

## LANYANG CAMPUS SHOWS THE WAY TO BE GREEN

英文電子報

Lanyang Campus (LC) was awarded with a Green Building Certificate and a Silver rating from the Ministry of Interior (MOI) last December by meeting the six indices of the nine set forth by the MOI. The followings are the measures LC took to pass each of the six indices:

### 1. Greening:

When LC started its construction, it kept as many original trees as possible. New trees were also planted along main roads and paths in and off campus. There are more than 1,200 trees with indigenous sorts taking up 70% of them. Choices of trees were based on biodiversity so as to attract various creatures to pollinate from or build habitats.

Administrative offices and classroom buildings also benefit from greening with the design of several courtyards filled with trees, shrubs, and meadows. Layers of plants, mostly shrubs, can be seen on roof tops, terraces, and edges around buildings. They take up at least 1200 square meters of space on campus, allowing them to absorb up to 105 thousand tons of emitted CO<sub>2</sub>. Furthermore, dormitories were designed economically in terms of land so as not to disturb the ecology of the hills behind them

### 2. Soil Water Content

As LC sits on soil that absorbs water very well, in order to preserve sufficient ground water in the soil, the most effective way is of course to plant trees and shrubs. When artificial surfaces had to be laid such as footpaths and sport grounds, water absorbing materials were chosen. In principle, there should be as little construction as possible to maintain water in the soil.

### 3. Daily Energy Saving

Ventilation is maximized by having enough openings in all rooms to allow air and natural lighting to circulate. Rooms that are fitted with French windows are built with balconies or ledges that function as shades. All roofs are coated with layers of water resistant and heat insulating materials with some sheltered by metal sheets or flower beds. The windows that cover the outside wall of the Clement Chang International Conference Hall are fitted with Low-E (emissivity) glass. The solar panels installed on the roof top of dormitories can resist heat efficiently.

Indoor light fixtures are of energy efficient type equipped with anti-flicker and reflection devices to ensure healthy and good quality light. Rooms are coated with paint that reflects light efficiently. Air-conditioning systems are divided into two types: Central controlled system and VRV system (variable refrigerant volume) that are alternately installed for different functions. The former consists of six water chillers of various capacities to supply cold air or heat to different larger, more open spaces on campus. Smaller and more confined spaces such as classrooms, offices, dormitories are fitted with the latter, which is run on refrigerant.

Renewable energy such as solar power is also well exploited in LC. Part of the electricity (up to 2100 kw) and hot water of dormitories are supplied by the PV modules and tubular solar water heaters installed nearby.

#### 4. Indoor Environment

Materials for walls of classroom buildings and dormitories are made of steel and concrete. Outer walls and floors are of 15cm thick of reinforced concrete (RC). Window glass is usually clear to bring in light and of 5mm thickness to seal off noise. Designs of buildings are such that natural lighting is allowed into 90% of offices, classrooms, dormitories. All rooms are well ventilated.

Indoor fixtures remain as simple as possible: 70% of the ceilings and

walls stay bare apart from coats of paint which is of environmental friendly type. 50% of the lighting fitted in living spaces is protected by an anti-glare filter to reduce strain on the eyes.

#### 5. Water resource

All toilets and public water fixtures are of low water capacity. Most taps and shower heads are fitted with flow restrictors. A water reuse system is well installed as well. There are several cells underneath the classroom buildings and dormitory buildings to collect and treat waste water and rainwater. For instance, rainwater is usually collected in certain cells that hold over 430 tons of water and can be used for irrigation.

Furthermore, waste water (includes black water) after treatment, will be used for irrigation, too. These measures enabled LC to score very high in this index, nearly 5 points above the threshold.

#### 6. Sewage and garbage improvement

The waste water pipes and cells are well separated from those that collect rain water. After treatment, some of the reclaimed water is discharged, while some will be supplied to sprinklers through hydraulic devices.

Greywater is also collected in cells before treated together with other waste water. The greywater discharged from kitchens will first pass through a special filter which is cleaned regularly before going through special pipes to the treatment center.

Garbage bins and bags are designed to prevent scavenges from animals.

Cleaners collect and separate garbage before processing it with compressors, cardboard pressing machines, and tin and aluminum separation devices. It will be carefully weighed for transport afterwards. Kitchen leftover is treated with a special device (capacity of 50 kg) to biodegrade it into water and air. These efforts earned LC a high 16 points, 6 points higher than the 10 points threshold. ( ~Ying-hsueh Hu )