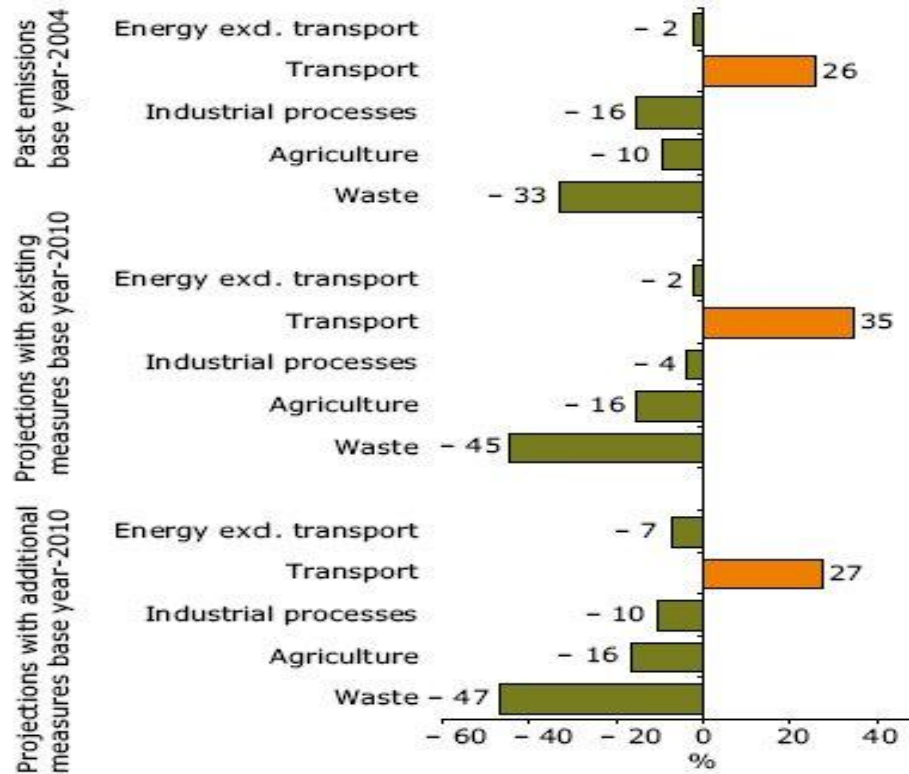
Investigating the potential for algae biofuels in aviation

- Aviation sector included in the EU Emission Trading System (ETS) from January 1st, 2012: airlines will need to cut their CO₂ emissions by 5%
- aircraft adaptation not an option
- potential for algae biofuels able to replace aviation fuels
- several demo flights prove interest of airlines and aircraft manufacturers

EABA – Potential for algae biofuels in aviation



GHGs emission trends estimates



EABA & AquaFUELS Project – next steps

Overall sustainability assessment: economic viability, GHG life-cycle analysis, natural resources availability (June 2011)

Promote double counting mechanism under Renewable Energy Directive

Carry on compilation of algae who's who

Continue co-operation with other research projects with which Barter agreements were signed

VERY IMPORTANT : Coordination with other research projects and scientific initiatives – Structure the algae biomass community in the EU

- **2011 EABA EU Algae Conference and Expo:**
November 29th-30th - Brussels
with Evening debate in the EUROPEAN PARLIAMENT (Nov. 30th, 2011)



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