



Media Release

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Singapore Bags 5 ASEAN Energy Awards

SINGAPORE – Four Singapore organisations bagged top awards at the 2010 ASEAN Energy Awards. Convened annually, the ASEAN Energy Awards recognise efforts by enterprising ASEAN companies to integrate renewable energy and energy efficient solutions in their projects.

2 The winners are:

ASEAN Energy Awards - Renewable Energy Project Competition 2010

(i) IUT Singapore Pte Ltd - Food Waste to Renewable Energy (Winner, On-grid category)

IUT Singapore Pte Ltd innovatively treats food and organic waste to generate renewable energy. Electricity produced is used to power the plant itself and the excess electricity is exported into Singapore's power grid. By biodigesting the food waste via a patented process known as Anaerobic Digestion of Organic Slurry(ADOS), this project also helps to reduce the need for landfill space and the methane-rich bio-gas (methane is one of the greenhouse gases that contribute to climate change) produced is used to generate power via gas engines.

(ii) Eco Special Waste Management Pte Ltd - Sewage Sludge Dehydration Using Thermal Energy Generated from Sludge Incineration (Winner, Off-grid category)

This project by Eco Special Waste Management Pte Ltd is the first of its kind in Singapore and the biggest in South-East Asia where sewage sludge¹ is burnt as fuel. The burning process produces thermal energy which is then recycled to dry the sludge.

ASEAN Energy Awards – ASEAN Best Practices for Energy Efficient Buildings Competition 2010

(iii) Tampines Grande Building (Winner, New and Existing Category)

Tampines Grande cleverly uses covered walkways, landscaping and plants to reduce the amount of energy needed to cool the building. Solar photovoltaic (PV) panels are also innovatively installed on the rooftops and as part of the

¹ Sewage sludge is the end-product from the treatment of used water at the water reclamation plants.

façade to harvest solar energy. This is the first commercial development with the largest and most extensive use of solar technology in Singapore. The building is expected to achieve a minimum energy-efficiency of more than 30% compared to a standard commercial office building.

(iv) Fuji Xerox Towers (Winner, Retrofitted Category)

Fuji Xerox Towers has implemented numerous energy conservation initiatives such as upgrading their chiller plant, installing ultrasonic and motion sensors over the past few years and achieved 23% reduction in electricity consumption from 2007 to 2009.

[Tampines Grande and Fuji Xerox Towers are both properties under City Development Ltd. They have attained BCA's Green Mark Platinum and Gold awards respectively where energy efficiency is a key criterion. The other criteria for Green Mark include water efficiency, environmental protection, indoor environmental quality and other green features.]

(v) People's Association Headquarters (2nd Runner-up, New and Existing Category)

People's Association Headquarters utilises technology and design to maximise its energy efficiency. Solar PV panels are installed, air-conditioning and lighting systems are monitored closely to control usage. To prevent heat gain, the building has an additional roof, a breathable wall and sun shades.

[The People's Association Headquarters is also a BCA Green Mark Gold^{PLUS} award recipient.]

3 The companies received their awards at the Awards Ceremony during the Gala Dinner of the 28th ASEAN Ministers on Energy Meeting in Da Lat City, Vietnam today. Mr S Iswaran, Senior Minister of State for Trade & Industry and Education, who attended the Meeting, commended the efforts of the companies and said "These awards are a testament to the winning companies' contributions to more energy efficient buildings and innovative renewable energy solutions. We look forward to more of such companies as Singapore works to become a smart energy economy."

4 This is the first time our companies participated in the ASEAN Energy Awards - Renewable Energy Project Competition, and they emerged with top honours in the category. Mr Lawrence Wong, Chief Executive of the Energy Market Authority said, "Despite the scale limitations of renewable energy in Singapore, our companies have shown that they have the capabilities to come up with innovative solutions in this area. These awards highlight the opportunities available for companies to use Singapore as a site for test-bedding of renewable energy options, and a platform for exports to other countries where conditions are more conducive for the deployment of large-scale renewable energy solutions."

