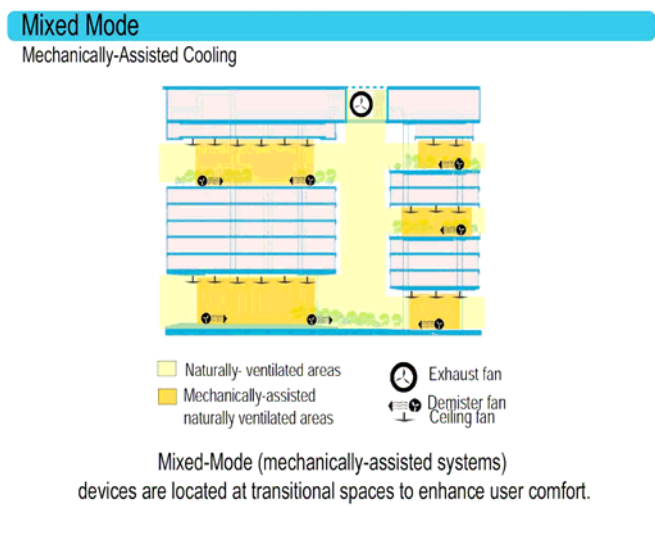


**Building Name: National Library Building**  
**Address: 100 Victoria Street, Singapore 188064**

The National Library Building, which spans 16-storeys with a floor area of approximately 58,000 square metres, was designed as a state-of-the-art library and an innovative building in the tropics that serves as an icon locally and for the region. The building is an innovative “green” (environmentally-responsive) tropical building designed using bioclimatic design techniques (e.g. passive low-energy systems, passive lighting concepts, climate-response building orientation and built form configuration, effective façade systems and bioclimatic use of landscaping). Some of these innovative energy efficient design features are explained as follows.

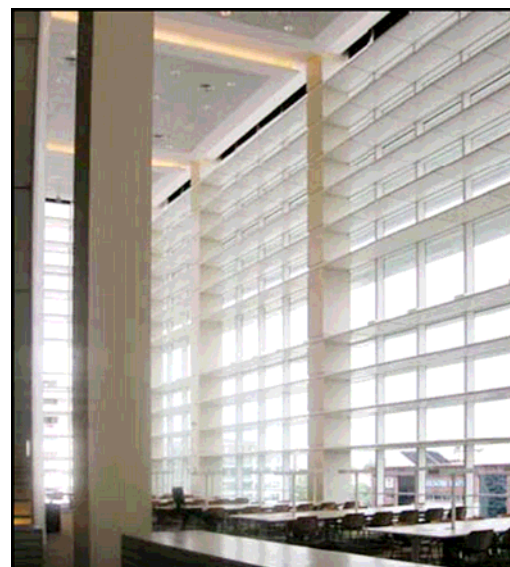
To provide comfort at a reasonable cost and use of energy, a mixed mode ventilation strategy was adopted where natural ventilation is supplemented by mechanical means such as fan in central transition spaces (internal walkways, public events plaza and courtyards).



Light sensors at the perimeter of the library areas allow the lighting control system to dim or switch off lighting when there is sufficient natural light to illuminate the building interior. Also, automatic blinds are located along the facades facing Victoria and North Bridge Road which will activate when necessary during the day to reduce solar gain and thus reduce air-conditioning load.

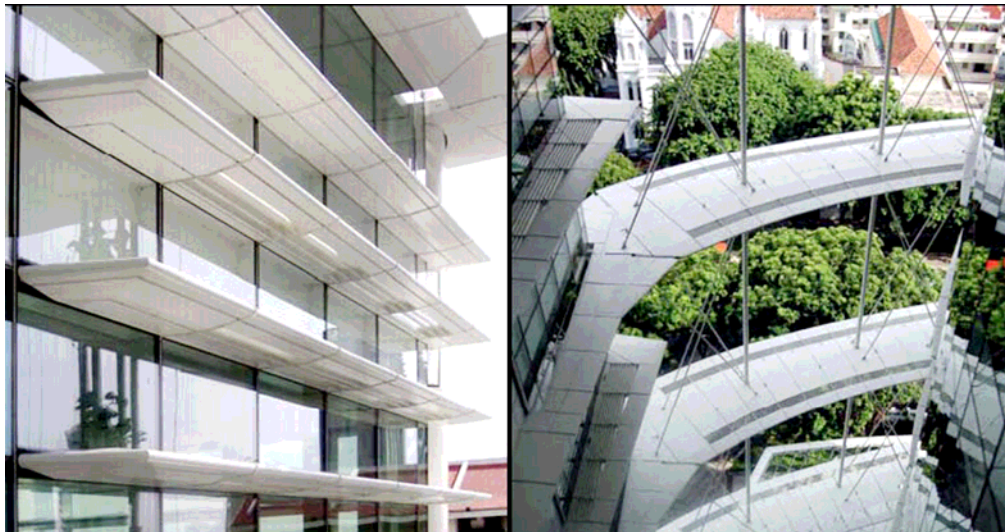


**Light sensor**



**Adequate daylight - lights along perimeter switched off**

About 2/3 of the building façade is double-glazed with high quality low-emissivity glass. The OTTV is 32.1 W/m<sup>2</sup> and U-value for the glass is about 1.62W/m<sup>2</sup>K. In addition, the building is also heavily shaded to reduce solar heat gain through the façade.



A high efficiency chiller of 0.61kW/RT has been provided for the project. The chiller plant is also configured with a larger non-essential centrifugal chiller and smaller essential screw chillers which double up as the night-load chillers as well as a swing chiller in the day. The chilled water system employs a primary and secondary chilled water circuit with variable speed drive installed for the secondary chilled water pump. Better energy efficiency is thus achieved through a lower pump static for the constant speed primary chilled water pump and a reduced pump speed in the secondary circuit when the chilled water demand is low.

Approximately 6,000-8,000 m<sup>2</sup> is designated as ‘green space’ through-out the building that creates urban “Sky courts” to provide a positive psychological effect on building users and improve the general working environment. The presence of these landscaped areas in the building reduces the surface temperature of the roofs due to the shading effect of vegetation and also reduces the heat transfer into rooms below, thus improving the indoor thermal environment and thermal performance of the building.

