



# Green Schools 2.0 for Retro-commissioning

Introduction of  
HKGBC Retro-commissioning  
Training and Registration Scheme



# AGENDA

- 1 RCx Trainings for RCx Practitioner/ RCx Professional
- 2 RCx Training and Registration Scheme – Individual Registration/ Renewal
- 3 Registration Scheme – Services Provider Registration
- 4 HKGBC RCx Website
- 5 Roles of EMSD, HKGBC, and the Registration Committee



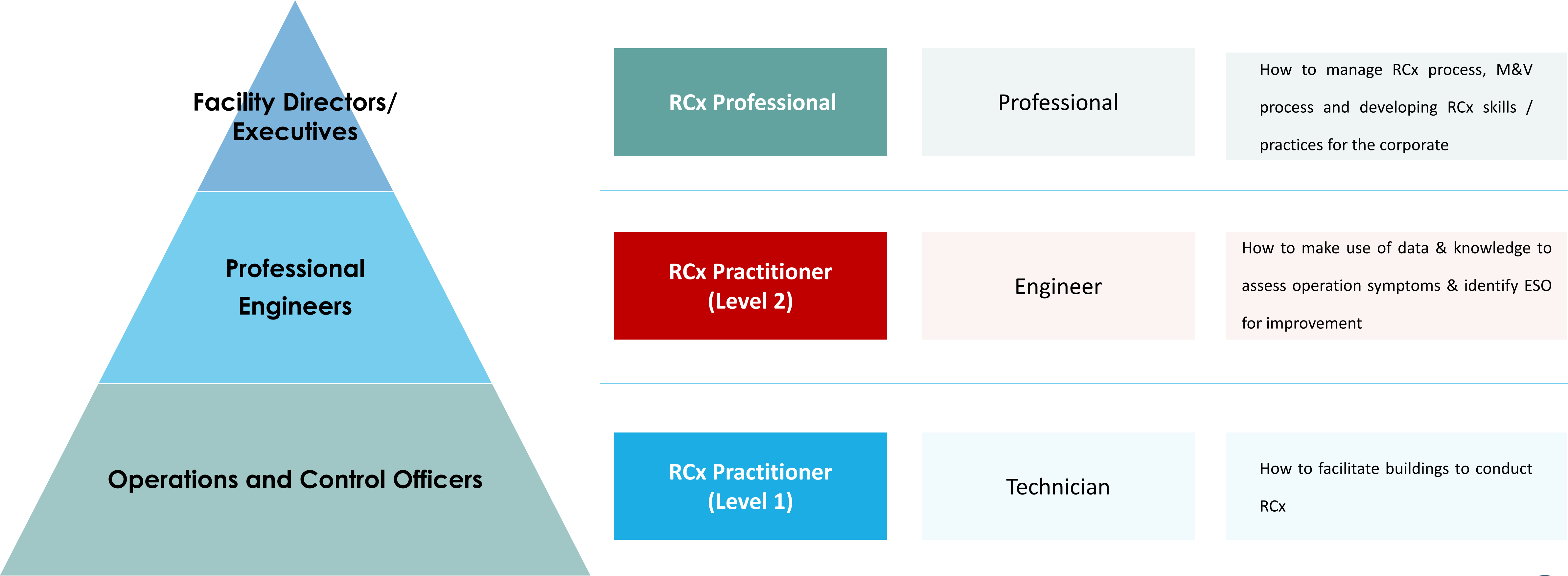


# RCx Trainings for RCx Practitioner/ RCx Professional



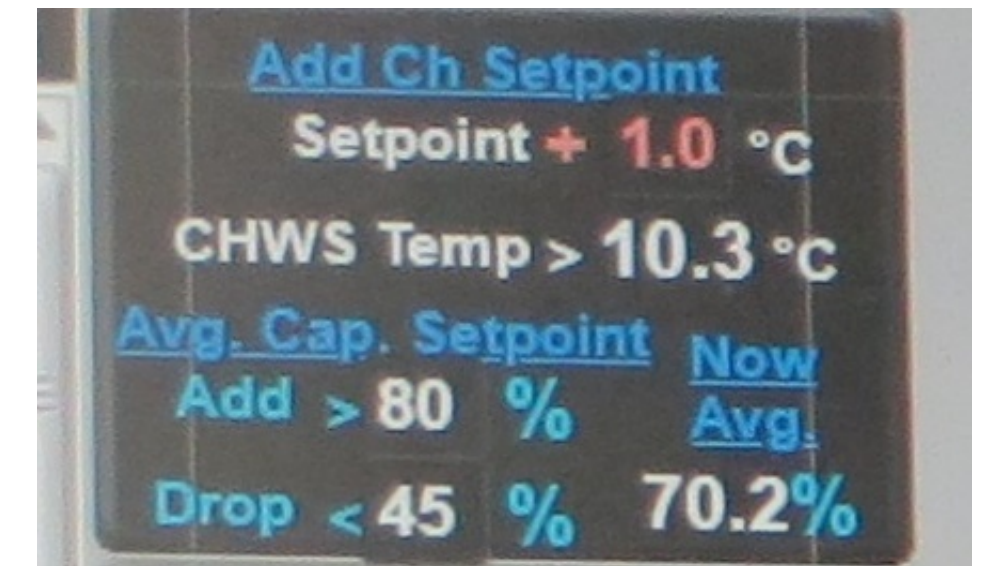
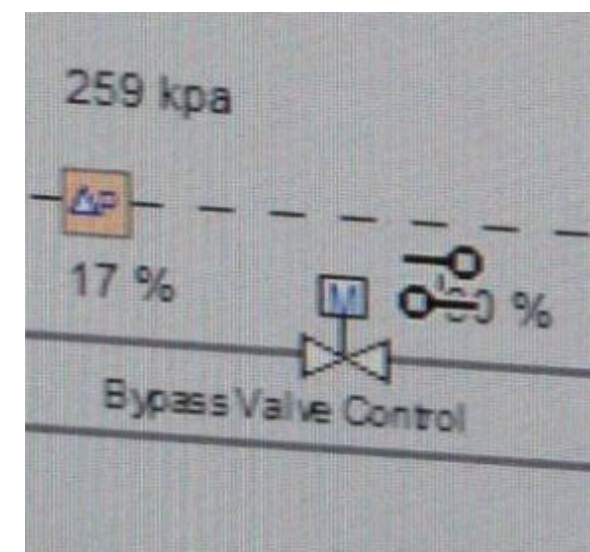
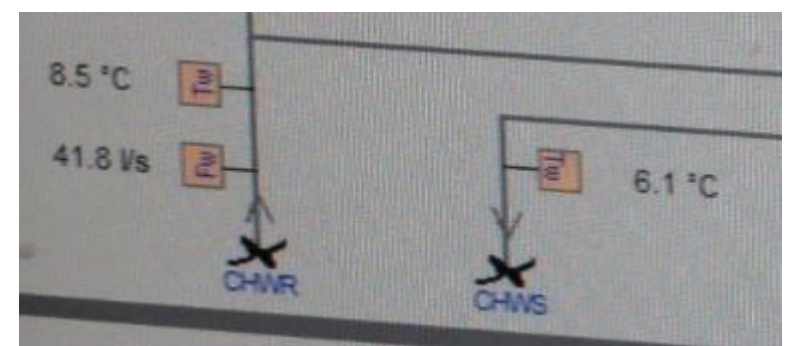
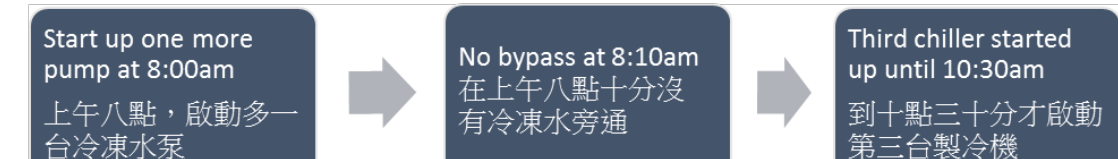
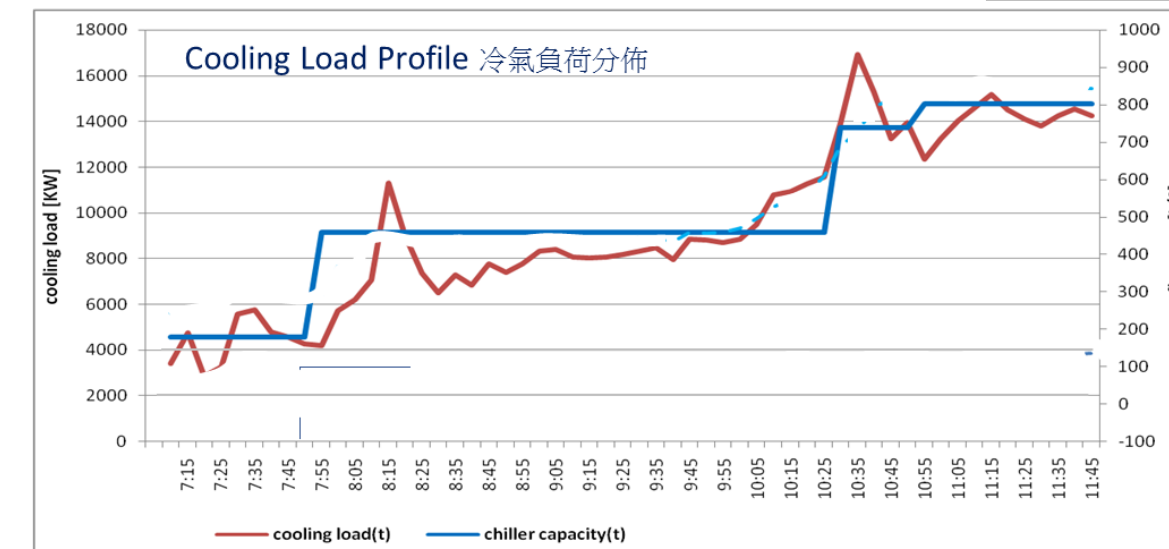
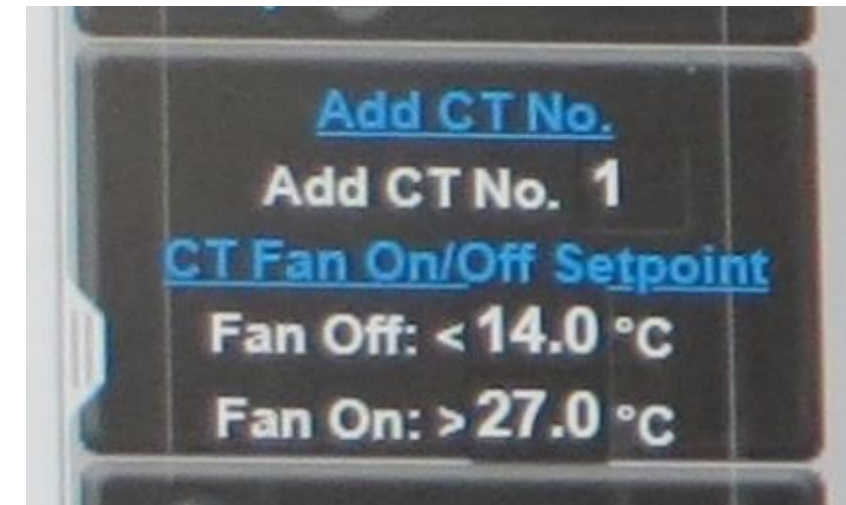
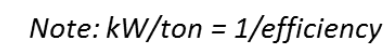
# RCx Trainings for RCx Practitioner/ RCx Professional

