



## **MEDIA RELEASE**

### **Singapore's Zero Energy Building (ZEB) On-Track to Meet Net Zero Power Consumption**

Almost one year into its operation, the Zero Energy Building has achieved zero power consumption and a surplus of 16.3 MWh (megawatts/hour) of electricity. The power surplus translates to savings of about \$3,900 per month for 35 units of <sup>1</sup>HDB 5-room flats at residential electricity tariffs at <sup>2</sup>24.13 cents/kWh (kilowatts/hour). With the power surplus generated, this BCA's flagship R&D project is on-track to achieve its target of net zero energy consumption in October 2010, at its first year anniversary.

2. Located at BCA Academy in Braddell, the ZEB, a super energy efficient building, is the first existing building in Southeast Asia to be fully retrofitted with green building design features and technologies. Passive Design and Active Solutions, a two-step, integrated design approach was employed to ensure that the ZEB was 40-50% more efficient than a typical office building.

3. Through 'Passive Design', the project team comprising researchers from NUS (The National University of Singapore) and practitioners from the private sector, managed to minimise heat transfer through the building envelope via design features such as greenery systems, light shelves and sun-shading devices. This was followed by a well conceived installation of 'Active Solutions' such as energy efficient air-conditioning system, high efficiency lighting including motion sensors and carbon dioxide (CO<sub>2</sub>) sensors.

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<sup>1</sup> National average consumption for HDB 5-room flat is 0.457MWh per month from SP Services

<sup>2</sup> Residential electricity tariff from Energy Market Authority and SP Services

4. Dr. John Keung, BCA's CEO, said "Besides bringing our vision into fruition, it is something that we strongly believed in and set out to do, and for this reason that the ZEB has placed Singapore favourably in the world green building map. From achieving innovation and engineering excellence, we have also enhanced sustainability in the built environment through advanced green building technologies. Together with our key partner, National University of Singapore (NUS), the ZEB will continue to serve as a test-bed for integration of Green Building technologies (GBTs) in existing buildings and will maintain as a hub for practitioners and students in the study of energy efficiency and green buildings".

5. To achieve net zero energy power consumption, the building has to produce its own electricity. Facilitated through an EDB-funded solar power system, about 1,540 m<sup>2</sup> of solar energy (photovoltaic) panels or a combined area bigger than an Olympic-sized swimming pool were installed on ZEB's roof and other prominent areas to tap on the sun's energy. (Please see Annex A for details on performance statistics of the ZEB.)

6. One of the key researchers in the ZEB project team is Stephen Wittkopf, Associate Professor at NUS and Director of the cluster Solar and Energy Efficient Buildings of the Solar Energy Research Institute of Singapore (SERIS). He is heading the design and research on building integrated photovoltaic and advanced daylighting of the zero-energy building.

7. Commenting on the ZEB's objective, Prof Wittkopf said, "The main target of the project was to demonstrate that the concept of a zero-energy building is possible even in the tropics, where high air-conditioning loads make up more than 50% of the electricity consumption of buildings. After almost one year of analytical energy monitoring we are happy to confirm, that we have achieved this target. The building integrated photovoltaic (BIPV) systems have generated a surplus of electricity which is fed back into the BCA premise grid".

8. Prof Wittkopf, added, "Another objective is to provide a demonstration building to showcase and test bed different Green Building Features in operation. Every time, I bring overseas colleagues they are impressed by the wide range of photovoltaic

(PV) technologies and types of integration (roof, facade, window, shading, railing etc). The innovative double glazing with embedded switchable electrochromic layers, thin film PV and motorized blinds attracts a lot of attention as well as the vertical and horizontal light pipes, where daylight is channelled deep into the interiors”.

9. The ZEB has drawn interest from 7,000 visitors from various local and international academia, corporates, government organisations and the public since its opening. Recently, it was also awarded with the IES Prestigious Engineering Achievement Award from the Institute of Engineers Singapore (IES) on 4 September 2010. This is the latest addition to the other awards conferred on ZEB and BCA (Please see Annex B on award details).

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### ***About BCA***

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

At BCA, our 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, we aim to differentiate Singapore's built environment from those of other cities and contribute to a better quality of life for everyone in Singapore. Hence, our vision is to have "the best built environment for Singapore, our distinctive global city".

Together with our education and research hub, 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](http://www.bca.gov.sg).

### ***About the Zero-Energy Building (ZEB)***

The Zero-Energy Building is the first building in Singapore and Southeast Asia to be retrofitted with green building technologies. Converted from a three-storey school building, Zero-Energy Building now houses classrooms and offices, and is a testing centre for green building technology.

The 4,500 m<sup>2</sup> Zero-Energy Building generates its own electricity from solar power through 1,540m<sup>2</sup> of panels installed on its roof and other prominent places. It is expected to generate about S\$84,000 a year through energy savings by using green building technology, incorporating the building's natural cooling and lighting elements in its design, and tapping on solar energy.

## Annex A

### Performance Statistics of the ZEB: October 2009-June 2010

<b>S/N</b>	<b>Electricity Generated/ Electrical Consumption</b>	<b>Power (MWh)</b>
1)	Cumulative Electricity Generated (Solar Power	151.0 MWh
2)	Cumulative Building Electrical Consumption	134.7 MWh
3)	Average Monthly Electricity Generated	16.8 MWh/month
4)	Average Monthly Building Electrical Consumption	15.0 MWh/month
5)	Average surplus generated electricity per month	1.8 MWh/month
6)	<b>Electricity Savings</b> ( <i>Difference of 1 and 2</i> )	<b>16.3 MWh</b> <b>(surplus)</b>

## Annex B

### IES Prestigious Engineering Achievement Award

BCA received the IES Prestigious Engineering Achievement Award awarded by the Institute of Engineers Singapore (IES) for the ZEB, recognised as an outstanding achievement or project, on 4 September 2010.

The award recognises engineering achievements that demonstrate outstanding engineering skills which have made a significant contribution to the engineering progress and the quality of life in Singapore.

### Awards in 2010

Award	Initiative
Ministry of National Development (MND) Minister's Team Awards for Singapore Green Building Week and Zero Energy Building	It recognises officers for their contributions to the Ministry and to the country. The winning teams manifest the spirit that MND seeks to nurture in its officers, that of innovation and collaboration, and a deep sense of commitment, with the knowledge that they work to better the lives of fellow Singaporeans. Their projects achieved impactful results, and are representative of MND's work and mission to create a better home for all Singaporeans.
BCI Green Design Award (Green Leadership Award - Institutional Architecture)	Launched by the BCI Group of Companies, this award recognises innovative and environmentally responsible architecture that has been designed, built and commissioned in Asia
The Aspen Institute Energy and Environment Award (Government Award)	Created by the Aspen Institute Global Leadership Network, it recognizes and rewards excellence for those making a real and concrete contribution to innovation, implementation, and communication of energy and environmental solutions.  Enhancing Sustainability for the Built Environment - For government leadership in designing and implementing policy or programs that promote utilization of new energy technologies, or energy and environment conservation efforts

## Annex C

### Photos of Zero Energy Building



**Façade of ZEB**



**Solar Panels**



**Solar Chimneys**



**Rooftop Garden**