5 Myanmar's representative on the Board of Judges for the ASEAN Energy Awards 2010, Mr U Win Khaing, Vice President, Myanmar Engineering Society, said, "The two renewable energy projects submitted by Singapore were exemplary due to their innovative concepts of utilising daily wastes such as food waste and sewage for power generation. These two projects were lauded as an eye opener for waste utilisation and they have the added benefits of reducing carbon dioxide emissions significantly." Agreeing was Mr Ronnie N Sargento, Officer-in-Charge & Project Manager, United Nations Development Programme - Capacity-Building to Remove Barriers to Renewable Energy Development, the Philippines's representative on the Board of Judges. He said, "Singapore is currently showing other ASEAN countries the significance of research and the tangible results it could achieve."

6 Commenting on the award-winning energy efficient buildings, Dr John Keung, Chief Executive Officer of Building and Construction Authority said, "This shows that both existing and new buildings can achieve equally high standards of energy efficiency through adopting best practices and technologies to consciously reduce energy used. These buildings, which have also received commendations under BCA's Green Mark scheme, will serve as good benchmarks in the course of greening our built environment."

7 Technologies for energy efficiency, as well as other innovative solutions needed for the region to balance its needs for energy security, environmental sustainability and economic competitiveness will be showcased at the upcoming Singapore International Energy Week (SIEW) 2010, to be held from 27 October to 4 November 2010. Building on the theme" Fuelling the Smart Energy Economy", SIEW 2010 will see more than 10,000 energy professionals, policy makers and commentators coming together to discuss energy issues, strategies and solutions.

Please refer to the Annexes for more information on the ASEAN Energy Awards and the five Award winners.

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About the Building and Construction Authority (BCA)

The Building and Construction Authority (BCA) of Singapore champions the development of an excellent built environment for Singapore.

BCA's mission is to shape a safe, high quality, sustainable and friendly built environment, as these are four key elements where BCA has a significant influence. In doing so, it aims to differentiate Singapore's built environment from those of other cities and contribute to a better quality of life for everyone in Singapore. Hence, its vision is to have "the best built environment for Singapore, our distinctive global city".

Together with its education and research arm, the BCA Academy of the Built Environment, BCA works closely with its industry partners to develop skills and expertise that help shape the best built environment for Singapore. For more information, visit www.bca.gov.sg.

About the Energy Market Authority

The Energy Market Authority (EMA) is a statutory board under the Ministry of Trade and Industry. The EMA's main goals are to promote effective competition in the energy market, ensure a reliable and secure energy supply, and develop a dynamic energy sector in Singapore. Through its work, the EMA seeks to forge a progressive energy landscape for sustained growth. For more information, please visit www.ema.gov.sg

About the Singapore International Energy Week

The annual Singapore International Energy Week (SIEW) is a leading energy event that provides a platform for policymakers, business leaders and academics to exchange ideas, strategies and best practices that will help shape global and industry energy agendas. Jointly organized by the EMA and the Energy Studies Institute from 27 October to 4 November 2010, SIEW features a comprehensive schedule of energy-focused conferences, exhibitions and networking sessions from a diverse cross-section of energy industry leaders. For more information, please visit www.singapore.iew.com.sg

About the ASEAN Energy Awards

The ASEAN Energy Awards was established in 2000 to recognise the efforts of building owners and property developers in implementing energy efficiency best practices in buildings as well as to spur energy efficiency. Since its inception, the AEA has evolved into competitions in energy efficient buildings, renewable energy projects and energy management best practices.

