

THE ACADEMIC TOWER

@ B C A A C A D E M Y

The BCA Academy is the education and research arm of the Building and Construction Authority (BCA). We pride ourselves on providing practical and hands-on learning for students and working adults in the built environment sector.

The Academic Tower is a new extension built to facilitate experiential learning. It allows the students to learn and experience how a building **'lives'**, **'breathes'** and **'interacts'** with its occupants.

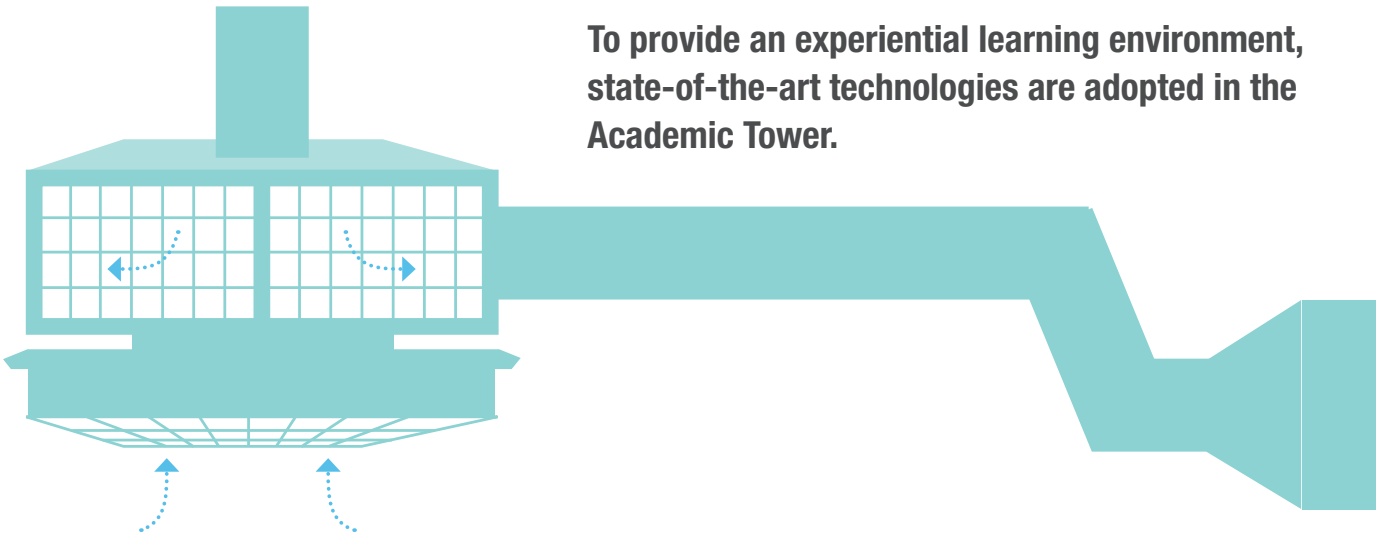


Building and Construction  Authority

We shape a **safe**, **high quality**, **sustainable** and **friendly** built environment.

AN INNOVATION HUB

To provide an experiential learning environment, state-of-the-art technologies are adopted in the Academic Tower.

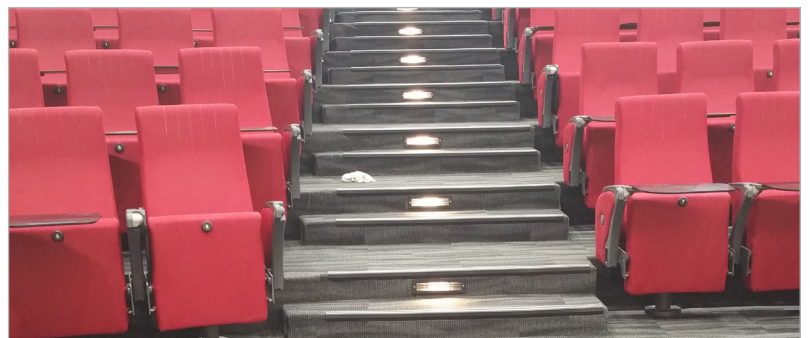


DEDICATED OUTDOOR AIR DUAL WHEEL SYSTEM & ACTIVE CHILLED BEAMS

Fresh air is cooled and dehumidified at the dedicated outdoor air dual wheel system. Primary air is then supplied to the space through the active chilled beams, inducing space air through the cooling coil. With the use of heat-exchange wheels at the outdoor unit, primary air is cooled to a lower dew points with less energy, improving system performance.

