Retro-Commissioning (RCx) – Fact Sheet

Swimming Pool & Sports Centre

Kowloon Park Swimming Pool & Kowloon Park Sport Centre

Address: 22 Austin Road, Tsim Sha Tsui, Kowloon, Hong Kong.

User:

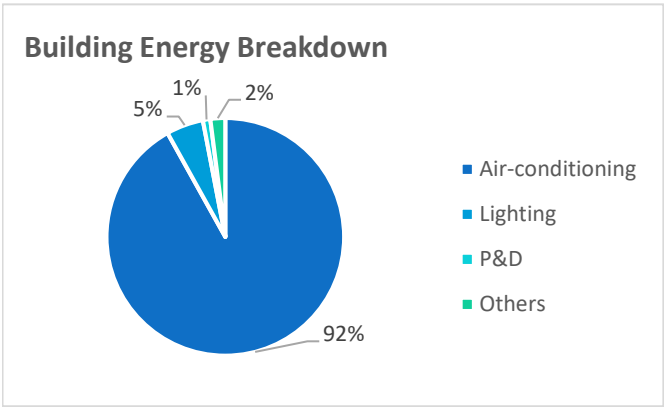
O&M Team:

5% Building Electricity Saving

Background

The building was constructed and opened on 12 September 1989. Kowloon Park Swimming Pool & Kowloon Park Sport Centre is a 3-storey building with Electrical and Mechanical Services Department (EMSD). The operating hours of the building is between 06:00 to 22:00 for swimming Pool; 07:00 to 23:00 for Sport Centre and Monday through Sunday.

The HVAC waterside system is supplied by 5 chillers included Air-Cooled Chillers (ACCs) and Air-Cooled Heat Pumps (ACHPs). The chilled water and hot water is distributed by four CHWPs with VSD and 3 CHWPs with constant speed respectively. The airside system included fourteen Air Handling Units (AHUs), twenty-five Primary Air Units (PAUs) and nearly 170 Fan Coil Units (FCUs). The electrical system is make up by three 2500A Air Circuit Breaker in one main switch room. Various lighting technologies are being used on the site.



HVAC is the highest energy-consuming equipment in the facility and in total consumed over 90% of the total site consumption. Lighting energy use is the second highest its consumption is around 5% of the total site consumption. The rest of the energy used for the P&D and other usage, consumed 1 % and 2% respectively.

Approaches

HVAC: Waterside

It was observed that the chiller plant operated way earlier than the actual opening hours of the site. The energy consumption of the chiller is unnecessary as the site is not occupied. To align with the actual operation schedule of the site and save energy, a new operation schedule with an operation starting time of 45 minutes later is applied to the chiller plant. Therefore, the electricity consumption of the chiller will be reduced.

Moreover, due to the difference of heating load, the primary bypass valve of the Gas Boiler Hot Water Pumps (GHWPs) is fully opened while the GHWPs operated in a constant speed. Therefore, to reduce the heating supply in winter, Variable Speed Drives is installed on the GHWPs. The Pumps is also set to be operate with high speed in summer and relatively low speed in winter to save the energy consumption of the GHWPs.

HVAC: Airside

Target AHUs/PAUs, are observed to be running 24/7, which is not match with the operation hour of the Sports Centre and Swimming Pool. To reduce the energy use of AHUs/PAUs, an appropriate operating schedule starting from 06:15 is applied to those target AHUs/PAUs.

On the other hand, there are some PAUs' CHWV was fixed at 100% by the operator, which is very energy-consuming. To save energy, a proposed Supply Air Temperature (SAT) setpoint is applied to those target PAUs. Therefore, the cooling load will be reduced and achieved energy saving.

Lighting

Kowloon Park Swimming Pool has a cleansing period regularly in a month. However, there are no separate mode for cleansing period in the past. To save energy, the usage of equipment like the lighting should be reduced during the cleansing mode. Therefore, a Cleansing Mode is applied to the site where half of the site lighting will be switch off during the cleansing hours on the cleansing days.

Energy Saving Opportunities (ESO) Summary

Energy Saving Opportunities (ESO)	Action	Investment (Note 1)	Energy Saving (Note 2)
HVAC Water Side – Adjust operating hour of water side equipment	To adjust the chiller operation schedule	N/A	
HVAC Water Side – Adjust speed for water side equipment	To install VSD on Gas Boiler Hot Water Pumps	$	
HVAC Air Side – Adjust operating hour of air side equipment	To adjust the AHU/PAU operation schedule	N/A	
HVAC Air Side – Adjust temperature setpoint of air side equipment	To fix the CHWV control	N/A	
HVAC Air Side – Adjust speed of air side equipment	To apply the cleansing period mode	N/A	

Note 1:

$ denotes investment is required

Note 2:

 denotes % of ESO electricity saving / building electricity consumption <5%

 denotes % of ESO electricity saving / building electricity consumption 5%-10%

 denotes % of ESO electricity saving / building electricity consumption >10%

Remarks: The building owner(s) has/have given consent to the Electrical and Mechanical Services Department (EMSD) to display our provided information to their web site and other document.