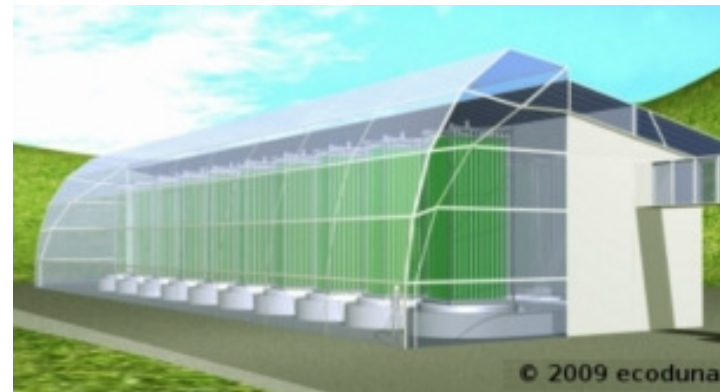


ecoduna®

# PHOBIOR



**Construction and operation of an innovative photo-bioreactor (PBR) for the production of micro algae comprising high amounts of omega-3 fatty acids**

## THE BURNING PROCESS



So far industrialization did evolve into very efficient processes of burning carbon sources.

Many ecological and economical consequences occurred.

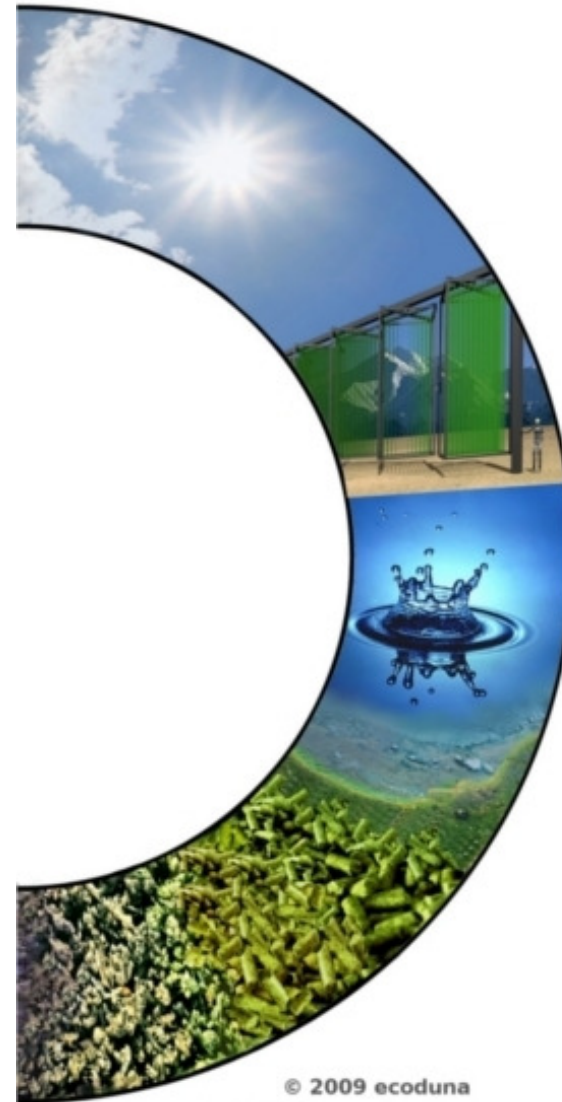
Carbon dioxide and enriched waters were produced up to an extend, till they started being a burden to the environment or being called “problematic waste”

“Burning Industries” did not increase the photosynthesis surface in the same time.

Growing demand for renewable raw materials for Food and Feed, bio plastics and finally energy create the demand for new solutions.,

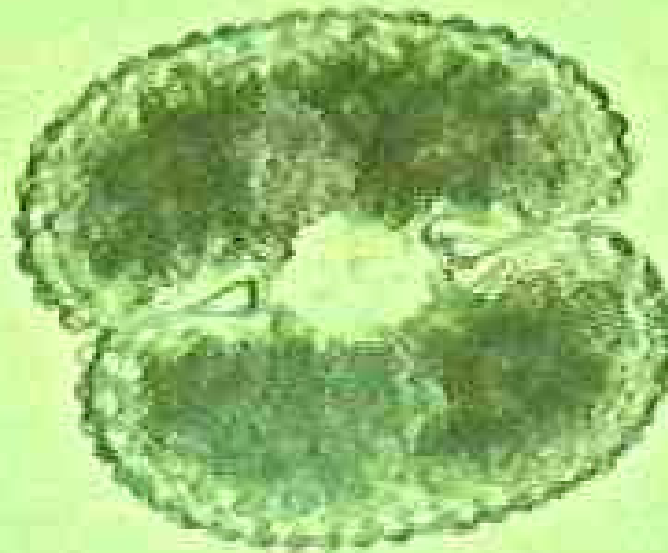
Clean water, good air and the possibility to sequestrate CO2 are additional advantages

