MINISTRY OF TRADE AND INDUSTRY SINGAPORE

For Immediate Release

10 LOCAL COMPANIES WIN THE 2018 ASEAN ENERGY AWARDS FOR SUSTAINABILITY

1. Senior Minister of State for Trade and Industry Dr Koh Poh Koon congratulated the 10 ASEAN Energy Awards winners for their efforts in driving sustainability designs and projects. The awards were presented at the 36th ASEAN Ministers on Energy Meeting (AMEM) Official Dinner held on 29 October 2018.

2. Launched in 2000 by the ASEAN Centre for Energy (ACE), the ASEAN Energy Awards is the region's highest recognition of efforts in energy efficiency, renewable energy and energy management. The Awards aim to encourage greater private sector interest to incorporate sustainable and innovative features into their projects in the region.

3. This year, Singapore emerged winners in three categories: (i) Energy Efficiency Building Awards – the highest accolade for energy efficiency in buildings, (ii) Green Building Awards – where buildings are assessed holistically based on their energy and water efficiency, environmental sustainability, and other innovative features, and (iii) Special Submissions – for projects that have used innovative technologies to reduce energy consumption and increase the use of renewable energy. (Refer to Annex A for more details on the awards and awardees.)

Green Building Awards - Small and Medium Green Buildings	
Winner	Sentosa Fire Station
1st Runner Up	IES Green Building at Bukit Tinggi
Energy Efficiency Building Awards - New and Existing Buildings	
Winner	SMU Law School
1st Runner Up	Our Tampines Hub

Energy Efficiency Building Awards - Retrofitted Buildings	
Winner	Keppel Bay Tower
2nd Runner Up	Alexandra Point
Energy Efficiency Building Awards - Tropical Buildings	
Winner	BCA Academy
1st Runner Up	Yishun Community Hospital
Special Submissions – Renewable Energy	
Winner	Floating Solar PV at Tengeh Reservoir
Special Submissions – Energy Efficiency	
Winner	Airbitat Smart Cooler by Innosparks

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4. Dr Koh said: “The number of local winners has increased from seven and nine in 2017 and 2016 respectively, to 10 organisations this year. This is testament to Singapore’s commitment towards a more resilient and sustainable energy future. Through innovative research in the areas of energy efficient designs and renewable energy technology, the awardees have showcased the efforts made towards the adoption of cleaner energy in our built-up environment. These winning projects also add to Singapore’s contributions to regional and global efforts for new energy solutions.”

5. Singapore, as the 2018 ASEAN Chair, hosted the 36th AMEM earlier today. It was held together with the 11th Singapore International Energy Week (SIEW), which is taking place from today to 2 November 2018. In line with Singapore’s ASEAN 2018 theme of “Resilient and Innovative”, the theme “Transforming Energy: Invest, Innovate, Integrate” will guide the discussions at this year’s AMEM and SIEW.

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ANNEX A

SINGAPORE WINNERS OF THE ASEAN ENERGY AWARDS COMPETITION 2018

Category	Award Recipients	Key Highlights
Green Buildings *Buildings are assessed based on its energy efficiency, usage of renewable energy, water efficiency, environmental sustainability, indoor environment quality, operation and maintenance features, and other green and innovative features.*		
Small & Medium Green Buildings	**Winner:** Sentosa Fire Station	• The 4-storey Sentosa Fire Station is the first fire station to attain the BCA Green Mark Platinum Award. • The station achieves low Envelope Thermal Transfer Value (ETTV[1]) through the introduction of air as insulation in walls and glass with low shading coefficient value[2], as well as the use of cool paint[3] to reduce solar heat gain. • The station features 100% LED lights with motion sensors in areas where continuous lighting is not necessary, such as staircases and toilets. • Solar thermal system which provides solar heated hot water to the showers. The use of solar photovoltaic (PV) panels on the rooftop contributes to 37.4% of energy savings per year. • The fire station is also controlled by a Building Management System that can monitor electricity usage, water consumption and leaks.
	1st runner up: IES Green Building at Bukit Tinggi	• The IES Green Building, completed in 2016, comprises a 3-storey institutional building housing office, meeting and training facilities and a basement car park. • The well-insulated building reduces both external heat gain and air-conditioning cooling load. With its highly efficient

[1] ETTV is the average of (i) heat conduction through opaque walls, (ii) heat conduction through glass windows, and (iii) solar radiation through glass windows, over the whole envelope area of the building.
[2] Shading coefficient is the ratio of solar heat gain (due to direct sunlight) through a glass unit to the solar energy passing through a 3 mm clear glass. The lower the range, which is from 1.00 to 0.00, the less solar heat is transmitted through the glass.
[3] Cool paint, usually a white coating containing transparent polymeric materials like acrylic, is the highest level of solar reflectance This is one of the mitigating technologies to reduce cooling loads in building as a passive building energy saving solution.

