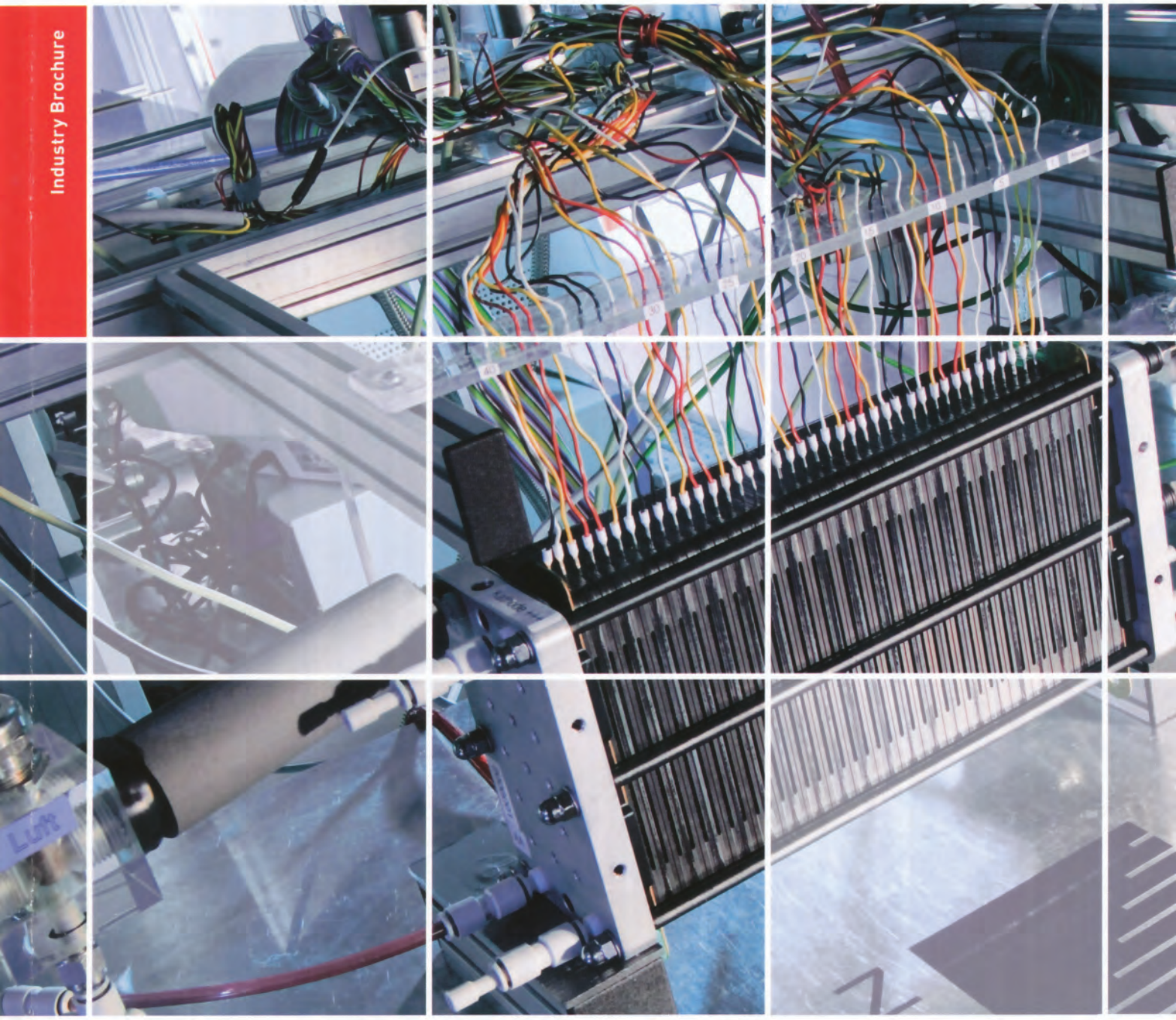
Germany: Lead Market for Energy Storage & Fuel Cell Systems