**Only industrial Algal biomass production can undertake that task without conflict traditional farming.**



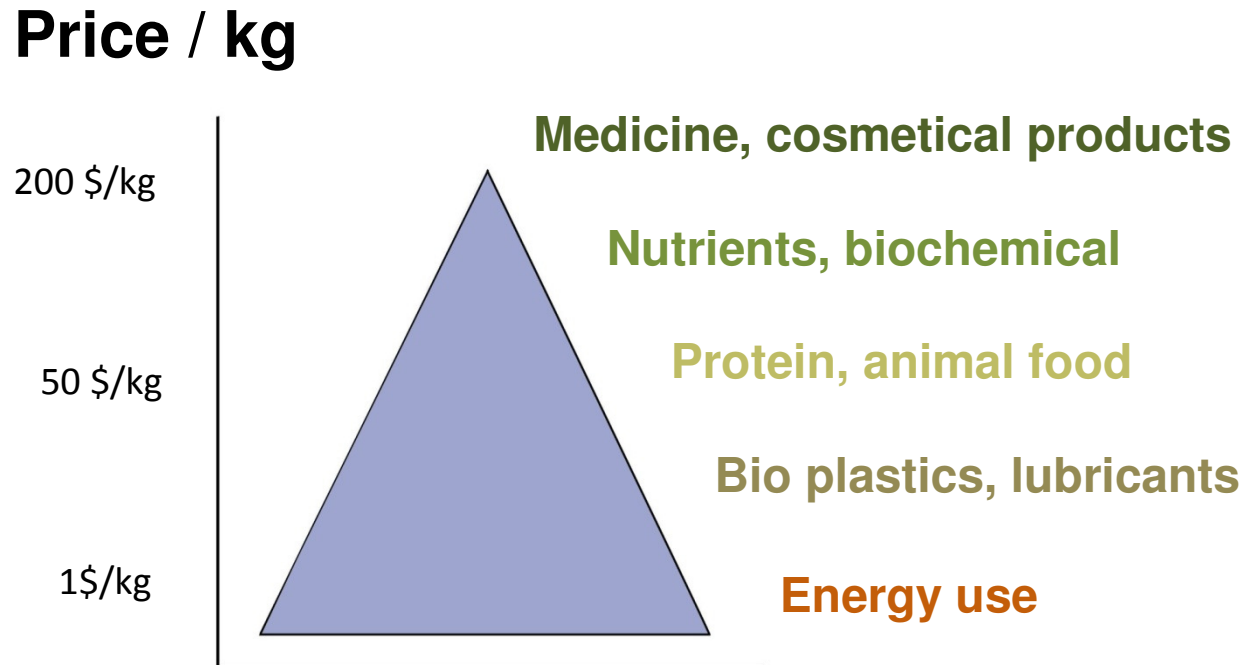
Products from algae are the most promising renewable recourse

