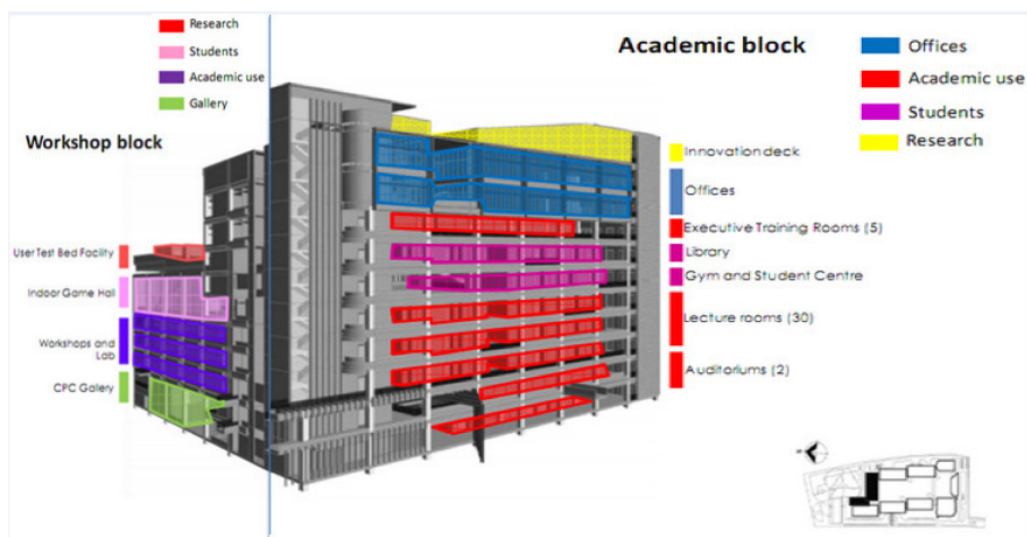


BCA ACADEMY

Green Building User Guide





Foreword

This Green Building User Guide details green features in the BCA Academy and explains how they help to minimize negative impacts on the environment, through the reduction of energy and water usage and maximising the reuse of discarded items on campus.

These green features reduce the Academy's environmental footprint and plays a part in curbing global warming by the reduction in the emissions of greenhouse gases, although these emissions may be prevalent upstream in the production process, such as factories or power stations.

To inculcate an environmentally responsible behaviour across the Academy, this guide also incorporates tips on the adoption of environmentally responsible behaviour into daily lives.

In view of the depth and coverage, we trust that this exemplary green guide will serve its purpose of educating and promoting environmental awareness across the Academy, which is aligned to a greater objective of minimizing environmental footprint and enhancing the quality of life for all.



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Introduction

As the educational and research arm of the Building and Construction Authority (BCA), BCA Academy prides itself as a premiere educational institution, which offers practical and experiential learning experiences for both students and professionals in the built environment sector.

BCA Academy houses a multitude of cutting edge technologies, evident in the range of sustainable features on site, particularly energy and water efficient technologies. The Academy also prides itself for the state of the art design which capitalizes on the usage of passive ventilation and natural lighting while addressing the needs of different user groups. The fusion of these two elements empowered the Academy to bag both the Green Mark Platinum and Universal Design (UD) Mark Gold Plus Design accolades.

The latest addition to the Academy – the award winning Academic Tower is a showcase of an inclusive and user friendly building. Clear zoning and seamless connectivity enables users to find their destinations intuitively.



All common corridors are 3m wide to facilitate unobstructed and free access for wheelchair users

The Academic Tower is also a barrier free building featuring wide corridors and lifts with large elevator car. Seamless connectivity with other blocks enables wheel-chair users to navigate the area with ease.

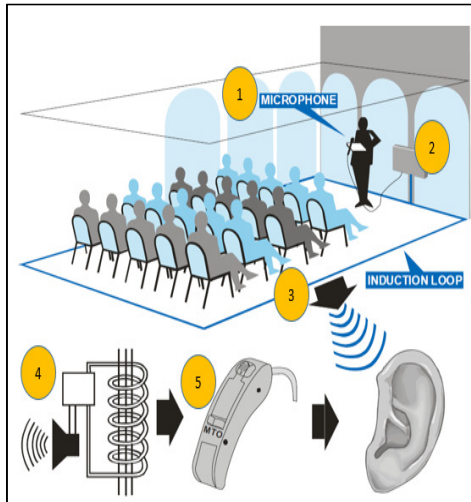


Seamless connectivity across the Academy allows for intuitive way-finding

SECTION A: Environmental Green Features

Life-size graphics and posters are strategically placed along walls at lift lobby, at staircase landings, inside lifts and at handicapped toilets, to educate and raise awareness on the latest Universal Design (UD) Guide, which specifies the requirement of an inclusive environment.

To facilitate hearing for the hearing impaired, Induction Loops are also installed within lecture theatres to synchronise the hearing impaired devices (HID) with audio equipment.