A Profile of Selected Market and Research Opportunities

Industry Brochure



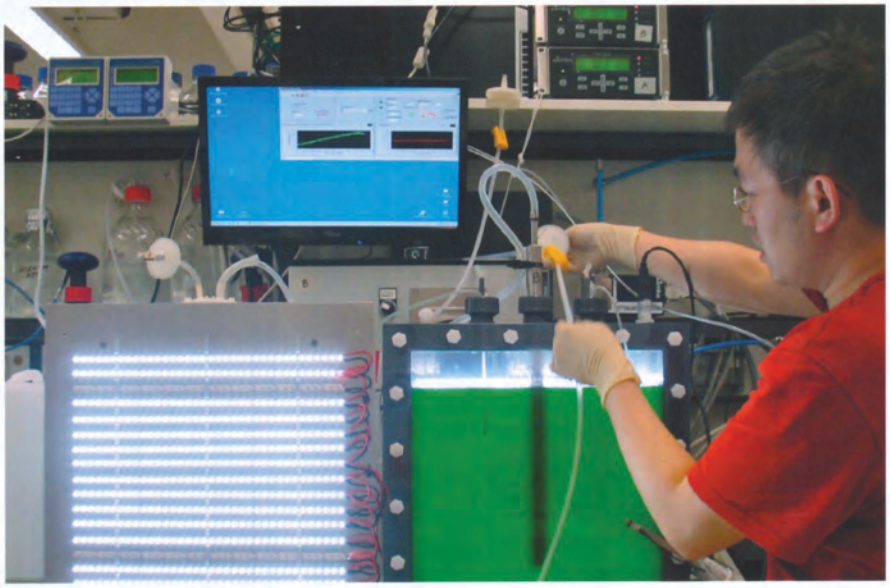
GERMANY
TRADE & INVEST

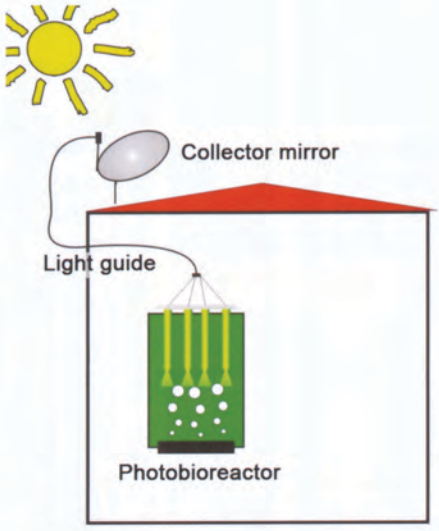
Ruhr-Universität Bochum: Production of hydrogen by micro-algae

Description of institute

Ruhr-Universität Bochum
in cooperation with
HU Berlin, FU Berlin,
MPI Mülheim, Universität Köln,
Universität Duisburg-Essen

www.bpf.ruhr-uni-bochum.de





Description of research
This is a research initiative aimed at harnessing cyanobacteria for energy production. The R&D programme will design and generate a cyanobacterial cell producing hydrogen from sunlight and water. In addition, operational Photo-bioreactors for large scale hydrogen production will be constructed.

This major R&D initiative is based on the leading European expertise in biohydrogen production by utilising cyanobacteria. It is a collaborative initiative of selected research institutes in Germany with industrial partners and has qualified for a federal grant (BMBF).

The first milestone is the development of a labscale (5 l) continuous photobioreactor and a cyanobacterial design cell in which electrons originating from the water-splitting process are mainly used for hydrogen production. This technology will be up-scaled to a large demonstration reactor (100 l). Once this system has been optimised and the design-cell has been generated, it opens up the possibility for large industrial scale reactors.

We envision that this technology will be used to power innovative concepts based on LEDs, light guides, light collectors etc. Furthermore we are developing semi-artificial systems ("Biobatteries") as "proof of principle" for water-based hydrogen production: they involve isolated proteins which are immobilized on gold electrodes for hydrogen production from photosynthetic water oxidation.

Opportunities for collaboration

This initiative is a special opportunity for companies engaged in the development of bioreactors as basis for a future scale-up for mass-production (modular cheap flat-plate bioreactors). Furthermore companies interested in developing a position in a future mass production are encouraged to develop cheap LEDs with focus on red light (i.e. about 720 nm). We are also developing technologies for collecting sunlight and channeling it through glass fibres to the vessels containing the cyanobacterial cultures. In this way, reactors do not need to be located in an outdoor environment.