The measured quantity of global biomass from algae is only 0,02%



Algae can have a conversion of 700%

Therefore the total annual global biomass from algae adds up to 55%



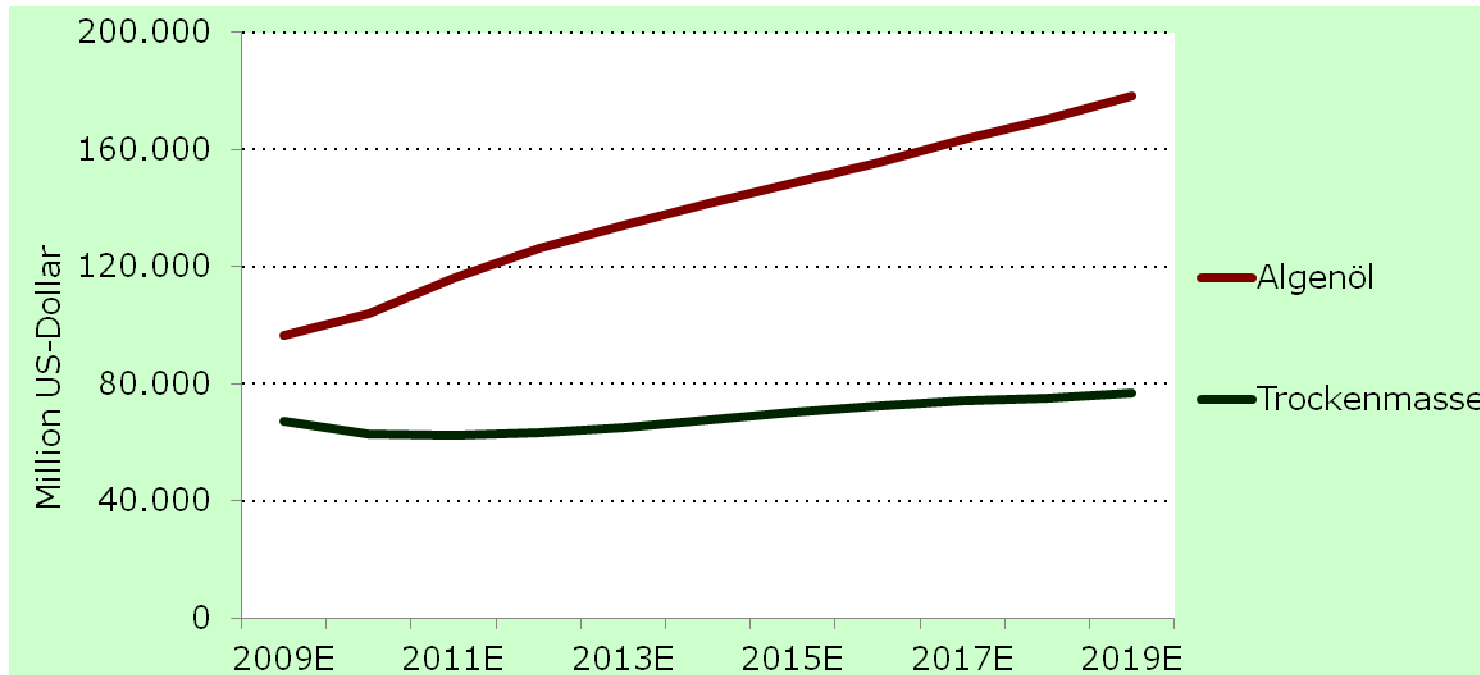
The market of omega 3 fatty acids nutrition products has exceptionally grown over the last years (24,3% annually), predicted to reach 1,6 bill\$ in 2014 in Europe and there is no reason conceivable why this dynamic trend should stop.  
(Frost & Sullivan, 2008).

Algae are the most effective source to obtain biological, guaranteed mercury free Omega-3 fatty acids of high quality. The production unit of ecoduna will tackle only a modest contingent of this estimated annual market of 2 billion USD in omega 3 fatty acids.

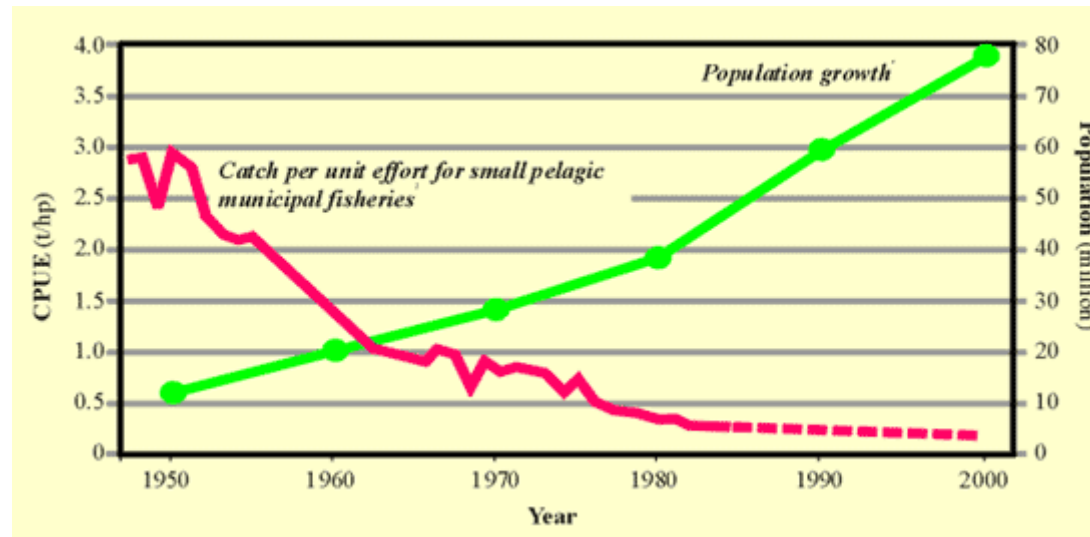
### EPA DHAs

- Each EPA DHA capsule contains 1000mg of fish oil with 180mg EPA and 120mg DHA.
- EPA DHA has undergone the Molecular Distillation process to produce a higher grade of fish oil that is more pure as it removes heavy metals, pollutants, impurities and environmental toxins.

