

BCA ACADEMY

BCA Braddell Campus,  
Singapore



# Explore

## Overview

BCA Braddell Campus supports the living lab concept on expanded research, innovation and training with key focus on environmental sustainability, construction productivity and quality in Singapore. It has purpose-built immersive facilities and systems, which is adaptive and responsive to the occupants and environment. This gives vast opportunities for developers to pool resources and bring their capabilities together to develop real life solutions to users. It provides a “sandbox” for businesses along with different innovators to create, connect and collaborate to prove ideas or discover new solutions. Imagine an innovator, researcher or entrepreneur working on a project to reduce carbon footprint, can partner with an AI specialist within the same platform to scale solutions easily. This ecosystem will continuously breed innovation and extend it to the real world.

The BCA Braddell Campus has a total floor area of 73,768m<sup>2</sup> on a site area of 50,746m<sup>2</sup>. It comprises a good mixed of six low rise buildings to house offices, a flagship 10-storey academic building completed in 2016 and two new iconic buildings to be completed soon for research into new products and technologies and launching new events.





The Academic Tower was recognised for its excellent passive designs, with cutting edge solutions and technologies, that it won the ASEAN Energy Awards for Tropical Building for Singapore for the first time in 2018.

## Academic Tower

The Academic Tower at BCA Braddell Campus is a part 10-storey and part 6-storey institutional building with GFA of 23,054m<sup>2</sup>. The building is linked to the existing buildings via walkways, and contain lecture theatres, lecture rooms, gallery space, break-out study areas, library, training rooms, offices, labs, ancillary rooms and a Research Test Bed Facility.

The pavilion takes centre stage in the campus, providing connectivity to all buildings in the campus. The garden binds all the buildings within BCA Academy forming a green courtyard shaded with the large canopy of the existing rain trees. The reflective pool running across the garden not only provides some respite for visitors and students from the tropical heat but also adding a pensive mood to the garden.



The Academic Tower itself is a highly intelligent building with thousands of input/out points and network integration engine to enable 3<sup>rd</sup> party connectivity from any web browser device. It is designed to constantly respond to the environment to achieve interior comfort and optimal energy consumption. This open opportunities for researchers, product providers, specialists from various fields to test bed solutions targeted at improving the building performance further.

The architectural, structural and M&E systems are also coordinated in Building Information Modeling (BIM) format. It provides rich data in 3D format to develop digital twin representation of the building. Developers can simulate solutions on virtual models with cloud-based data captured though the new 5G network.

Being a flagship project of BCA, the Academic Tower showcase the various initiatives that BCA is championing. The building reflects a technologically advanced and productive construction industry and a future-ready built environment. It boasts exceedingly high energy savings of 35%, which far exceed 30% for the GM Platinum criteria in 2015. This is a good platform for researchers to exhibit practical solutions to scale up the energy savings further to meet the new SLEB Criteria.

# Explore

## BCA SkyLab

The BCA SkyLab is a rotatable laboratory erected on the roof of the lower extension of the Academic Tower. It is the first-of-its-kind in the world, a rotatable research facility to test bed materials, components and systems under real world conditions in building energy efficiency. The BCA SkyLab strengthen Singapore's position in nurturing ground-breaking research and as a leader in energy — efficient buildings in the tropics.