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		Variable Refrigerant Volume system[4], the cooling system's efficiency is rated at less than 0.75 kW/RT[5]. • Carpark and office spaces are designed to allow for maximum daylight penetration, reducing the reliance on artificial lighting. Motion sensors are installed in the carparks, stairwells and toilets, turning on lights as needed and reducing electricity use. Where necessary, energy-efficient fixtures such as T5 fluorescent lamps and LEDs are used. • Solar panel arrays spanning a total of 195 m^2 have been installed on the entire roof space to maximise the capture of renewable energy and reduce the operational carbon footprint. This generates approximately 25% of the building's annual power needs. • An intelligent Advanced Energy Management System has been installed in the building, which enables users to monitor electricity, water and gas consumption from any web-enabled device. This facilitates efficient decision-making on maximising energy saving opportunities, and encourages employees to take ownership of the process.

Energy Efficient Buildings *The highest accolade for energy efficiency in buildings*		
New & Existing Buildings	**Winner:** Singapore Management University (SMU) School of Law	• The SMU School of Law building is situated in the heart of Singapore's Civic District area and houses 8-levels (inclusive of 2 basements), equivalent to 23,000 m^2 of gross floor area. • The building's passive design responds to the sun's path with features like double glazing, low-emissivity[6] glass, fritted glass, external shading devices and greenery which minimise glare and heat absorption into the building. This in turn reduces overall building energy consumption. The average ETTV of the building is 37.74W/m^2.

[4] The variable refrigerant volume system of the air-conditioning plant is designed to specifically meet the needs of the building by constantly adjusting the amount of refrigerant. This enables the system to be activated only when needed, and hence offers high levels of energy efficiency.
[5] kW/RT or kilowatts (kW) per refrigeration tonne (RT): A refrigeration tonne is a unit of power used to describe the heat-extraction capacity of chiller equipment, and is defined as the rate of heat transfer that results in the melting of 907kg (a short tonne) of ice in 24 hours. On average, an aging or non-efficient cooler would have an efficiency of >1 kW/RT.
[6] Low-emissivity glass limits the amount of direct solar heat entering the building.

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		• The building features energy-efficient LED lighting with dimmable controls and an Intelligent Lighting Management System, which has provided the building with a lighting density of 5.8 W/m2.[7] • Its chiller plant system operates at a high efficiency of 0.54kW/RT with optimised, streamlined chilled water and condenser water pipes, and controls through the use of Variable Speed Drives for the pumps and cooling towers. Coupled with high efficiency chilled water fan coil unit (FCUs) and Computer Room Air-Handling (CRAH) units for all IT rooms and Data Centre.
	1st runner up: Our Tampines Hub	• Our Tampines Hub is Singapore's first integrated community and lifestyle hub with a vision to foster an active, creative and green Tampines. • Some of the design tools to promote sustainability include: envelope and façade design, natural ventilation, solar gain study, and computational fluid dynamics (CFD) simulation. For example, the orientation of the complex and building response to solar analysis has been studied and refined to minimise solar heat gain. At the same time, porosity of building is optimized based on wind direction to maximize the potential of natural ventilation. • The central air conditioning system design maximizes energy efficiency and is installed with high efficiency chillers, variable speed pumps and cooling towers. These features allow variations of capacity to match changing cooling loads, which enables system efficiency to be optimized at 0.583 kW/RT. • The extensive use of LED lights and energy efficient lighting has enabled an estimated 41% reduction of lighting power density compared to the baseline of 9.5 W/m^2. • Use of motion and lighting sensors in restrooms and at staircases ensures that lights are activated only when required. Photocell sensors also allow for electric lighting to be deactivated when daylight is adequate. • The provision of 830 Solar PV Panels above the stadium seating has a total capacity of 265 kiloWatt peak (kWp) and generates about 338 MWh annual to contribute almost 2% of the annual building energy consumption.

[7] The reference value for BCA Green Mark buildings is 10 W/m^2 (for common areas) and 15 W/m^2 (for office areas)

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Retrofitted Buildings	**Winner:** Keppel Bay Towers	• Keppel Bay Tower, an 18-storey office tower with a 6-storey podium and a basement carpark, has implemented several passive energy efficiency design features. • To reduce incident solar radiation into the building, low-emissivity, doubled glazed tinted façade glass, external horizontal shading devices on every floor of the east and west facing façades have been installed. • The chiller plant was retrofitted with an integrated measurement instrumentation, to monitor the parameters of the chiller plant to ensure optimal operating conditions so as to maximise energy efficiency. • Other energy efficiency initiatives implemented include a standalone energy management system with energy monitoring features, an auto-tube cleaning system for the chillers, and the use of an environmentally-friendly refrigerant. • The building uses motion sensors for staircases and toilets, Variable Voltage Variable Frequency drives for escalators and lifts, CO sensors at carpark, CO_2 sensors for all air handling units (AHUs) and a recycling system to pre-cool the AHU condensate water. • Keppel Bay Tower will be retrofitted with new and emerging technologies which will reduce the building's annual energy consumption by an additional 20% and to be developed as Singapore's first Super Low-Energy High-Rise Existing Commercial Building.
	2nd runner up: Alexandra Point	• Alexandra Point, a 25-storey office tower with a 5-storey annex carpark has embarked on an energy improvement programme. The retrofitting process included the complete retrofit of its chiller plant with the replacement to high efficiency variable speed multi-compressor chillers, installations of CO_2 monitoring and controls for the AHU, motion sensors among others. • The chiller plant was retrofitted with an integrated measurement instrumentation which monitors the parameters of the chiller plant to ensure optimal operating conditions, thereby maximising its energy efficiency. This resulted in an improvement of the chiller plant efficiency from 0.87 kW/RT to 0.538kW/RT, which translates to energy savings of 550MWh per year. • Alexandra Point was able to achieve 37% energy savings by replacing lighting in stairs and lift lobbies with energy-efficient LED lighting.