- 2 The ASEAN Energy Awards consist of the following categories:
 - A. ASEAN Best Practices for Energy Efficient Building Competition
 - i. New and Existing Category
 - ii. Retrofitted Category
 - iii. Tropical Category
 - iv. Special Submission Category
 - B. ASEAN Best Practices for Energy Management in Building and Industry Competition
 - i. Building (Small and Medium) Category
 - ii. Building (Large) Category
 - iii. Industry (Large) Category
 - iv. Special Submission Category
 - C. ASEAN Renewable Energy Project Competition
 - i. On-Grid Category
 - ii. Off-Grid Category
 - iii. Co-Generation Category

3 Some of the previous Singapore winners of the ASEAN Best Practices for Energy Efficient Buildings Competition include:

Categories	2009	2008	2007	2006	2005
New & Existing Buildings	Xilinx Building	Republic Polytechnic	National Library Board	One George Street	National Institute of Education
Retrofitted Buildings	Singapore Airlines Training Centre	Singapore Post Centre	Environment Building	Tan Tock Seng Hospital	

IUT Singapore Pte Ltd - Food Waste to Renewable Energy Grid Connected Power Project (Winner, On-grid category)

The first of its kind in Singapore and the largest in Asia, IUT Singapore Pte Ltd operates a food waste biomethanisation and renewable energy plant at Tuas, using its own patented technology. At full capacity, the facility will recycle more than half of Singapore's food waste currently being disposed at local incineration plants. The plant is able to process up to 800 tons of organic waste per day, and generate up to 10 MW of electricity. Marking a significant milestone in Singapore's environmental waste management industry, it is the only renewable energy plant that exports green electricity into Singapore's power grid.

2 The waste recycling plant treats food and organic waste produced from industrial, commercial and institutional premises such as shopping centres, hotels, food manufacturers, markets, hospitals, institutes of higher learning and animal waste from slaughterhouses, farms and stables.

3 The project encompasses three suites of technology to convert organic waste into a resource.

- **Pre-Treatment Process** involving screening and shredding to separate inorganic materials (for recycling and disposal) from the organic waste
- An **Anaerobic Biological Digestion Process** that generates methane-rich bio-gas for combustion in a gas engine to generate power for internal consumption and export excess electricity into the local power grid
- An Environmentally Controlled Composting Process that prevents noxious odours from escaping the facility, thereby enabling the recycling plant to be located in an urban environment and not creating any nuisance to the plant's neighbours.



IUT Singapore's Food Waste to Renewable Energy Biotechnology

An Overview of Power Generation and Grid Export



Relevance, Impact, Efficiency

The Project's ability to create resource from solid waste has high relevance in protecting the environment. It is also an alternative green energy source. This project will have the following positive impacts on any urban setting:

- 1. Reducing the volume of solid waste that ends up in a landfill therefore extending the life of existing landfills and postponing the need to create new landfills.
- 2. Eliminating organic waste (source of methane rich green house gas and the cause of most landfill fires) from landfills.
- 3. The ability to control noxious odours emanating from organic waste enables the project's plant to be located in an urban environment, closer to the source of organic waste.
- 4. Production and application of bio-compost for plant growth replaces the need to use mineral based fertiliser.
- 5. Treatment of organic waste via the project's anaerobic digestion process generates more renewable energy than the combustion process of an incineration plant.

ECO Special Waste Management Pte Ltd - Sewage Sludge Dehydration Using Thermal Energy Generated from Sludge Incineration (Winner, Off-grid category)

The Sewage Sludge Dehydration and Incineration project is the first project of its kind in Singapore and the biggest in South-East Asia which aims to minimise sludge landfill to avoid methane emission. The inexhaustible sewage sludge is incinerated, and the thermal energy produced from the combustion process is utilized on-site for the sludge dehydration process.

The incineration process reduces the volume of sludge dramatically, and at the same time, it completely eliminates methane production. With this project, 100,000 ton CO_2 emission is reduced annually and 2,280,000 MJ thermal energy is generate. About 22% of the thermal energy generated is used for sludge dehydration process which is equivalent to 13,000 m³ of natural gas being avoided daily.

3 This project is designed to maximize the sewage sludge as renewable fuel source to reduce the consumption of auxiliary fossil fuel with environmental compliances. It is achieved through the main six processes involve in the sludge treatment plant as illustrated below.



Schematic flow diagram of the sludge treatment processes

Relevance, Impact, Efficiency

4 Through this project, sludge as renewable fuel is fully utilized to substitute fossil fuel and generates renewable thermal energy to put in good use for sludge dehydration. Low carbon-intensity of natural gas is used as auxiliary fuel to maintain the sludge combustion in incinerator and generates minimum ash.

