

Green Energy Development Center, Feng Chia University, Taiwan

Energy Research, Energy Saving, and Resource Recycling

Overview

The Green Energy Development Center (GEDC) was founded in August, 2010 (Former known as Research Center for Energy and Resources, RCER, 2000-2010). The mission of the GEDC is to develop energy research, energy saving, resource recycling, and personal training of the science and technology. Besides, we seek the international cooperation to boost up the research quality and technology on the innovative energy research for the next generation. This center has 10 professors, 15 staffs and around 60 students.

The GEDC is currently focusing on the research and development of Fermentative Biohydrogen Energy Technology. This project is supported by the Bureau of Energy (BOE), MOEA, and it uses technologies such as immobilized cell technology (ROC patent: I317381) of selectivity for hydrogenase cell, induced granular cell hydrogen fermentation, and preparation of electro chromic materials by chemical depositions (US patent: 6 652 980 B2). In the past 5 years, 7 patents have been awarded and further applications have been submitted for 9 more patents. The GEDC also promotes regional cooperation by holding international meetings such as the APEC Advanced Bio-hydrogen Technology Conference and Short-term Training Course, Asian Biohydrogen Symposium and the Asia Bio-HyLinks Meeting. The GEDC is currently networking with several research institutes, including TUT, KKU, HIT and SIUC.

Research fields:

The theme of the research is anaerobic fermentation for bio-hydrogen production, and the key technologies are (a) Culture enrichment technology, (b) High-rate three-phase bioreactor, (c) Molecular biological technology, and (d) Pilot plants. Based on the established key technologies, the GEDC is leading the bio-hydrogen production rate among the world by constructing a 400-liter dark fermentation pilot plant on Feng Chia campus in December, 2007.

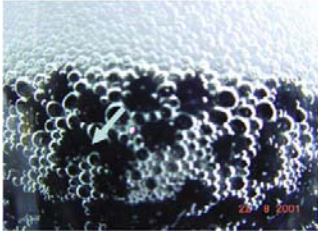


400-litre Pilot Plant on Feng Chia Campus

Recent projects:

1. Research and Development for Fermentative Bio-hydrogen Energy Technology
Bureau of Energy, Taiwan, US\$1,000,000 (2005-2008)

Objective: (a) Selection and acclimation of hydrogen producing bacteria, (b) Sludge granulation and immobilization, (c) Bio-hydrogen pilot plant design, and (d) Bacterial community structure analysis



Immobilization

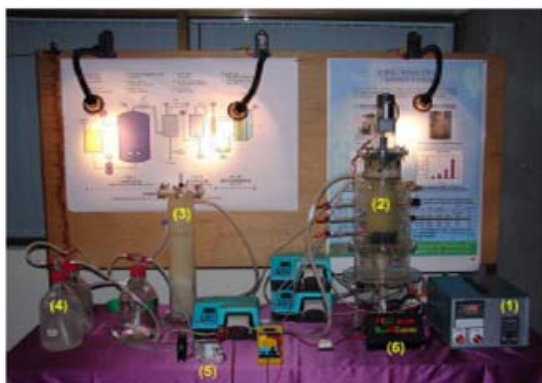


Bacterial Community

2. Development and Demonstration of Bio-hydrogen Energy System

Feng Chia University, Taiwan, US\$ 172,000 (2006-2008)

Objective: (a) H₂-ICE design and test and (b) Bio-hydrogen pilot plant demo system



Bio-hydrogen Lab Scale Demo System

3. Research of Hydrogen Energy

Feng Chia University, Taiwan, US\$313,000 (2008-2011)

Objective: (a) High Performance of Bio-hydrogen Production and (b) High Efficiency of

Hydrogen Storage Alloy Fabrication and Characteristics Analysis

4. Hydrogen Education

(a) Graduate Program for Green Energy Science and Technology

The Master of Science (MS) degree reflects mastery of core and specialized areas of green energy science and technology.

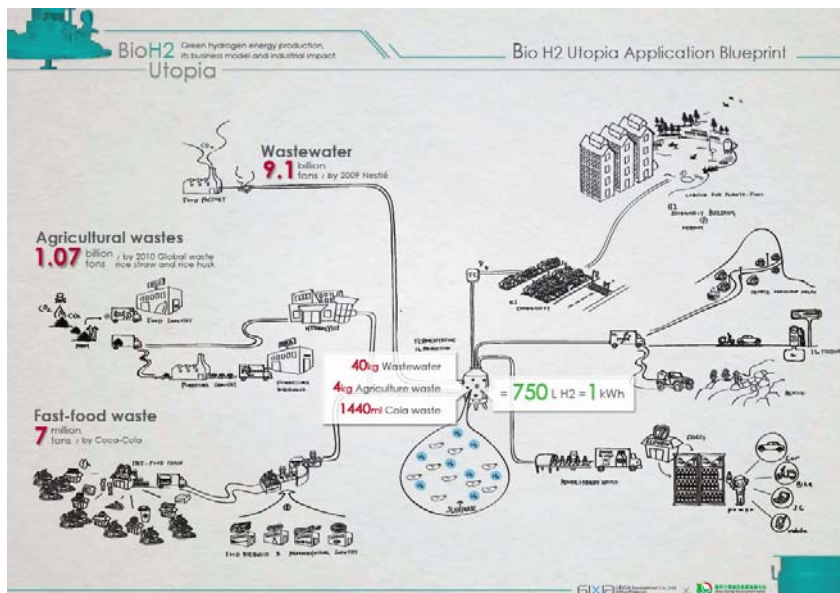
(b) Undergraduate Program for Biomass Energy and Green Energy Science and Technology
Ministry of Education, Taiwan, US\$76,000 (2008-2010)

(c) Resource Center for Talent Training in Biomass Energy Technology, Ministry of Education, Taiwan, US\$ 210,000 in 2011 (2011-2013).

5. The Promotion Program of Research Centers for Energy Technology- Biomass Energy Bureau of Energy, Taiwan, US\$1,000,000 (2009-2012)

Objective: (a) Bio-hydrogen pilot plant operation; (b) Selection and acclimation of hydrogen/butanol producing bacteria, (c) Hydrolysis of cellulosic materials, (d) Bio-hydrogen/butanol pilot plant design and operation, and (d) Bacterial community structure analysis.

7. Green Hydrogen Energy Technology and Economy, National Science Council, Taiwan, US\$ 205,000 in 2011 (2010-2012).



Bio H2 Utopia Application Blueprint

International Technical Exchange Platforms

1. Research Center for Biomass Energy Technology, Bureau of Energy, Ministry of Economic Affairs, Taiwan
2. APEC (Asia-Pacific Economic Cooperation) Research Center for Advanced Biohydrogen Technology
3. Secretary's Office of Asia Bio-HyLinks (ABHL)
4. International Association for Hydrogen Energy (IAHE) -Taiwan Chapter

Research team leaders:

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- Director, Green Energy Development Center
- Professor, Department of Environmental Engineering and Science; Department of Water Resources Engineering and Conservation

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