PASSIVE DISPLACEMENT VENTILATION SYSTEM

Deliver cool supply air for the auditorium at very low velocity through diffusers at or near floor level and returning it at ceiling level. This stratified performance of temperature provides 5% energy savings over conventional mixed ventilation system.

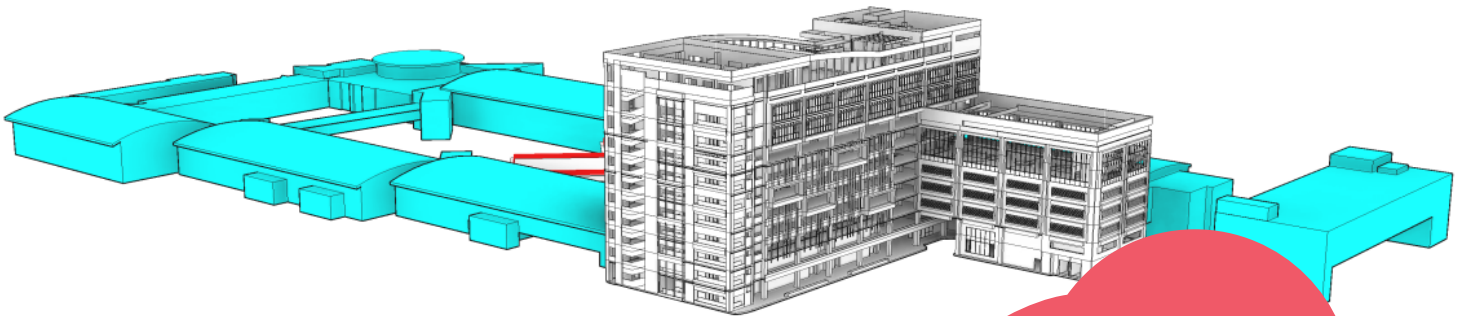


INTEGRATED BUILDING MANAGEMENT SYSTEM

Web-based building management system is remotely accessible from any location and anytime using any web-enabled devices. It provides comprehensive facilities management of key operational activities with analytical tools to report and monitor energy performance, operational status of equipment and systems, resource planning and scheduling. These are useful tools for displaying useful data and information for a real life learning environment.

DRIVER OF CONSTRUCTION PRODUCTIVITY

The building adopts highly buildable and productive design, methods and materials. Prefabricated and Precast elements are used extensively.



3-D modelling is used extensively in the design and construction stages. Animated model done by BCA Academy students are used to visualise the final outcome.

**BUILDING
INFORMATION
MODELLING
(BIM)**

Fabric air-con ducts provide
86%
manpower
savings compared
to conventional
galvanised sheet
duct

88%
of the structural
components are
precast concrete

Constructability
Score of
70

*well above the mandatory
minimum of 40*

Buildable Score of

80

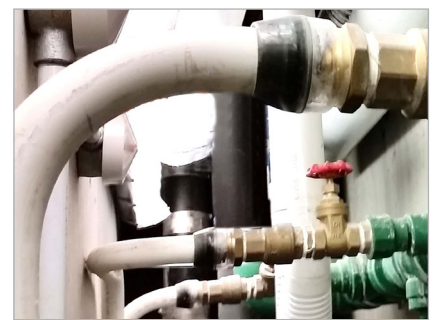
*way above the 66 points
required for projects under
the Institutional Building
Category*



Lightweight Precast Concrete Panels (recycled content 30%) and prefabricated steel stiffeners. Improve productivity by 150%.



Pre-insulated chilled water pipes eliminate corrosion due to poor site quality control and save manpower by 30%.



“PEX” polyethylene water pipes
Light and flexible pipes that come in bundles are easy to handle and bend around obstacles and corners.