## ZEB Plus

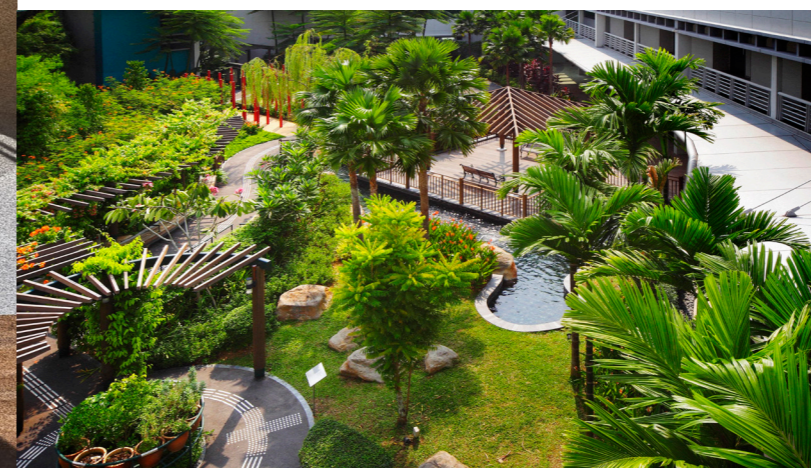
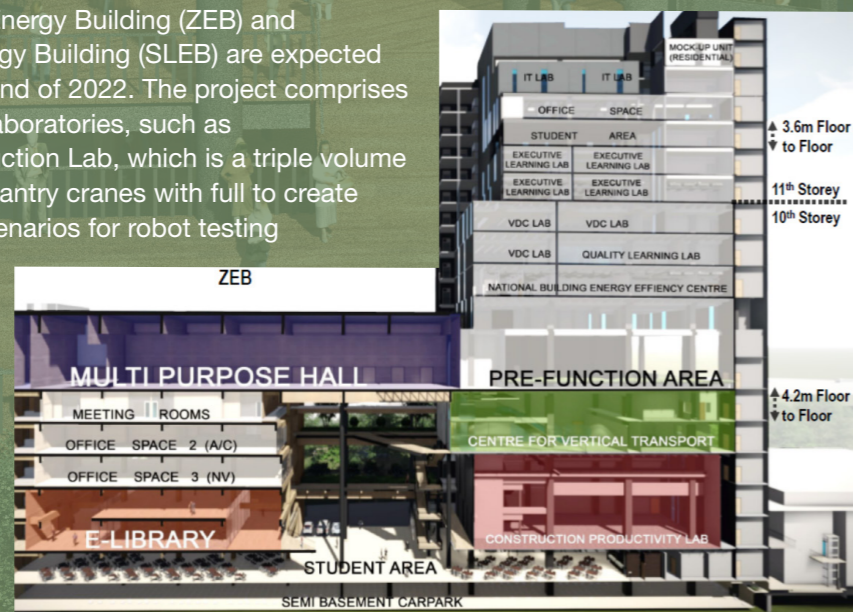
One of the low-rise buildings was retrofitted and transformed to a Zero Energy Plus Building the first in South East Asia. We challenged ourselves by picking a 3-storey existing building with its main façade facing West to test this concept and worked closely with engineers, researchers and occupants to develop and implement innovative solutions. Passive and active systems were carefully designed, optimised and integrated to respond to the occupants need and deliver the energy target, including measures such as solar chimneys, passive displacement ventilation, smart lighting, etc. Through these measures, we managed to reduce the energy consumption by 40% compared to the reference building.



## ZEB & SLEB

The iconic 7-storey Zero Energy Building (ZEB) and 16-storey Super Low Energy Building (SLEB) are expected to complete towards the end of 2022. The project comprises purpose-built immersive laboratories, such as

- The Construction Production Lab, which is a triple volume space with availability gantry cranes with full to create various construction scenarios for robot testing
- Co-Innovation Labs for design and simulation on construction technology
- Various application mock-ups to test façade performance, acoustic and smart controls, thermal comfort, and energy consumption

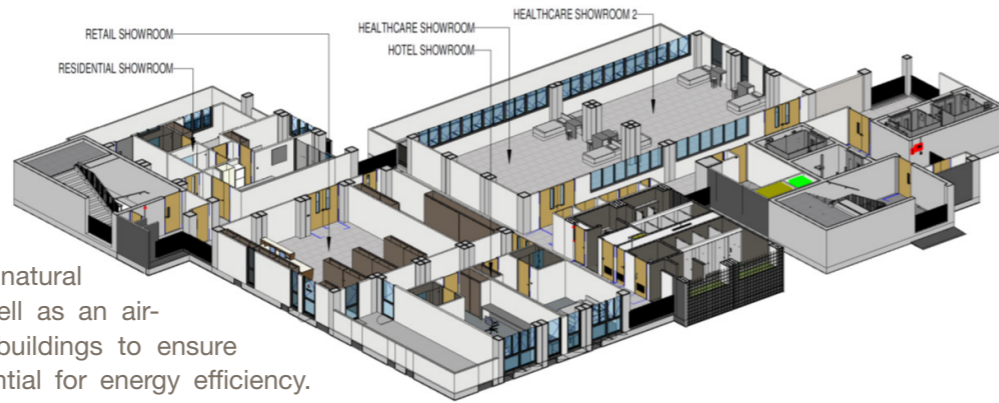


## Sensory Garden

The low-rise buildings mainly serve as office in the campus. The buildings overlooked into the beautifully landscaped courtyard and therapeutic sensory garden, which give a sense of tranquility to occupants. A therapeutic environment spark creativity flow that is most needed for exciting challenges.