5 With the accomplishment of this project, greenhouse gas emission is greatly avoided and the life span of the only one landfill site in Singapore is extended.

6 Technology transfer and collaboration between Japan and the local company resulting from this project has built up the local capability in managing the Sludge Treatment Plant which can lead to the potential of replicating the project within the ASEAN region. The project has demonstrated its sustainability in the aspects of environmental, social and economic as well as promoting its renewable energy concept to mitigate the global warming impact.

Tampines Grande Building (Winner, New and Existing Category)

Tampines Grande is a cutting-edge and new generation green office. The building has achieved an Energy Efficiency Index (EEI) of 122kWh/m²/year (compared to the norm of 200kWh/m²/year for buildings) and is expected to achieve a minimum energy-efficiency of 30% higher than that of a standard commercial office building.

2 Tampines Grande embraces one of the largest and most extensive use of solar technology in a commercial property in Singapore. It has the first Solar Air-Conditioning System to generate sufficient air-conditioning for the atrium. The system uses 1,160m² of solar thermal panels to heat water up to 88°C which is in turn used by the adsorption chiller to produce chilled water to generate enough air-conditioning to cool the atrium.

3 The development is the also the first commercial project in Singapore to incorporate the use of Building Integrated Photovoltaic (BIPV) panels as part of the building's façade. Forty customised large sized 152 Wp amorphous silicon thin-film panels have been installed on its façade across an area of 140 square metres to give an output of 6 kWp. The customised BIPV panels form part of the façade cladding, replacing conventional glass that would otherwise have been used.

4 The building also maximised the use of its two rooftops, installing 101 kWp polycrystalline silicon Photovoltaic (PV) panels across a total area of 780 square metres. The estimated annual energy generated from the roof PV panels is 113,000 kWh. The rooftop system also doubles as a shading device for water tanks and reduces the heat transfer through the roof by shading it from direct sunlight.

5 Together, the BIPV and roof PV panels generate a total clean energy of 115,000 kWh/year, equivalent to the annual estimated electricity required to power up the lightings for the building's basement car park, which is 55 percent of the overall electrical lighting loads of common areas (including lobbies, corridors, staircase and toilets).

1. Building Integrated Photovoltaic (BIPV) and Photovoltaic (PV) Systems



6 In addition to highly efficient lighting fixtures, the building features lightsensors that automatically monitor perimeter lighting levels for the typical office spaces. There are also motion detectors to ensure lights are turned off when they are not needed. Other sensors monitor temperatures, CO₂ levels in offices, and CO levels in the basement carpark.

7 Taking a holistic life-cycle approach, Tampines Grande is an exceptional showcase of a sustainable green building – from design, to construction, maintenance and use. An effective twin-strategy of utilising passive low energy architectural design and energy-efficient features will lead to significant overall energy savings amounting to 2.7 million kWh per year and an overall reduction in CO_2 emission by approximately 1,400 tonnes per year for the entire building.

Fuji Xerox Towers (Winner, Retrofitted Category)

Fuji Xerox Towers is a 38 storey commercial building located at 80 Anson Road, in the heart of Singapore's Central Business District. It comprises a 3 storey basement carpark, an annexed 4-storey podium block with mixed retail/office units and a naturally ventilated atrium. Owned by City Developments Limited (CDL), this building attained the BCA Green Mark Gold Award in 2008.

2 CDL established Environmental, Health and Safety (EHS) Policy, reflecting the organisation's strong commitment towards a "Safe and Green" culture sets the strategic direction for all departments to take practical efforts to ensure effective EHS management so as to create a "Green" culture, conserve resources and prevent pollution.

3 Fuji Xerox Towers has implemented numerous energy conservation initiatives over the past few years and has achieved 23% reduction in electricity consumption (equivalent to S\$709,500 in 2009) over the last 3 years as illustrated in the chart below. It has achieved an Energy Efficiency Index (EEI) of 138.71kWh/m²/yr (compared to the norm of 200kWh/m²/year for buildings).