## MONEYTARY EQUIVALENT FOR ALGAE PRODUCTS



Vienna University of Economics and Business, 2009

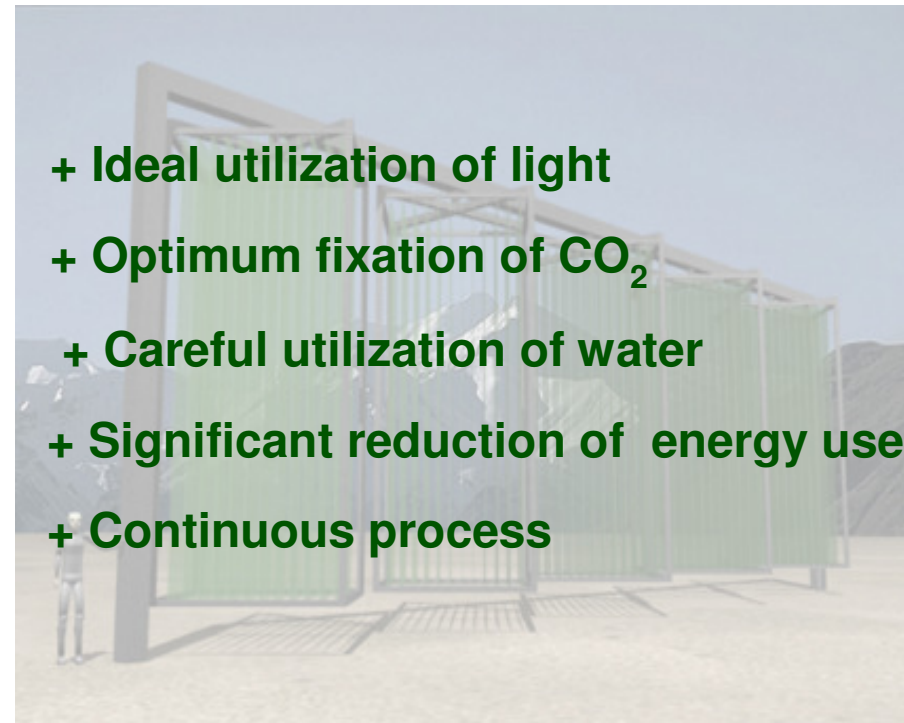


Population growth and declining fish stocks in the Philippines

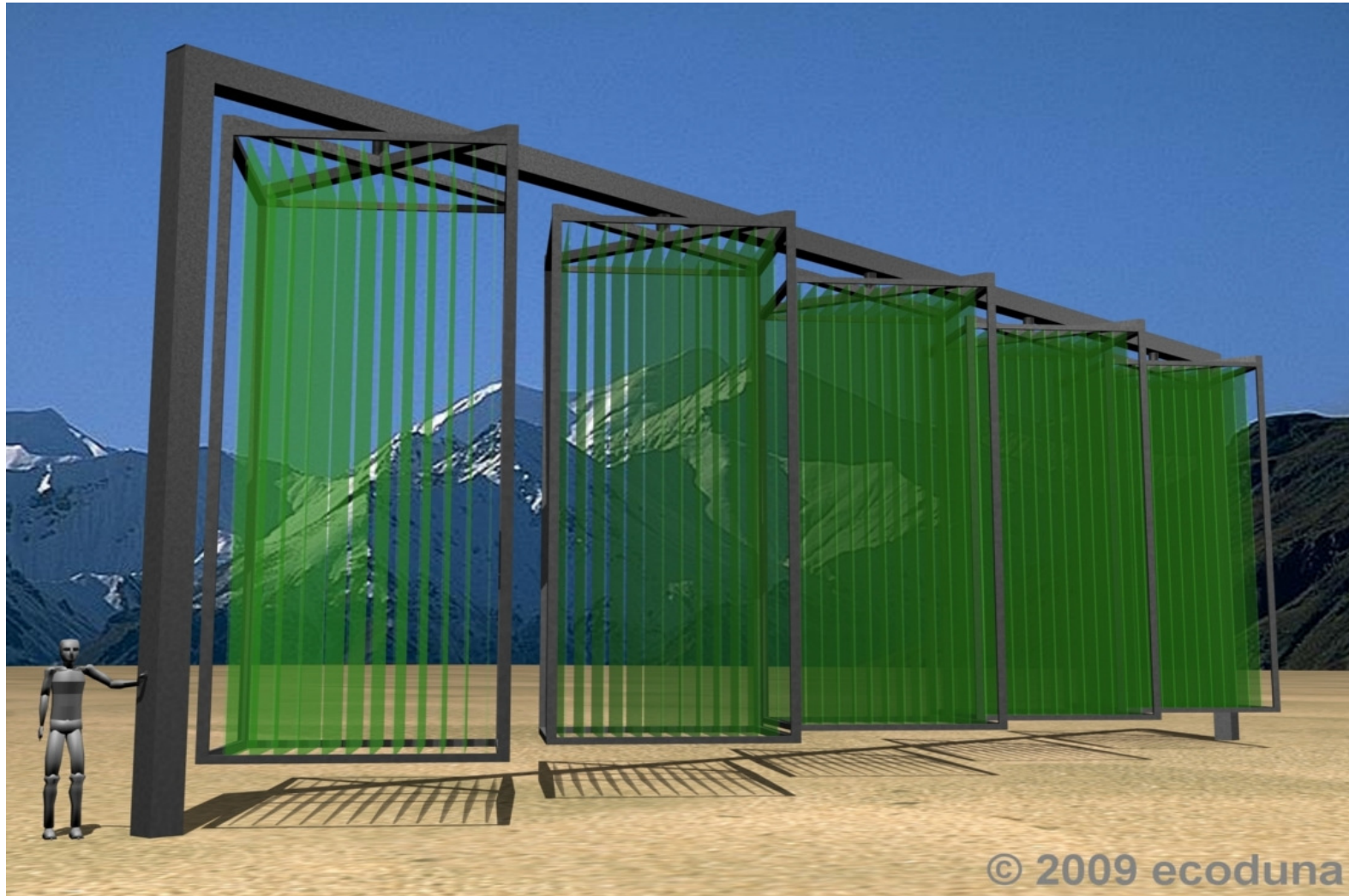
Algae is the base of the aquatic food chain!