# A Living Lab

Spaces within the new buildings will either be used as Living Labs. A suite of state-of-the-art cooling, ventilation and dehumidification technologies – Mixed mode ventilation system consists of natural and mechanical ventilation modes as well as an air-conditioning mode are installed in the buildings to ensure thermal comfort and maximize the potential for energy efficiency. Complex Intelligent Control System is integrated with multiple technologies together with IoT solutions (sensors) to provide control feedback. The data analytics model is subsequently used for controls to meet occupant preference. Researchers can propose individual technologies to be integrated and demonstrated as proof-of-concept in the various readily available mock-up space. With integration of multiple technologies, innovative designs and controls, there is a potential to unlock greater energy efficiency to support the Singapore’s grand vision to achieve super low-energy buildings.



The 4<sup>th</sup> and 14<sup>th</sup> storey office space are designed to be naturally ventilated, where staff can work in, and researchers shall gather data from the living environment to determine its variability to make future improvements. Besides thermal comfort, the façade should have sufficient opening to achieve a good wind flow and is also able to sufficiently muffle out traffic noise. There is the additional consideration of wind driven rain. As such, researchers can study various configurations of plenum windows, combined with automatic blinds that are able to provide good ventilation rates and acceptable noise insulation levels. The buildings façade is designed to be demountable to allow testing of various building envelope systems that are close to prototype stage.

# Advanced Construction Technologies



The buildings also adopt advanced construction technologies such as Mass Engineering Timber (MET), Advanced Precast Concrete System (APCS) and PPVC to improve construction productivity. The 7-storey ZEB will be constructed using a hybrid of MET and steel, with lift shafts and staircases in stainless steel. The 16-storey SLEB will feature Advanced Precast Construction System (APCS) for the 1<sup>st</sup> to 10<sup>th</sup> storey and Prefabricated Prefinished Volumetric Construction (PPVC) for the 11<sup>th</sup> to 16<sup>th</sup> storey. The lift cores will be constructed in APCS throughout whilst the toilets will be using PPVC throughout. A sensor network can be developed and implemented for providing real-time monitoring of moisture content, end grain condition, delamination, deflect monitoring and corrosion check on screws and fasteners to predict the conditions of the components.



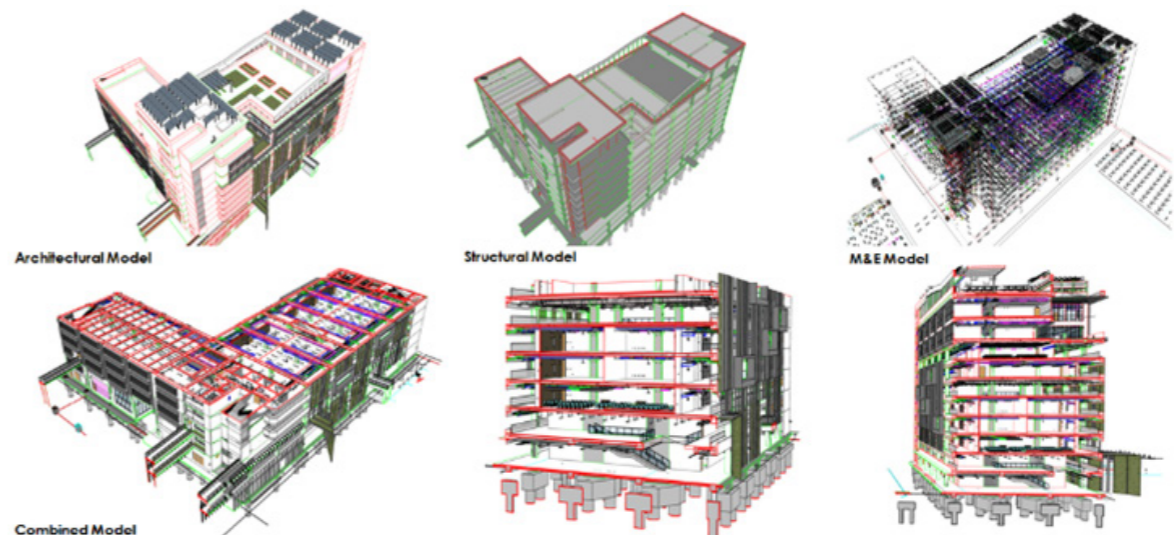
## Crane Yard

The open outdoor crane training area also creates ample opportunities for close collaboration to test bed production techniques or operation of heavy machinery perhaps for 3D printing or crane operation automation.

# Explore

## Functional Design

- Unlike most conventional practices, throughout the building, mechanical & electrical services are exposed and not concealed. Students are in a better position to appreciate the designs and observe for themselves real-life examples of good design and practice in the installations at the campus.

