BATANGAS STATE UNIVERSITY
The National Engineering University
1903
PHILIPPINES
EXCELLENCE

BATANGAS STATE UNIVERSITY'S (BATSTATEU'S) POLICY GUIDELINES FOR SUSTAINABLE DEVELOPMENT

1.3.3 All construction activities shall consider natural behavior of identified species on the site.

1.3.4 Spaces for wildlife interaction shall be created and maintained. Areas where wildlife can engage in courtship, mating, and raising their young shall be undisturbed. These areas include mature trees, thick vegetation, meadows, streams, dense shrubs, ponds, or burrows, among others.

1.3.5 Light-emitting devices and lasers shall not disturb wildlife as much as possible.

1.3.6 The use of devices that may disturb existing wildlife shall be minimized. Unmanned vehicles such as drones, remote-controlled cars, boats, and other related devices for research or survey purposes must be approved by the University prior to operation.

1.3.7 Loud events such as concerts, parties, celebrations, and other related activities shall be held away from highly ecologically sensitive areas to reduce disturbance.

1.3.8 Waste management shall be strictly implemented to avoid potential harm to the species' natural habitat.

1.3.9 All species in the University shall be properly labeled as to name (scientific/english/local) and status (endemic/endangered/threatened).

1.3.10 Utilization of endangered and endemic species is limited to research purposes only subject to strict compliance to guidelines and protocols. Permit shall be secured from the proper office prior to utilization of any species.

1.3.11 Introduction of flora and fauna species inside BatStateU campus shall be properly observed and monitored.

1.3.12 Mechanisms to encourage and engage a multiparty system including students, faculty and other employees in the conservation and propagation of endemic species shall be undertaken.

1.3.13 Taxonomic studies shall be pursued, supported, and encouraged.

1.3.14 The foregoing shall be applied *mutatis mutandis* to initiatives to protect and conserve marine life

1.4 Green Buildings (GB)

The University GB Policy shall be subject to the following performance standards:

1.4.1 Energy Efficiency

Energy efficiency requires the adoption of efficient practices, designs, methods and technologies that reduce energy consumption resulting in cost savings.

1.4.1.1 Building Envelope

a. Air Tightness and Moisture Protection

As the humidity levels are very high in the Philippines, the unwanted infiltration and humidity ingress into the spaces can cause additional load on the air conditioning system and a detrimental impact on air quality. Buildings shall be planned and designed with specific details to ensure that air tightness is maximized. Details shall precisely include joints, service entry points, windows and doors. The implementation of these measures requires only increased attention to the construction details and it can be implemented at practically no cost.

Buildings shall be planned and designed with:

a.1 Complete gaskets, weather-stripping, door bottom sweeps and seals within and around window and door assemblies.

a.2 Moisture protection on the surface of the external façade to reduce vapor or moisture migration from external spaces.

b. Glass Properties

Compared to wall assemblies, glazing transfers more heat and hence, it is ideal to reduce the amount of glazing with respect to the wall in order to reduce internal heat gains.

The requirement of Windows to Wall Ratio (WWR) needs to be balanced with the amount of daylight coming through the glass area.

Solar Heat Gain Coefficient (SHGC) is used to determine the amount of solar heat admitted through the glass divided by the total solar radiation incident on the glass.

Visible light Transmittance (VLT) is used to determine the amount of light transmitted through the glass

WWR shall be balanced with SHGC to maintain flexibility in design. To further describe, the higher the designed building WWR, the lower the required SHGC in glass windows shall be and vise-versa.

This does not however, remove the option for building owners to apply windows with low SHGC for buildings with low WWR.

1.4.1.2 Natural Ventilation

This measure will give building occupants the flexibility and opportunity to use natural ventilation for free cooling and fresh air in regularly occupied spaces. This measure will limit the tendency to create glass sealed box type buildings. Size of each room and space shall be consistent with the occupancy load of the NBC.

Windows shall be planned and designed with:

a. Operable windows or balcony doors shall be provided in regularly occupied spaces. The size of the opening shall be equal to at least ten percent (10%) of the floor area of regularly occupied spaces.
b. All operable windows shall be provided with safety features for protection against strong winds, water penetration and protection for building occupants including child safety and security.

1.4.1.3 Building Envelope Color

Light-colored building envelopes, especially the roof areas which are the most vulnerable, can reduce heat transfer from the outside to the inside of the building by having surfaces with high Solar Reflectance Index (SRI), hence must be prioritized.