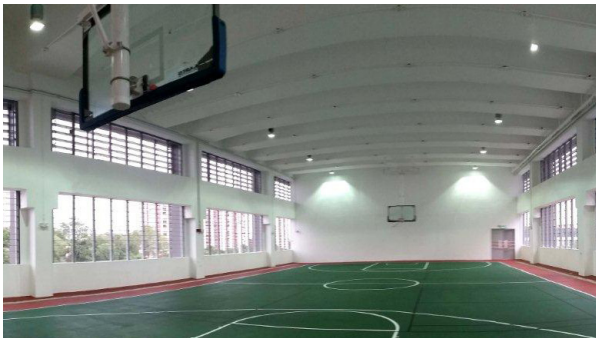
BCA GREEN MARK

LEADER IN SUSTAINABILITY

Won Green Mark Platinum Award in 2014 with excellent passive design, sustainable installations and cutting edge energy and water efficient technologies.

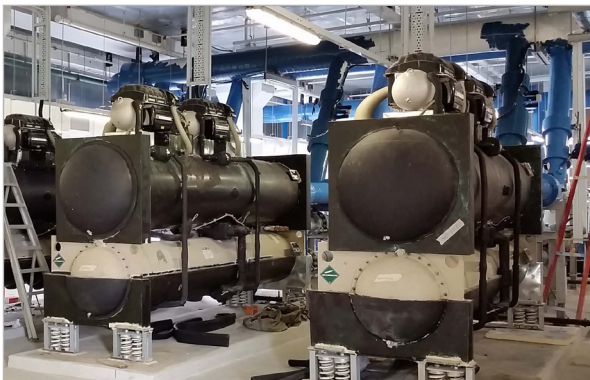


Reduces energy usage by **967,057kWh** per year or **35%**, compare to a similar building. Equivalent to energy used for 210 units of 4-room HDB flats per year.



Light Emitting Plasma (LEP) luminance provides higher lighting intensity (200-250 Lumen/W) than the conventional High Intensity Discharged (HID) lamps (80-150 Lumen/W).

Brushless Direct Current (BLDC) motor consumes up to 70% less power than an AC motor for Fan Coil Unit.



Magnetic bearing centrifugal chillers Rotating shaft levitating on a magnetic field eliminate mechanical friction loss and allow lubricant-free operation. Reduces maintenance costs and provides energy savings of up to 57%.



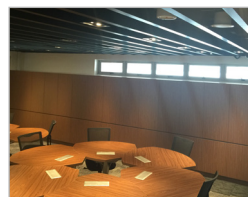
Saves **4,750m³** of water per year is equivalent to water in 1.5 Olympic Size Pool.

Water-Efficient Features

- The building is fitted with efficient fittings under the Water Efficiency Labelling Scheme (WELS) and has been awarded the PUB Water Efficient Building Certificate.
- Rainwater is collected and harvested for irrigation use.
- 62% of condensate water from the air-conditioning system is re-cycled.
- Non-chemical water-treatment is for cooling tower, improving the Cycle of Concentration (COC) and reducing the make-up water required.



Cut **480 tonne** of CO₂ per year



Passive Design

- Long naturally-ventilated corridors along N-S orientation to optimise airflow
- Clerestory windows for all classrooms to admit daylight and fresh air
- Sun pipes and skylight to illuminate the top floor

AN INCLUSIVE CAMPUS

Won UD Mark Gold^{Plus} Design Award.



Zoning of Floors

for different users
to promote informal
interaction between
teachers and
students



Clear and intuitive **way-finding system** through
seamless connectivity



Barrier Free
design



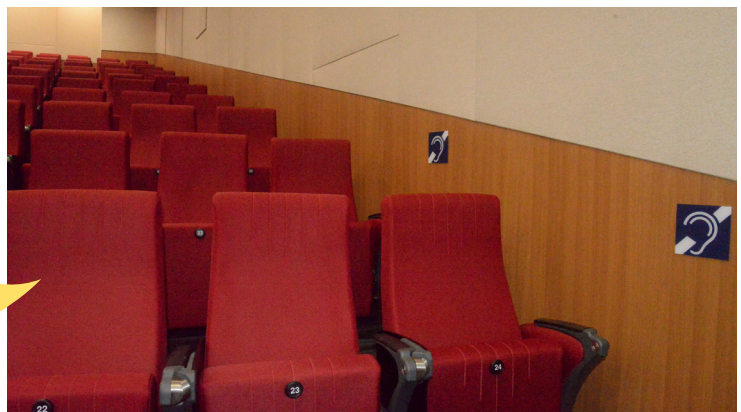
Life-sized graphics
are laid on walls, stair
case landing, lift,
handicapped toilet for
educational purposes.