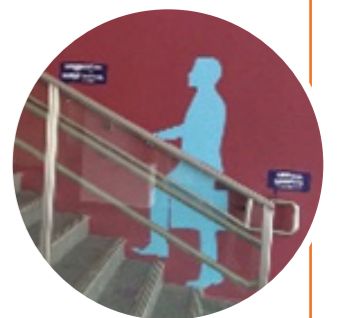


- Building Information Modelling (BIM) has been extensively used in the design and construction phase. Before the commencement of actual works, the contractor, using the design model from the consultant, was able to further build up the model and performed construction sequencing. This helped them to do the initial site planning, considered site safety issues and improve construction sequencing. It also helps to optimize energy performance by identifying more naturally ventilated space, eliminating piping sharp turns and cut down on artificial lighting to space.



- The chiller plant at the Academic Tower roof deck serves two purposes - functional and educational. It is designed as a spacious room so that students can learn about how an efficient chiller plant is designed. This is unlike conventional chiller plants which are congested, dimly lit and where pipes are not labelled.

- The building is also designed to be inclusive. It is not only barrier free but also provides clear and intuitive wayfinding through seamless connectivity. The floors are zoned for different users, with adequate social and interactive space for all. In addition, interesting features such as life-sized graphics are laid on walls for educational purposes and induction loops are fitted in lecture theatres that transmit sound source directly to hearing aid for the hearing impaired.



# Green Features







- We have retrofitted one of our existing buildings to a ZEB Plus Building, the first in South East Asia, with target of energy surplus up to 40%.
- The existing Academic Tower was recognised for its excellent passive designs, with cutting edge solutions and technologies, that it won the ASEAN Energy Awards for Tropical Building for Singapore for the first time in 2018.
- The BCA SkyLab, which is the first-of-its-kind in the world, is a rotatable research and test bedding facility to test technologies under real world conditions in building energy efficiency.
- BCA Braddell Campus is also expected to generate 20% of its energy consumption through renewables at steady state; the highest in any other institutions.
- We are committed to reduce electricity, water and waste consumption and carbon emission more than the Government targets for all Government buildings by 2030.
- The new 7-storey Zero Energy Building (ZEB) and 16-storey Super Low Energy Building (SLEB) are expected to achieve ZEB and SLEB certification with stretched outcomes above the prerequisites, such as higher energy savings and lower EEs, for such buildings. In addition, we are test bedding solutions in the buildings, such as Natural Ventilated Office, hybrid cooling systems for mock up units, innovation labs for lighting technologies, etc.



# Spaces for Leasing/Rental

Office, Research Lab & Co-working Spaces available.

|   |  |   |
|---|--|---|
|  <p><b>OFFICE</b><br/>Blk B &amp; C - 3,028m<sup>2</sup><br/>Phase 2 - 1,813m<sup>2</sup> (Level 4 &amp; 5)<br/>Blk H - 842m<sup>2</sup></p>               |  <p><b>CO-WORKING</b><br/>Blk F - 1,369m<sup>2</sup><br/>Blk G - 787m<sup>2</sup></p> | <p><b>RATES*</b> (inclusive of 15% charges)<br/><b>Office Rental:</b> \$2.00 to \$2.20 psf per month*<br/><b>Empty Workshop or Research Space:</b> \$1.20 to \$1.40 psf per month*</p> <p><b>SHARED FACILITIES</b><br/>Library, gym &amp; meeting rooms</p> <p><b>OTHER FACILITIES</b><br/>Hall, auditorium, IT rooms, Classrooms, seminar rooms fitted with state-of-the-art AV systems and new learning tools at attractive prices</p>  |
|  <p><b>RESEARCH</b><br/>Academic Tower - 389m<sup>2</sup> (CPC Gallery)<br/>Phase 2 - 3,288m<sup>2</sup> (Level 3, 8 &amp; 13 Collab Area &amp; Labs)</p> |  |   |

For leasing of spaces, please contact **6850 5055** 

# Our Key Partners

|   |  |   |   |
|---|--|---|---|
|  | <p><b>Singapore Green Building Council</b> chart the drive for a world-class and sustainable built environment to reach the goals for The Singapore Green Plan 2030.</p>               |  | <p><b>SIFMA</b> spearhead efforts to uplift the FM Sector by adopting advanced solutions with data driven services.</p> |
|  | <p><b>Singapore Society of Project Managers</b> representing 400 members promote the use of technology and initiatives to raise the profile and productivity of the local industry</p> |   |   |

**Built Environment Research and Innovation Institute (BERII)** assist the Built Environment Sector to leverage on technologies to improve capabilities and productivity through managing the various funding schemes.