Induction Loops within lecture theatres facilitates hearing for the hearing impaired.



Strategic placement of life-size graphics to educate and raise awareness on the Universal Design (UD) Guide which specifies the requirements of an inclusive built environment

SECTION A: Environmental Green Features

The Gallery was revamped and expanded from a single storey showcase to a 2-storey experiential journey to provide visitors with a better knowledge of Singapore's Built Environment (BE), and how BCA plays a vital role in regulating, leading and transforming the BE sector.

Two highlights to mention are the energy efficient intelligent air-conditioning system and low power platform passenger lift.



The installed air-conditioning system has a high energy efficiency performance and is fitted with the infrared red occupancy and temperature floor sensors.

The occupancy sensor detects the presence of visitors in the space and directs the air flow away so as to minimize draughts.

The temperature floor sensor detects the floor temperature and ensures that an even temperature distribution is achieved between the ceiling and floor.

The platform lift is handicapped user friendly. It requires less power to operate and hence lowers the maintenance costs. It comes with a control panel that comprises easy-to-use tactile braille push buttons, emergency light, alarm button and an emergency stop button.



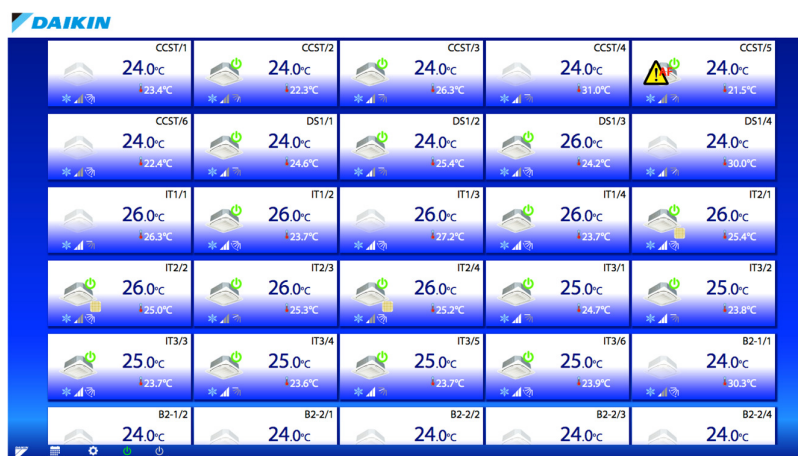
Environmental Green Features

(Innovative Green Features)

Daikin Remote Monitoring System

The Daikin Remote Monitoring System is installed to predict the condition of all these standalone air-conditioning systems. The proposed system will constantly monitor all the networked air conditioners on 8760 hours (24x365) a year. As the air-conditioning systems operate, the remote monitoring system will collect information on the operating data in real time. It then analyse such data based on the system historical records and send alerts to engineers before a data value reaches abnormal level. Engineers are then notified through:

- Emails
- SMS
- Apps on smart mobile devices



Environmental Green Features

(Innovative Green Features)



Roof Top Gardens and Solar Panels

As part of the assortment of green features, the roof top garden at Academic Tower reduces energy consumption by absorbing radiation from the sun thus reducing the cooling load on the top level. Solar panels provide supplementary source of power, and reduces energy consumption from power grid.



Displacement Ventilation System

Displacement Ventilation System leverages on the stratification of air and thus, air movement to reduce energy consumption.

In this system, cold air is supplied to the room at the base. The newly supplied air gains heat from various sources and rises, and is being extracted from the room through diffusers located at the ceiling of the room.



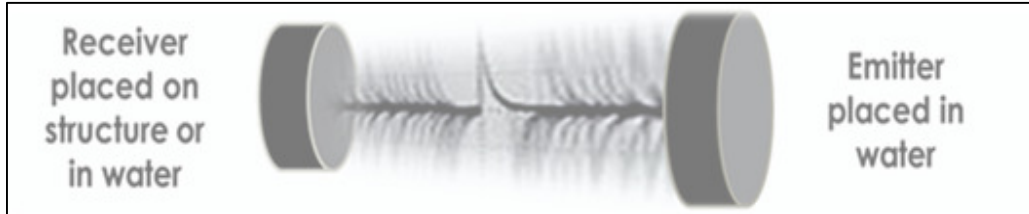
Active Chilled Beam and Dedicated Outdoor Air Dual System

This innovative system eliminates mechanical fans by supplying fresh air to rooms through duct. Thus, it consumes 15 to 20 % less energy compared to conventional air-conditioning system.

In addition, the Dedicated Outdoor Air Dual System dehumidifies primary air supply, lowering its dew points, and this optimizes system performance.

