Retro-Commissioning (RCx) – Fact Sheet

Education Services Centre

FaS_001

Kowloon Tong Education Services Centre

Address: 19 Suffolk Road, Kowloon Tong

User: Education Bureau

O&M Team: EMSD/GESD

9.4% Building Electricity Saving

Background

The building is a 5 storey building which is separated into 2 blocks. The internal floor area of the building is about 22,000m^2 consisted of offices, function rooms and a lecture hall. The building was completed for more than 10 years.

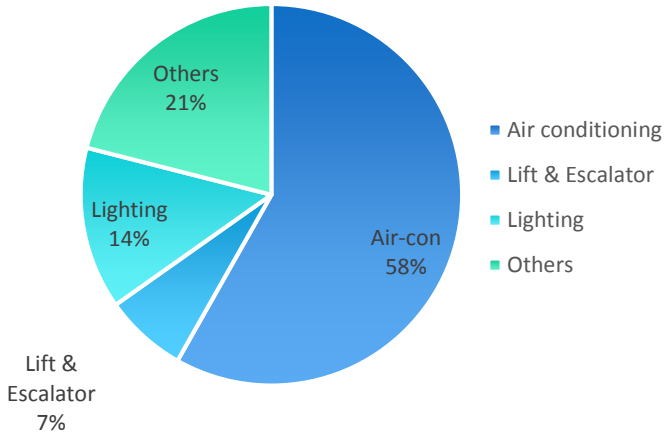
Apart from the normal operation hours of office floors, G/F & podium floor are opened between 8:00 and 22:00 daily except weekends and holidays.

The building is air conditioned served by central chilled water system with Variable Air Volumes (VAV) air distribution system and split-type units for specific rooms.

Some energy saving measures on lighting and lift/escalator installations have been implemented. To commit further energy saving in particular the MVAC installation, a study has been carried out to identify more energy saving opportunities.

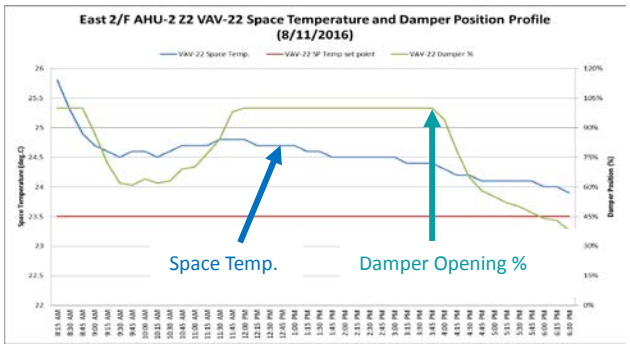
After completion, a saving of around 350,000 kWh is recorded resulted in an annual energy reduction of 9.4%.

Building energy breakdown



The above breakdown shows that more than half of the total building energy is consumed by the air-conditioning installation. As such, retro-commissioning on the MVAC system is vital for improving energy performance of this building.

An observation on fully opened damper even though the room temperature is lower than the set point means that pressure reset at VAV box is vital to achieve lower air flow which in turn led to reduction of fan speed for the VAV system.



Approaches

Following the procedures as stipulated in the Technical Guidelines on Retro-commissioning (TG-RCx), the study was carried out in four stages.

Stage 1 involves collection of preliminary building information and initial walk-through.

Stage 2 is about investigation and analysis of operation data with measurement and identification of energy optimization opportunities.

In Stage 3, proper rectification through quick fix and further implementation enhancement features, the operation of building services systems can be optimized and become more energy efficient.

Finally, measurement and verification will be conducted continuously to monitor the energy performance of building systems as an ongoing commissioning process for periodically review on the achievements.

Key issues of the Study

During the study, on-site measurement of power input to chillers and AHUs, chilled water flowrate and temperature at main and branch chilled water pipes, temperature logging and damper opening positions at some VAV boxes, etc. The measurement results are used to evaluate the energy performance on both water and air sides of the MVAC installation and explore areas of improvement to optimize energy use for such system.

Energy Saving Opportunities (ESO) Summary

Energy Saving Opportunities (ESO)	Action	Cost	Saving
To adjust the chilled water flow of Chilled Water Pumps across the night mode Chiller	Chilled water flow is reduced and half of the pump energy being saved at night time		
To setback supply chilled water temperature during night mode operation	Chilled water temperature is raised by 2°C and ~6% of chiller plant power at night time is saved		
To review set-point of room temperature of VAV in office area	Temperature set point is re-adjusted and ~3% of AHU fan power is saved		
To optimize operation hours of PAU	Delay starting and early stopping of PAU which saved ~2.5% of chiller plant power.		
To review operation schedule in CCMS of lighting	Switching off unnecessary lighting can reduce operating time by ~20%		
To review set point of AHU static pressure serving VAV system	Air pressure setting is re-adjusted and ~10% of AHU fan power is saved	$$$	
To upgrade chiller plant automation system (CPA)	Enhanced algorithm to ensure optimized chiller operation can reduced chiller plant power by ~5%	$$$	