

APEC

Advanced Biohydrogen and Green Growth

Newsletter

APEC Meetings and Events

§ Taiwan Academic Research Expo of Photonics Festival in Chinese Taipei 2012 §

June 19-21, 2012

Chinese Taipei

Photonics Festival in Chinese Taipei 2011 brought on the latest advancement in photonics, display, and green industry during June 19-21, 2012. In order to help students to understand the international trends and development of the green energy and renewable energy, Green Energy Development Center, Feng Chia University in “Taiwan Academic Research Expo” to present the most pioneering technologies of Bio hydrogen and R & D achievements developed from Green Energy Development Center.

During the exhibition, many visitors were interested in the multi –stage green energy demonstration (MSGED) which is designed and built by Green Energy Development Center, Feng Chia University. They would like to understand the process of “waste to energy”. By this demonstration system, many visitors could know “waste is not waste” and related green energy industry.

The participation in this exhibition, it helped students understand international trends and development of the green energy and renewable energy. This platform gave an opportunity to enhance further cooperation between academic and industry.



Green Energy Development Center present the multi–stage green energy demonstration (MSGED) in Photonics Festival in Chinese Taipei 2012

The food security, climate change, energy security, interlinked challenges, and green growth for the APEC region.

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Research News

§ Carbon Emission Reduction in Australia: Pork CRC Opens One Stop Gas shop §

AUSTRALIA - Launching its *Bioenergy Support Program* at the Pan Pacific Pork Expo 2012 marks the first step of an internationally acclaimed commitment by the CRC for High Integrity Australian Pork to reduce the carbon footprint of Australia's pork producers to one kilogram of carbon dioxide per one kilogram of meat. *Australian Pork Limited life cycle assessment* having indicated more than two thirds of greenhouse gas emissions were generated from piggery effluent ponds and with more than 90 per cent of Australia's pork production utilizing ponds to manage effluent, a significant opportunity existed for industry to capture emissions for mitigation or utilization.

According to Pork CRC CEO, Dr Roger Campbell, *methane capture, utilization and flaring*, would be some of the most effective steps in realizing the CRC's carbon target. "As part of Pork CRC Subprogram 4C, *Carbon Neutral Pork Production*, this project prioritizes production, capture and use of methane from piggery effluent treated in covered anaerobic lagoons," "specific efforts towards carbon neutral pork production would involve novel research to maximize methane production from effluent ponds so that gas collection and use can be

made more economically viable. "Alternative approaches to waste management will also be assessed to develop solid waste pork production systems that mitigate carbon outputs'. Despite Australia's long distances and issues with bio-security, feedstock, restrictive policies and standards and relatively high labor and component costs inhibiting uptake of *biogas technology*, interest is accelerating due to lower cost technologies, rising energy costs and the introduction of the Carbon Farming Initiative and carbon tax. The Pork CRC Bioenergy Support Program, headed by Dr Stephan Tait, a professional engineer chartered with the Institution of Chemical Engineers and a research fellow at the *Advanced Water Management Centre, University of Queensland*, will be, effectively, a 'one stop shop' for Australian pork producers to find out everything they need to know to better manage piggery effluent and reduce their carbon footprint. The Program will provide independent advice on **low-cost biogas options**; details of suppliers; independent reviews of feasibility assessments; information on available funding and much more. A steering committee of the Pork CRC Bioenergy Support Program will be promoted towards the awareness.



Adapted from: <http://www.thebioenergysite.com/news/11077/pork-crc-opens-one-stop-gas-shop>

§ Biofuel application promotion: China Prepares for Biofuel Demonstration Flight §

CHINA - China will be next to conduct a *biofuel demonstration flight*, with an Air China Boeing 747-700

The flight will be conducted under the auspices of a U.S.-China energy cooperation program launched in 2009. A May 2010 agreement between Air China, Petro *China, Boeing and Honeywell Company* UOP covers the demonstration flight, using fuel derived from biomass grown in China, and evaluation of the potential for establishing a sustainable aviation biofuel industry. Petron China provided the biomass, which has been processed into biofuel by UOP and is now being blended with conventional jet fuel for the demonstration flight, Zheng Xing Wu, a professor at the Civil Aviation University of China, told the International Civil Aviation Organization's sustainable fuel workshop in Montreal last week.