To produce healthy fish, rich in omega 3 fatty acids in a sustainable way there is no way without producing algae as a feedstock first.

	hanging gardens
Continuity	++
Yield	++
Energy costs	++
Utilisation of light	++
Surface to the light	++
Stress to algae	++
Discharging the oxygen	++
Contamination	++
Evaporation	++
Environmental impact	++
Integration of CO	++
Integration of nutrient	++
Temperature control	++



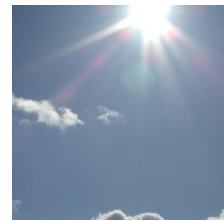
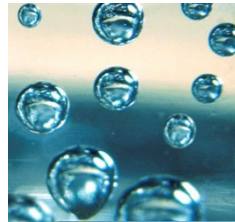
**The first continuous system with full light utilization**



© 2009 ecoduna

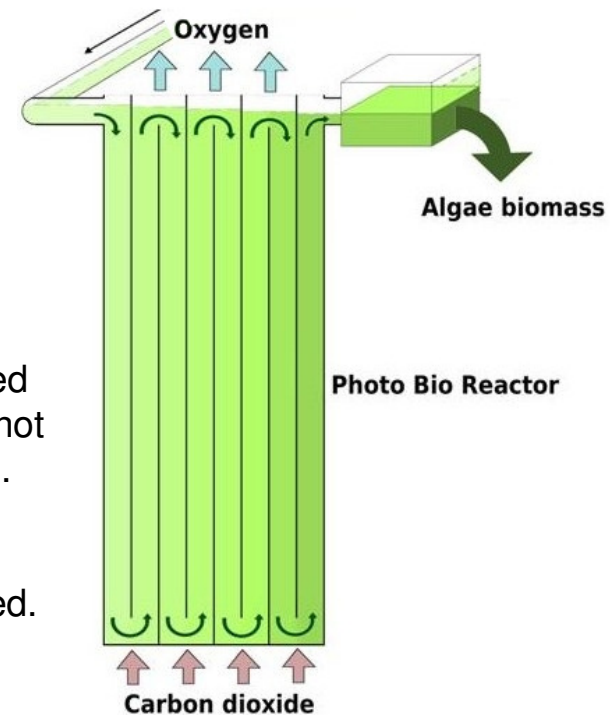
## TECHNIQUE, HOW DOES IT WORK

ecoduna's system allows the optimum addition of CO<sub>2</sub> and nutrition to the system, higher yields can be obtained.

