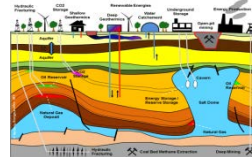


# Integrated Project EnergyLandUse

Land Use Aspects of Transforming the Energy System –  
Sustainable Options for a Renewable Energy Era



## 7<sup>th</sup> UFZ EnergyLandUse Lecture

Friday, 25 September 2015, 10:00 – 11:30  
Lecture Hall, Main Building, UFZ Leipzig

### *CO<sub>2</sub> as a resource? Innovative biotechnologies for photosynthesis-driven energy supply*

## Prof. Dr. Christian Wilhelm

Professor for Plant Physiology

Institute of Biology I, Leipzig University

All CO<sub>2</sub>-using technologies include two steps: carbon concentration and carbon conversion. Both steps are energy dependent. The only process which uses CO<sub>2</sub> in one single process is photosynthesis, where carbon concentration and carbon fixation are integrated processes in a leaf or in an algal cell. Traditional green biotechnology starts from the generation of biomass using plants or photoautotrophic cells. This biomass is then harvested and refined to the product of interest. This production line, however, has a limited efficiency. Because of physical constraints, the conversion efficiency from light to biomass cannot exceed 4-5% . If the production and refinement allocations are taken into account biomass-based conversion efficiency is close to zero and in many cases below. We have developed a new approach based on algal biofilms which directly produce organic carbon in the form of glycolate which is excreted and directly used for fermentation. The combination of glycolate excretion with classical white biotechnology opens the full spectrum of industrial products. The data show that this approach has the real potential to increase the product formation per ha used area by at least one order of magnitude. The next steps of research to reach this goal are presented.



After Professor Wilhelm's talk, there will be the chance for interaction with him. All interested colleagues are kindly invited.

Link to registration: <http://www.ufz.de/index.php?en=33338>

### Prof. Dr. Christian Wilhelm

... is the Executive Director of the Institute for Biology I at Leipzig University. He is a botanist with special expertise in the whole cell physiology of microalgae. His particular interests lie in the mechanisms that regulate the efficiency of energy conversion from photon to biomass. His research covers the identification and quantification of heat emitting processes in photosynthesis and metabolism, the electron partitioning in microalgae and the measurement of in-situ physiological activity of microalgal communities. Recent research activities involve the metabolomic engineering of different species of *Chlamydomonas* and *Pheodactylum*, but also of new species which have not been used for biotechnological applications.

For more details see: [http://www.uni-leipzig.de/unigeschichte/professorenkatalog/leipzig/Wilhelm\\_1475.pdf](http://www.uni-leipzig.de/unigeschichte/professorenkatalog/leipzig/Wilhelm_1475.pdf)