4 The followings are the energy conservation initiatives and their respective energy savings implemented at Fuji Xerox Towers:

No.	Description of Energy Conservation Initiatives	Savings per year (kWh)
1	Installation of motion sensors for all staircases	33,200
2	Installation of ultrasonic sensors for all toilets	171,000
3	Replacement of T8 fluorescent fitting to T5 lighting for common areas and carparks	60,000
4	Implementation of Carbon Monoxide Monitoring System to control carpark ventilation	58,000
5	Installation of photovoltaic sensors at carpark entrance/exit	1,800
6	Implementation of Heat Pipe System for 3 pre- cooled AHUs Pipe to reduce relative humidity in the room without having to consume energy	111,000
7	Upgrade Chiller Plant with all the equipment are VSD controls and implement Chiller Plant Optimisation Programme	2,378,000
	Total Savings	2,813,000

5 Knowing that the chiller plant is the major energy consuming system in the building, Fuji Xerox incorporated an automatic tube cleaning system for its chillers complete with optimisation of the cooling towers to enhance performance thus reducing energy consumption. This results in a substantial 50% reduction in energy consumption in the chiller plant system, translating to an impressive 2,378,000kWh savings in energy per year.



People's Association Headquarters (2nd Runner-up, New and Existing Category)

The People's Association Headquarters, located at 9 King George's Ave, is the former Victoria School. The site area is 2.6 hectares and the gross floor area is 14,300 square metres. It has a mix of conserved and new buildings. The existing 2storey classroom and school hall cum canteen building were conserved because of their historical significance and architectural value. They were refurbished and used as offices, meeting rooms, performance arts studios and other supporting facilities. The new 5-storey building houses the rest of the offices.

2 The feature roof over the 5-storey natural ventilated central atrium incorporates a 12kW peak power size BIPV system. The 'semi-transparent' BIPV panel also brings natural light into the atrium. A separate PV panel system with a total peak power of 1.8 kW is also installed on the roof of the covered linkway. Both the PV systems are grid-tie system. In this way, the power supply drawn from the Singapore PowerGrid will be correspondingly reduced by the amount of power generated by the PV system.

3 The air-conditioning system is designed to allow for cooling load variations and fluctuations in ambient air to ensure consistent indoor conditions for thermal comfort. This flexibility allows the saving of energy as the system does not need to work at full load condition consistently while maintaining the required thermal comfort and relative humidity.

4 The building also utilises an alternate circuitry method for the atrium, lobby, staircases, landscape, etc, such that 50% to 70% of lighting can be switched off after office hours and the lighting level can then be reduced to a security level. Motion sensor controls for lighting is implemented in all toilets, pantries and common facilities. All toilet exhaust fans are interlocked with the lighting switches.

5 The 5-storey office block employs various methods to control heat gain within the Building:



• Secondary canopy roof

A secondary canopy roof provides shade to the building's elevations and the surrounding blocks through its long overhang (up to 4.5m); it helps to protect the primary RC roof from direct heat gains from the sun. The secondary

canopy roof, which houses the integrated photovoltaic cells, also provides rain and weather protection to the 5 storey naturally ventilated atrium.

• "Breathable" wall

The services of the building are consolidated and arranged along the southwest facing facade. The façade is designed in an innovative way, using precast panels called the "breathable" wall. The peripheral core functions as a passive "breathing" wall, allowing the exchange of light and air while keeping the rain out.

• Sun shading devices

The office block opens up towards the field, in the direction of the morning sun. With the help of the secondary roof overhang and the sun shading devises along the perimeter (of all facades of main 5 storey office block except for the SW facade) most of the glare from the sun would be eliminated. The use of high performance double glazed low-e glazing together with the sun shading devices employed for this development which makes it ideal for the open-plan office layout employed to enable all staff to have views out into the field.

• Roof garden

Up to 1100 sq m of the roof in the development has been designed as a green roof, and this helps to:

- a. Reduce the heat gain through the roof into the building
- b. minimize the visual impact from surrounding buildings
- c. Helps reduce the surrounding ambient temperature