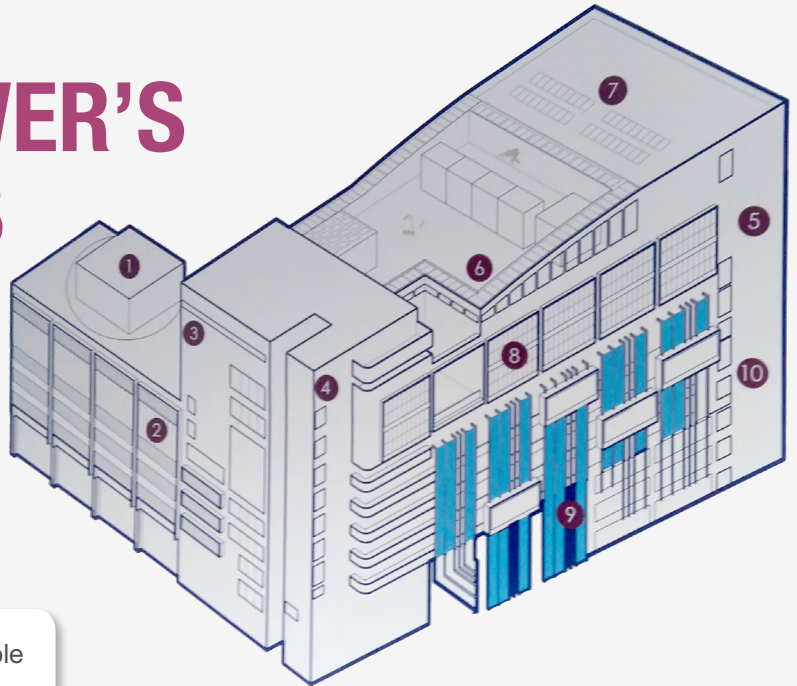
All common
corridors are 3m
wide, allowing easy
and unhampered
movement for
disabled users.



Induction loops
are fitted in lecture
theatres to help the
hearing impaired.



ACADEMIC TOWER'S ACHIEVEMENTS



01

World First High-rise Rotatable Laboratory for the Tropics

02

First in Singapore to use Light Emitting Plasma (LEP) Lighting

03

First in Singapore to use 20% Recycled Concrete Aggregate, 10% Washed Copper Slag, 20% Ground-granulated Blast-furnace Slag for Green Structural Concrete in High-rise Building

04

100% Reuse of Concrete Waste from Demolished Courtyard as Recycle Concrete Aggregate

05

88% Precast Concrete Used for Structural Components

06

Roof Educational Deck Showcasing Efficient Chiller Plant, PV Panels, Semi-sheltered Linkway, Green Garden Lab, Sun Pipes, Viewing Gallery and Rain Sensors

07

Test Bed for AC System

Ductless FCUs, Chiller Plant, AHU Systems, CO₂ Sensors, Passive Displacement Ventilation, Chilled Beam System, Fabric Ducts, Underfloor Displacement and Integrated Building Management System

08

EEI - 45kWh/m²/yr

Achieved through the use of Photo and Motion Sensor, Sunpipes, 45-degree Elbow Chilled Water Pipes, Double Glazed Tinted Low-E Glass, Efficient Lighting Design, Naturally Ventilated Corridors, Lift Lobbies, Toilets and Staircases

09

Highest Constructability Score of 70

Light Weight Precast Concrete Panel and Prefabricated Steel Stiffeners Labour Saving Products and Tools, and extensive use of BIM

10

4,750m³ of Water Saving per year Equivalent to water in 1.5 Olympic Size Pool