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		• Other passive design features adopted include using double glazed low-emissivity glass which has reduced the thermal heat transfer into the building by around 10%, natural ventilation design for its carpark and maximising daylight for the office tower lobby.
Tropical Buildings	**Winner:** Academic Tower at BCA Academy	• The Academic Tower comprises auditoriums, seminar and lecture rooms, labs, library for training students and professionals in the BCA Academy. • The building is staggered to create overhang verandas with outdoor breakout spaces and study corners for students. Its external skin, designed with calculated studies on sun paths, comprises a series of optimal sun-shading fins with vertical greenery to create a micro-climate of good thermal comfort. • The mechanical and electrical services of the building are exposed to provide students with a better appreciation of real-life examples of good design and practice in the installations at the campus. The Academy has achieved energy savings of 1,900 MWh annually, with the chiller plant operating at an efficiency of 0.578 kW/RT. • The BCA Skylab, situated on the rooftop of the Academy, is the first-of-its-kind in the world with a rotatable research and test-bedding facility. The Skylab enables the private sector and research organisations to test innovative building energy efficiency technologies under real world conditions. • The air-conditioning chiller plant, situated on the rooftop Education Deck, is designed to be a spacious "classroom" for students to learn about efficient chiller plant design. • In addition, the Academy has installed solar PV panels with a capacity of 34.5 kWp, and which doubles as sheltered link-way to the rooftop.
	1st runner up: Yishun Community Hospital	• The design of the Yishun Community Hospital optimises natural ventilation in the inpatient wards. Computational Fluid Dynamics (CFD), or simulations of air movement, was used at the development stages to create an airy and comfortable environment for patients, visitors and staff. This has also resulted in more than 40% savings in energy usage. • "Dual Mode Switches" have been installed for the air-conditioned wards to provide patients with the option to

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		have the air-conditioning unit automatically switched off when they open windows for natural ventilation. • "Pre-cooling of Fresh Air" for the AHU harnesses available cool energy from the outgoing airflow to lower the temperature of the incoming fresh air. • LED lights and "T5" fluorescent tubes with electronic ballasts are used to achieve higher energy efficiency in the lighting system. • Intelligent controls for lighting systems, through motion sensors, photocell sensors and programming in the Building Management System have been installed.

Special Submissions *For projects developed using innovative technologies in areas like materials, system application, design, among others, to reduce energy consumption and increase the use of renewable energy*.		
Renewable Energy	**Winner:** Floating solar photovoltaics (PV) testbed at Tengeh Reservoir, Singapore	• The Solar Energy Research Institute of Singapore (SERIS), in collaboration with the Singapore Economic Development Board (EDB) and the Public Utilities Board (PUB), has designed, implemented and is operating the world's largest testbed for floating solar PV at Tengeh Reservoir, Singapore. • The test-bed will allow the researchers to develop a thorough understanding of the various implications of floating solar PV on the water body and the presumed benefits from the cooling effect, which potentially leads to higher energy yields of the Solar PV, and reduced water evaporation. • The testbed consists of 10 largely different floating solar PV installations of ~100 kWp each, using commercially available technologies from Singapore and around the world. • A comprehensive sensor network has been installed to collect ~500 different parameters in real-time for the scientific analysis of the testbed. • The knowledge generated from this testbed is being compiled in a guidebook on behalf of the World Bank Group (World Bank, IFC).
Energy Efficiency	**Winner:** Airbitat Smart Cooler	• The Airbitat Smart Cooler developed by Innosparks is the world's first portable cooler delivering energy-efficient

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	by Innosparks, an ST Engineering Open Lab	cooling with a small carbon footprint which outperforms equivalent products in the market. • It delivers cool airstreams as low as 24^{o}C in hot and humid environments without using refrigerants, and enables up to 80% energy savings compared to conventional air-conditioning. It does not require a compressor and generates negligible waste heat. • It also features an intelligent system which continuously detects ambient environment and adjusts its mode of cooling to deliver energy-efficient cooling air. • The technology has been successfully deployed in commercial and industrial urban spaces, such as the Singapore Mandai Zoo, Resorts World Sentosa, and CHIJMES.

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