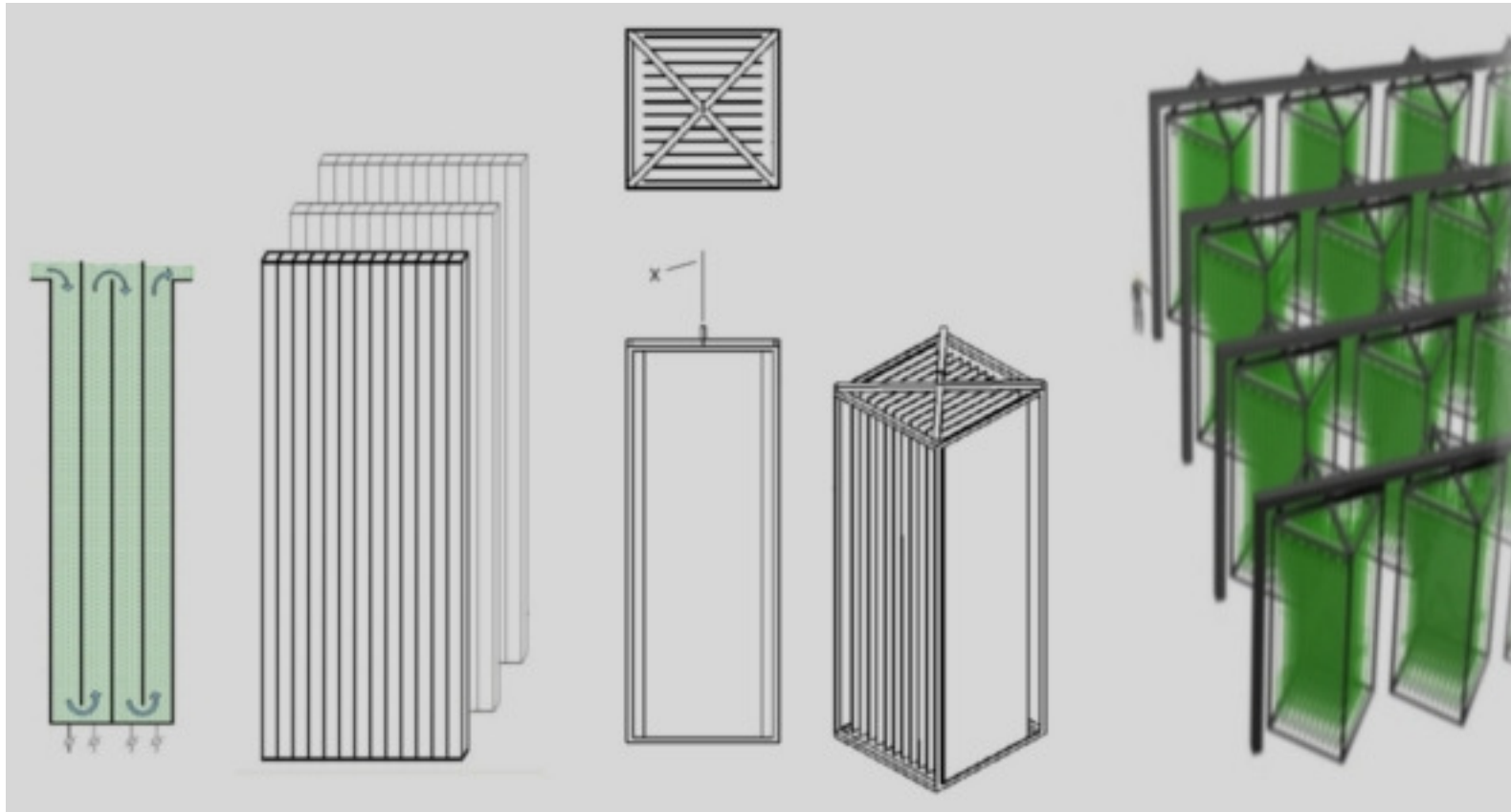


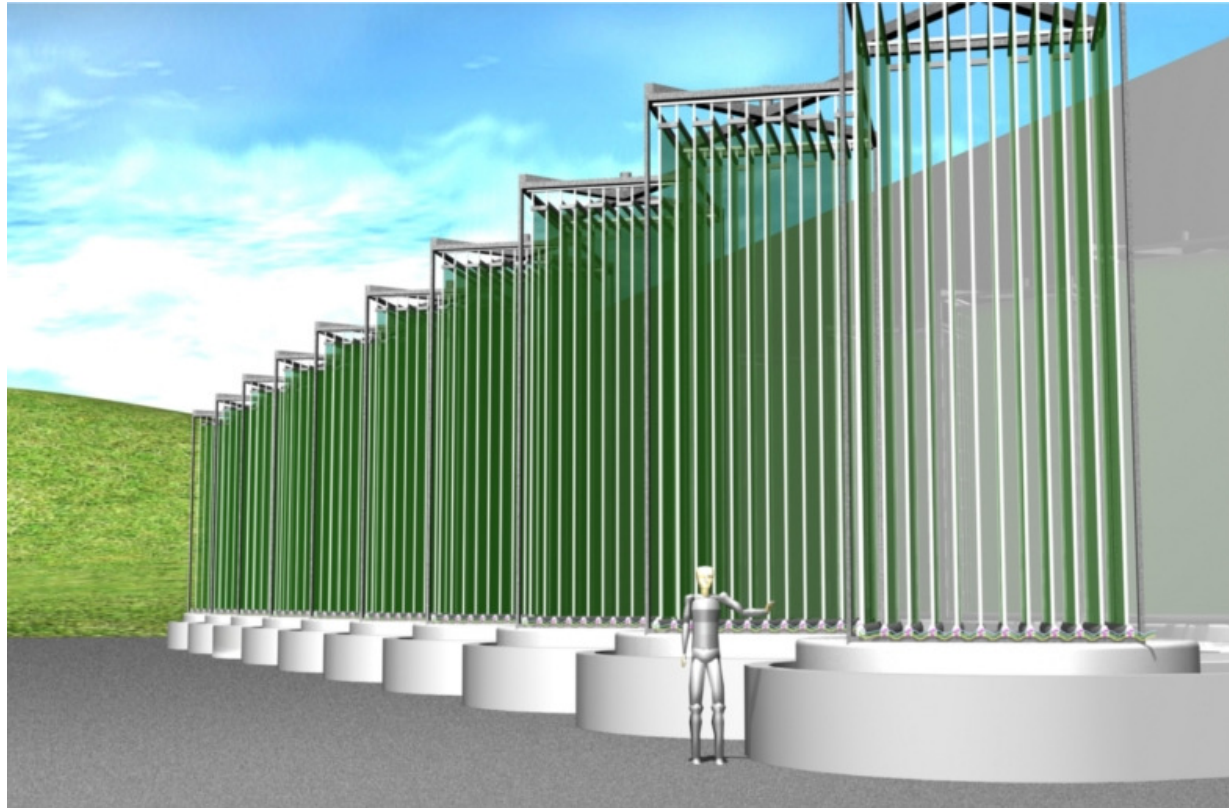
The system allows discharge of excess oxygen, produced during the process of carbon dioxide fixation. Growth is not inhibited by excess oxygen and productivity is increased.

