Retro-commissioning (RCx)- Energy Saving Opportunities (ESO) Tips

A. Air-conditioning and Ventilation Installation

	Common Issues Encountered in RCx	Energy Saving Opportunity (ESO)	Related Equipment / System
1.	Inaccuracy of sensors and/or insufficient sensors	● Check the accuracy of sensors and take calibration follow manufacture's recommendations; ● Check if the sensing range of sensor compatible with operating condition; ● Check if the position of installed sensor are appropriate or in accordance with manufacturer's instruction; ● Conduct periodic checking on any out-of-range values.	All system / CCMS
2.	Temperature difference (△T) of main supply and return chilled water temperature is too low	● Check and clean coil; ● Check thermostat settings; ● Verify that all coils have interlocking controls that insure that the control valve is closed; ● Check if defective modulating valve operation and/or improper control/setting of AHU/PAU.	Central air conditioning (Water-side)
3.	Failure of chilled water zone control	● Inspect zone valve condition and repair/replace defective zone valve/controller	Central air conditioning (Water-side)
4.	Condensation on surface of chilled water pipeworks and/or accessories	● Inspect the insulation and repair defective insulation	Central air conditioning (Water-side)
5.	Operating chiller capacity is greater than the required cooling load during cool climate	● Adopt chilled water temperature reset to save chiller energy while cooling loads can still be catered	Central air conditioning (Water-side)
6.	Blockage of condenser tube	● Periodic maintenance of condenser tube through monitoring of the pressure drop and the differential temperature; ● Consider to adopt automatic cleaning system for condenser tube can reduce the frequency and periodic maintenance which ensure the chiller efficiency and its expected life	Central air conditioning (Water-side)
7.	AHU Fan with constant speed design only or Variable air volume control by fan inlet guide vanes or modulating damper	● Replace defective or loosen belt	Central air conditioning (Air-side)
8.	Indoor air temperature is too low	● Review/adjust the setpoint of room thermostat to match with operation need; ● Check for sensor located properly.	Central air conditioning (Air-side)

A. Air-conditioning and Ventilation Installation (cont'd)

	Common Issues Encountered in RCx	Energy Saving Opportunity (ESO)	Related Equipment / System
9.	Indoor air distribution (Unbalancing in VAV air supply system)	● Check variable-air-volume boxes working properly; ● Perform air balancing and adjust air dampers; ● Replace defective damper or activator.	Central air conditioning (Air-side)
10.	Air leakage from air duct	● Inspect and repair air ductwork	Central air conditioning (Air-side)
11.	Unsatisfactory cleanliness of air filter and/or cooling coil	● Replace/clean air filter and/or cooling coil	Central air conditioning (Air-side)
12.	Incomplete or missing ductwork and pipework insulation	● Add ductwork and pipework insulation to reduce the amount of energy lost in transmitting heated or cooled fluids	Central air conditioning (Air-side)
13.	Review equipment operating schedules	● Check, update and review all equipment operation schedule which are on only when they are necessary	Central air conditioning (Air-side)

B. Lighting Installation

	Common Issues Encountered in RCx	Energy Saving Opportunity (ESO)	Related Equipment / System
1.	Over-illuminated at some areas	● Overlit or underlit areas should be corrected; ● Consider to de-lamping some lighting at overlit areas.	Lighting
2.	Lighting is "ON" during no occupancy period / non-peak hour period	● Add timer control or occupancy sensor control to match the operation schedule; ● Replace malfunction timer and/or occupancy sensor.	Lighting
3.	Insufficient calibration of Lighting control system	Time based ● Correct operating time schedule - lights are operating only when the building is occupied Occupancy based ● Adjust time-delay settings to suit the requirements of each space; ● Check sensor's position. Lighting level based ● Photocell controls should be checked to ensure desired daylighting dimming or daylight switching response; ● Setpoints should be adjusted so that the desired light levels are maintained.	Lighting

C. Electrical Installation

	Common Issues Encountered in RCx	Energy Saving Opportunity (ESO)	Related Equipment / System
1.	Insufficient review power quality of electrical distribution network	● Check the operation of capacitor bank and/or harmonic filter to enhance overall power quality and/or match operation needs/efficiency requirement	Electrical
2.	Insufficient review the total power factor for a circuit which is lower than the design value	● Install power factor correction device if economically viable	Electrical
3.	Total harmonic distortion of current for a circuit exceed the limited design percentage	● Install harmonic filter at the source of distortion to limit THD	Electrical
4.	Insufficient power monitoring device	● Install sufficient metering facilities to monitor the power consumption and energy performance of outgoing circuits	Electrical
5.	Insufficient review of Tariff	● Minimize of maximum demand in peak hour; ● If possible, equipment should run during the less expensive off-peak hours; ● Consider applying pre-cooling strategies.	Electrical

D. Lift and Escalator Installation

	Common Issues Encountered in RCx	Energy Saving Opportunity (ESO)	Related Equipment / System
1.	Insufficient administrative approach to optimize the operating quantity of Lift/Escalator with operation needs	● Assign only one or two lifts available to casual end-users after normal working hours and on holidays; ● Encourage the end-users to walk up or down one or two storeys rather than taking the lift.	Lift & Escalator
2.	Insufficient monitoring on power quality on lift and escalator	● To provide electric filter to improve both the power factor and total harmonic distortion, irrespective of DCTL, VV or VVVF typed.	Lift & Escalator
3.	Little energy saving measures in lift car and machine room	● Switch on the lighting in the lift machine room only when it is occupied; ● Switch off all lightings and ventilation fans inside the lift car automatically when the lift is parked; ● Switch off all ventilation fans and air-handling units in the lift machine room when all lifts have been parked for a significant period (e.g. at night)	Lift