1.4.1.4 Roof Insulation

Insulation can help reduce heat gain in a building thus improving thermal comfort, acoustic quality and reducing the load on the air conditioning system.

Buildings shall be provided with roof insulation so that the average thermal resistance value (R-Value) of the roof is at least R-8.

1.4.1.5 Mechanical System

a. Air Conditioning System

Air conditioning typically accounts for more than fifty percent (50%) of total electricity costs in a centrally air-conditioned building. Hence, the efficiency of an air conditioning system is of prime importance. The heart of the air conditioning system is the cooling system, typically chillers in large buildings and is important to procure an efficient cooling system. The cooling equipment shall meet or exceed the minimum efficiency requirements.

b. Water Heating System - The use of energy-efficient water heating systems in buildings, by observing minimum power performance requirements, will help reduce energy consumption due to heating of water.

Applicable buildings shall comply with the minimum performance requirements for water heating in the 2010 PSVARE Standards.

c. Variable Speed Drives and High Efficiency Motors - Variable Speed Drive (VSD) describes the equipment used to control the speed of machinery by changing the frequency of the motor that is being operated. Where process conditions demand adjustment of flow from a pump or fan, varying the speed of the drive may save energy compared with other techniques for flow control.

Motors requirements shall comply with the ff:

c.1 All motors for mechanical equipment over five (5) kW shall be provided with variable speed drive and high efficiency motors.

c.2 All motors of cooling towers shall be provided with variable speed drive and high efficiency motors.

c.3 All motors for domestic pumps shall have high efficiency motors.

d. Enthalpy Recovery of Exhaust Air - When buildings have outside air or fresh air supply and extract system through mechanical means, using heat exchangers can use the air extracted from the building areas to precondition the

incoming outdoor air. This process exploits the fact that the extract air is usually already conditioned and therefore colder and drier. All buildings with a centralized air supply system shall use enthalpy recovery wheels with efficiency of at least sixty percent (60%) of ninety percent (90%) exhaust air.

1.4.1.6 Electrical Systems

a. Daylight Provision - Buildings shall be planned and designed to maximize the use of natural light so to reduce the use of artificial illumination.

All regularly occupied spaces inside the building shall have a view of any combination of the following features that can allow daylight into the room space:

a.1 Window

a.2 Light shelf

a.3 Clerestory

a.4 Skylight

a.5 Light monitor / light scoop

a.6 Other devices that can allow daylight inside

b. Daylight Controlled Lighting System - Building interior perimeter zones exposed to daylight generally do not require artificial lighting during the day. However, sub-optimal design and operation of the building results in use of artificial lighting when not required.

Applicable buildings shall comply with the following:

b.1 Lighting fixtures within the daylight zone shall be controlled with photoelectric sensors with an auto on-off basis or continual dimming. The photoelectric sensor shall be located approximately at half (½) the depth of daylight zone.

b.2 If occupancy sensors are installed in the daylight zone, the occupancy sensor shall override the photoelectric sensor during non-occupancy period.

c. Lighting Power Density (LPD) - Limitation of LPD will help to design the lighting system in the most efficient way and reduce the lighting and cooling load in the buildings.

All applicable building types shall comply with the LPD limits in the 2010 PSVARE Standards.

d. Occupancy Sensors for Lighting Control - Occupancy sensors linked to lighting shall be installed in areas with variable occupancy.

Applicable buildings shall comply with the following:

d.1 In order to limit the use of electricity in unoccupied areas of buildings, occupancy sensors linked to lighting (except for emergency and security lighting) shall be installed in the following areas with variable occupancy: - corridors - private offices - storage rooms - common toilets - meeting rooms - stairways - other similar areas

d.2 For covered car parks: minimum of sixty per cent (60%) of the lighting must be controlled by the occupancy sensors.

e. Elevators and Escalators / Moving Ramps / Walkways - Escalators / Moving Ramp / Walkway must be fitted with controls to automatically reduce speed or stop when no traffic is detected. Elevators must be fitted with mechanisms to reduce energy demand.

e.1 Escalators / Moving Ramps / Walkways

e.1.1 Escalators / Moving Ramps / Walkways shall be fitted with automated controls to reduce to a slower speed when no activity has been detected for a maximum period of one and a half (1-1/2) minutes and duration may be adjusted depending on the demand.

e.1.2 The escalator / moving ramp / walkway shall automatically be put on a standby mode when no activity has been detected for a maximum period of five (5) minutes and duration may be adjusted depending on the demand.