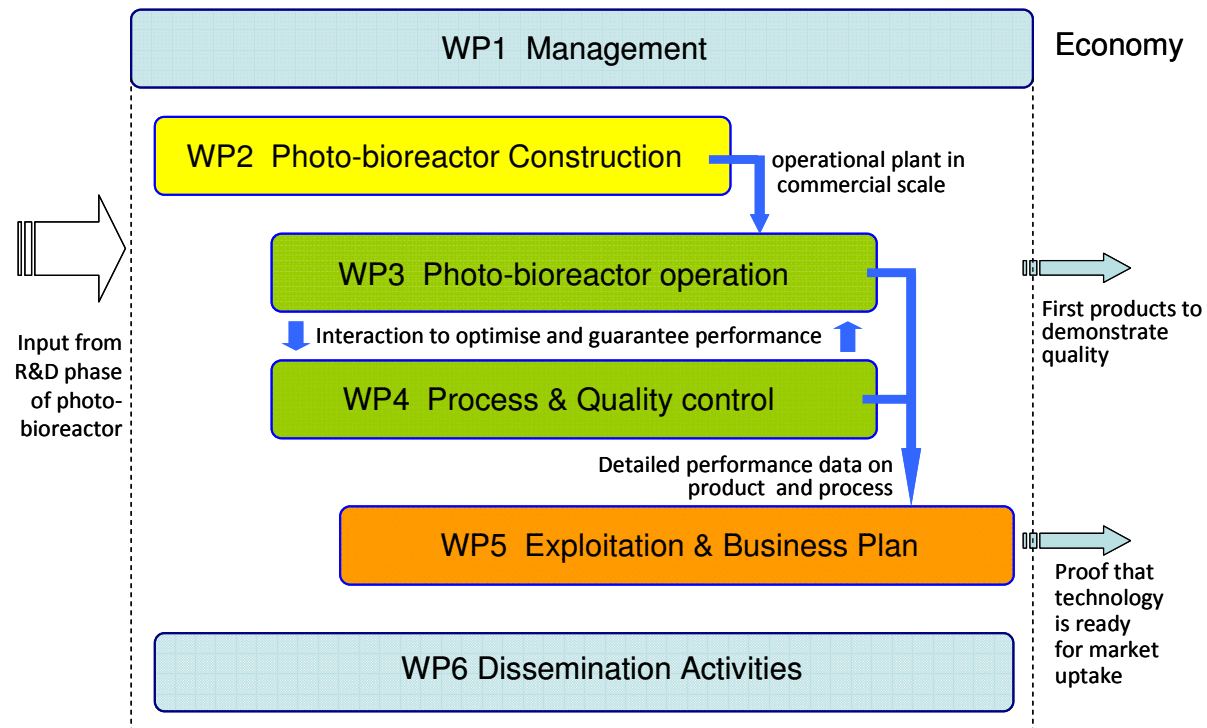
Additionally the whole transport is obtained by CO<sub>2</sub> integration, energy reduction up to 85% are accomplished.



## COMPARISON ON VOLUMETRIC PRODUCTIVITY









The Director

Brussels, **24 FEB. 2010**  
EACI/5/BY/mp D(2010) 30659

ecoduna OG  
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AT-2410 Hainburg

F.a.o. Mr. Martin Mohr

mohr@ecoduna.com

**Subject: Eco-innovation – First Application and Market Replication Projects:  
Call for Proposals CIP-EIP-Eco-Innovation-2009<sup>1</sup>  
N°256149, Construction and operation of an innovative photo-bioreactor (PBR)  
for the production of micro algae comprising high amounts of omega-3 fatty  
acids, PHOBIOR**

Dear co-ordinator,

With reference to the above call for proposals, the Executive Agency for Competitiveness and Innovation (EACI) acting under powers delegated by the European Commission has now completed the evaluation of the submitted proposals.