Possible raw materials for aviation biofuels identified by the study include jatropha, which is grown in remote valleys and mountain areas in southern and southwest China, and shiny leaf yellow horn, a native shrub grown in northern China. Establishing a domestic biofuel supply chain would help meet China demand for jet fuel, which Zheng said is projected to increase to *23.7 million tons in 2015, from 15.3 million tons in 2010*, and to 35.8 million tons in 2020. Biofuel would also help Chinese aviation meet its target of reducing CO₂ emissions by 3 per cent a year. China's demonstration flight comes as several airlines conduct revenue-service trials using the limited supplies of hydro treated renewable jet fuel currently available. In Mexico, Inter jet has launched a year-long program of weekly biofuel flights between Mexico City and San Jose de Costa Rica, using an Airbus A320. The 52-flight campaign began on Sept. 27, using a blend of 25 per cent camelina-derived biofuel. The *Mexican*

expected to fly by the end of November on a blend of conventional and hydro treated renewable jet fuel.

government's "flight plan" for sustainable aviation biofuels is targeting meeting 1 per cent of national demand (40 million litres a year) by *2015 and 4 per cent* (700 million litres a year) by 2020. Candidate feed stocks identified include jatropha, castor, salicornia, agave and algae.

In Brazil, having completed a test flight this year with camelina-derived biofuel, Embraer is now planning a flight in 2012 with a **renewable jet fuel produced from sugar cane**, using an advanced fermentation process developed by Amyris. The flight will involve an E-Jet operated by Brazilian airline Azul. Embraer will collaborate with Boeing and the São Paulo State Research Foundation (FAPESP) on development of a report, to be completed in late 2102, detailing a roadmap to creating a sustainable jet-fuel supply chain in Brazil. Airlines Azul, GOL, TAM and Trip will be advisers. Work to approve jet fuels produced via the so-called "*direct sugar to hydrocarbon*" (DSHC) pathway, like the Amyris process, for use in aircraft has begun at standards organization ASTM International. DSHC is one of two new production pathways on which ASTM has begun work, aiming for approvals in 2013-15. The other is alcohol-to-jet (AJT), which allows biofuel to be produced from cellulosic feed stocks. Lanza Tech meanwhile is working on a process to convert industrial CO₂ emissions to biofuel via the AJT pathway. The company has an agreement with Virgin Atlantic Airways, assisted by Boeing, to certify the fuel and conduct the first flights in two to three years.

Adapted from: www.thebioenergysite.com/news/9852/china-prepares-for-biofuel-demonstration-flight

Special Column

§ International Creative Bio-energy Championship §

August 9, 2012

Chinese Taipei

Feng Chia University and Ming Dao University was held “International Creative Bio-energy Championship” on August 9, 2012. This purpose of the Championship is to encourage students to propose a creative design work in Bio-energy field and deliver the clear ideas.

“What is Biomass?” Biomass is a renewable energy, biological material from living, or recently living organisms. “The themes of “Creative Technology of Bio-energy”, forms of applications are not restricted (Hydrogen production, Bioethanol, Biodiesel, Refuse Derived Fuel, Gasification and liquefaction, etc.).

This championship had one Gold Medallist, one Silver Medallist, one Bronze Medallist, and four Excellent Awards.

	Institution	Title
Gold Medalist	Tajen University	Nitrogen and phosphorus removal and biomass production by the Green Microalgae in Piggery waste water
Silver Medalist	Southern Taiwan University	A novel approach for microalgae oil extraction by microbial degradation
Bronze Medalist	Feng Chia University	A novel approach to degrade the organic contents in the wastewater
Excellent Award	Feng Chia University	Hydrogen production research by using the acid hydrolysis of cellulose resources with low energy consumption
	Feng Chia University	Multi-biofuel production from Biodiesel industrial waste using Bio-refinery
	Fooyin University	Biodiesel
	Ming Dao University	Recycle energy

The group of Gold Medalist demonstrated an idea titled " Nitrogen and phosphorus removal and biomass production by the Green Microalgae in Piggery waste water ", which deals TAJEN-X was isolated from local source water and cultured in a medium. This is a potential strain in integrating piggery wastewater treatment with biomass production. Fig. 1 shows the dried biomass collected by centrifugation and it is dried by a freeze dryer. This biomass was then mixed with methanol and NaOH which act as a catalyst to produce biodiesel (upper phase) and glycerol (lower phase, Fig.2).