e.1.3 These escalators / moving ramps / walkways shall be designed with energy efficient soft start technology. Activation of reduced speed, power off and power on modes shall be done through sensors installed in the top or bottom landing areas.

e.2 Elevators

Elevators shall be provided with controls to reduce the energy demand. To meet this requirement, the following features must be incorporated:

- Use of Alternating Current (AC) Variable Voltage and Variable Frequency (VVVF) drives on non-hydraulic elevators

- Use of energy efficient lighting and display lighting in the elevator car shall have an average lamp efficacy, across all fittings in the car, of more than 55 lumens / watt

- Lighting shall switch off after the elevator has been inactive for a maximum period of five (5) minutes

- The elevators shall operate in a stand-by condition during off-peak periods

f. Transformer - The transformer shall be tested in accordance with relevant Philippine National Standards (PNS) at test conditions of full load, free of harmonics and at unity power factor.

Transformers that are part of the building electrical system shall have efficiencies not lower than 98% as prescribed in the DOE Guidelines on Energy Conserving Design of Buildings.

g. Overhead or Elevated Water Storage

To reduce dependence on motorized systems to supply and distribute potable or non-potable water within the building, thus help reduce energy consumption, overhead or elevated water storage systems are used, provided there's a twenty percent (20%) fire reserve over and above the average daily demand supply. The system relies mostly on elevation and gravity to distribute water within the building.

Applicable buildings shall include in the water distribution system the integration of overhead or elevated water tanks that will facilitate the distribution of potable and / or non-potable water into the building spaces, without compromising the required water volume and pressure based on demand and the Plumbing Code of the Philippines.

BATANGAS STATE UNIVERSITY

The National Engineering University

UNIVERSITY CLIMATE CHANGE ACTION PLAN

Leading Innovations, Transforming Lives, Building the Nation

3.5.1.6. The University shall encourage establishment and protection of botanical gardens and arboretums whenever feasible.

3.5.1.7. Indiscriminate introduction of plants and animals as in the case of, but not limited to, random dispersal of seeds and release of animals within the campus shall not be permitted.

3.5.1.8. Fertilizer use and water consumption, preserving groundwater.

3.5.1.9. Endemic and indigenous species of flora shall be the priority in all landscaping programs in the entire university. Whenever feasible, flowering and fruiting trees shall be planted in landscaping projects of the university to encourage local biodiversity.

3.5.1.10. The University shall encourage establishment and protection of botanical gardens and arboretums whenever feasible.

3.5.1.11. Indiscriminate introduction of plants and animals as in the case of, but not limited to, random dispersal of seeds and release of animals within the campus shall not be permitted.

3.5.2. Green Buildings (GB)

The University GB Policy shall be subject to the following performance standards:

3.5.2.1. Energy Efficiency. Energy efficiency requires the adoption of efficient practices, designs, methods and technologies that reduce energy consumption resulting in cost savings.

3.5.2.1.1. Building Envelope

3.5.2.1.1.1. Air Tightness and Moisture Protection. As the humidity levels are very high in the Philippines, the unwanted infiltration and humidity ingress into the spaces can cause additional load on the air conditioning system and a detrimental impact on air quality. Buildings shall be planned and designed with specific details to ensure that air tightness is maximized. Details shall precisely include joints, service entry points, windows and doors. The implementation of these measures requires only increased attention to the construction details and it can be implemented at practically no cost.

3.5.2.1.1.2. Buildings shall be planned and designed with:

3.5.2.1.1.2.1. Complete gaskets, weather-stripping, door bottom sweeps and seals within and around window and door assemblies.

3.5.2.1.1.2.2. Moisture protection on the surface of the external façade to reduce vapor or moisture migration from external spaces.

3.5.2.1.1.3. Glass Properties. Compared to wall assemblies, glazing transfers more heat and hence, it is ideal to reduce the amount of glazing with respect to the wall in order to reduce internal heat gains. The requirement of Windows to Wall Ratio (WWR) needs to be balanced with the amount of daylight coming through the glass area. Solar Heat Gain Coefficient (SHGC) is used to determine the amount of solar heat admitted through the glass divided by the total solar radiation incident on the glass. Visible light Transmittance (VLT) is used to determine the amount of light transmitted through the glass WWR shall be balanced with SHGC to maintain flexibility in design. To further describe, the higher the designed building WWR, the lower the required SHGC in glass windows shall be and vice-versa.