I am pleased to hereby inform you that your proposal **Construction and operation of an innovative photo-bioreactor (PBR) for the production of micro algae comprising high amounts of omega-3 fatty acids** has been favourably evaluated. You will find enclosed a copy of the evaluation summary report regarding your proposal.



- 1. ecoduna offers a milestone technology for algae production**
- 2. ecoduna can secure the head position with PHOBIOR**

**Further improvements will be made**

**Faster growing algae found**

**Less staff by Improved process**

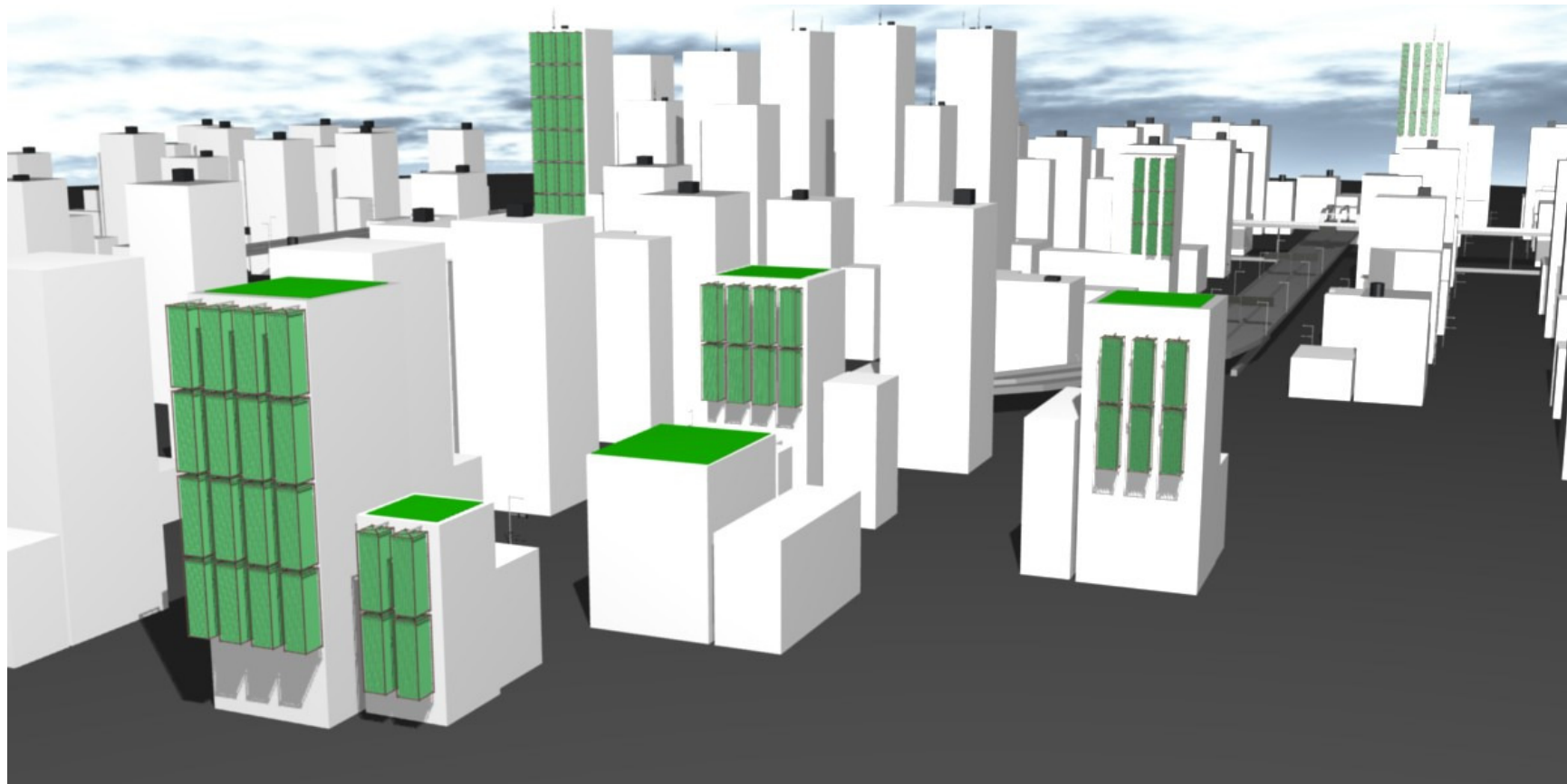
**Further industrial digression**

**Lower production cost by decreasing energy demand**





Wherever bio products are needed, ALGAE CAN PRODUCE IT



**ecoduna`s technology revolutionizes the biomass production by optimizing the utilisation of light and carbon dioxide.**

**carbon dioxide is a valuable resource in the future**

**Light is the only free energy source available**





**Many thanks!**

FFG and Mag. HARRALD GRILL, Competitiveness and Innovation Programme



YOUR QUESTIONS ARE WELCOME