Environmental Green Features

(Innovative Green Features)



Non-chemical treatment of cooling towers water

Instead of using chemicals, cooling towers at the Academic Tower taps on Ultra-Low Frequency (ULF) electromagnetic field to alter the property of water to that comparable to that after chemical treatment



Light Emitting Plasma (LEP)

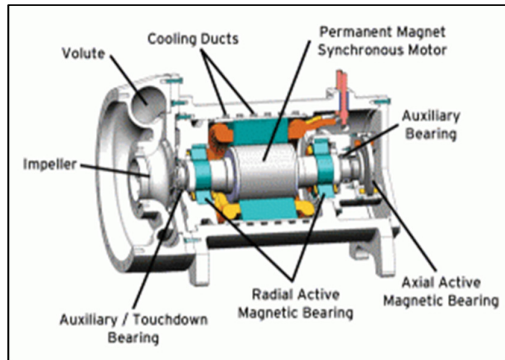
LEP luminance provides a higher lighting intensity of 200 to 250 Lumen / W compared to conventional High Intensity Discharge (HID) lamps which provides an intensity of 80 to 150 Lumen / W.



Ceiling fans in classrooms complements HVAC system by increasing air movement. This allows the room to achieve a thermal comfort level comparable to 24°C at a set temperature of 26°C, and this provides significant energy savings.

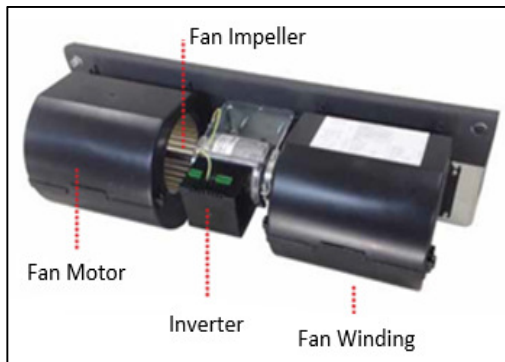
Environmental Green Features

(Energy Efficient Features)



The usage of magnetic bearings in centrifugal chiller is an innovative feature that allows energy savings of 20% to 60%.

The magnetic field levitates the bearing above the shaft, and minimizes contact within part and thus friction loss. This also eliminates the needs for lubricants.



The Direct Current (DC) motors for HVAC systems at the Academic Tower eliminates brushes, allowing a reduction of 70% power consumption compared to a typical AC motor for Fan Coil Unit (FCU).



Lifts at Academic Tower are equipped with regenerative features as they harness the energy generated as the lift decelerate or stops, and convert them to electricity.

Environmental Green Features

(Water Efficient Features)



All water fittings in the Academy have been certified as water efficient, under the Water Efficiency Labelling Scheme (WELS).

The Academy have also been awarded by PUB as a water efficient building.



Waterless Urinal Systems are also installed in BCAA. Microbial Waterless Urinal Cubes are added in order to clean the urinals via chemical means rather than usage of non-potable water.



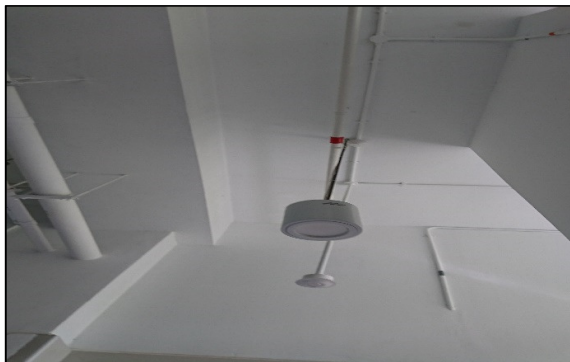
Rain water harvesting tank

Rainwater harvesting tank harnesses and stores rain-water, which will be diverted for non-potable use, such as watering of plants and flushing.

Energy Efficient Campus



Photo-sensors are installed at strategic location to monitor lighting level, and to regulate artificial lighting provision to save energy while not compromising occupants' needs.



Motion sensors are strategically installed in toilets and sensors and are linked to circuits. This arrangement ensures that electronic equipment such as lights, fans are switched on only when the sensor detect the presence of occupants within the vicinity.



Integrated Building Management System

Web-based Building Management System (BMS) enables monitoring and controlling of Mechanical and Electrical services through standard web browser.

The intuitive layout of the BMS simplifies the control process and

acquaint users with the data essential to optimize operations.

SECTION C: Water Conservation Guide

Good Conservation Habits

You can contribute to our water conservation efforts by inculcating and practicing these water efficient habits in the Academy and at home.



Recycling Programme Guide

You can contribute to our effort in waste reduction, by practicing the 3 Rs:

Reduce: Use Only What You Need!

Reduce the usage of plastic bags by bringing your own carrier bags or declining it when you do not need it.

Set your printer to print double-sided by default, to minimize wasting of paper.

Limit and minimize the usage of disposable items such as cups, plates or utensils in office and whenever possible.

Reuse: Here's a Great Way to Make Less Waste

Use unused sides of paper for draft notes taking. Newspaper can be reused to clean glass and window panels.

Recycle: Whenever Possible, Give an Item a Second Life

Recycling bins are placed strategically across the Academy. Make an effort to sort your waste and place them in the correct bins to recycle them. Give your pen or highlighter a second life by purchasing refills. Always make an effort to discard items into recycling bins instead of general waste bins.