## Introduction





## How to conduct adjustment?

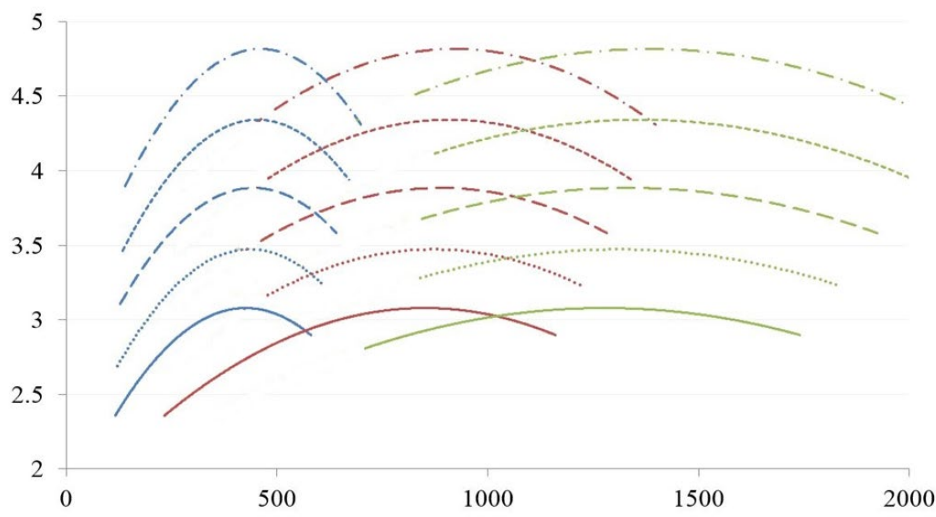
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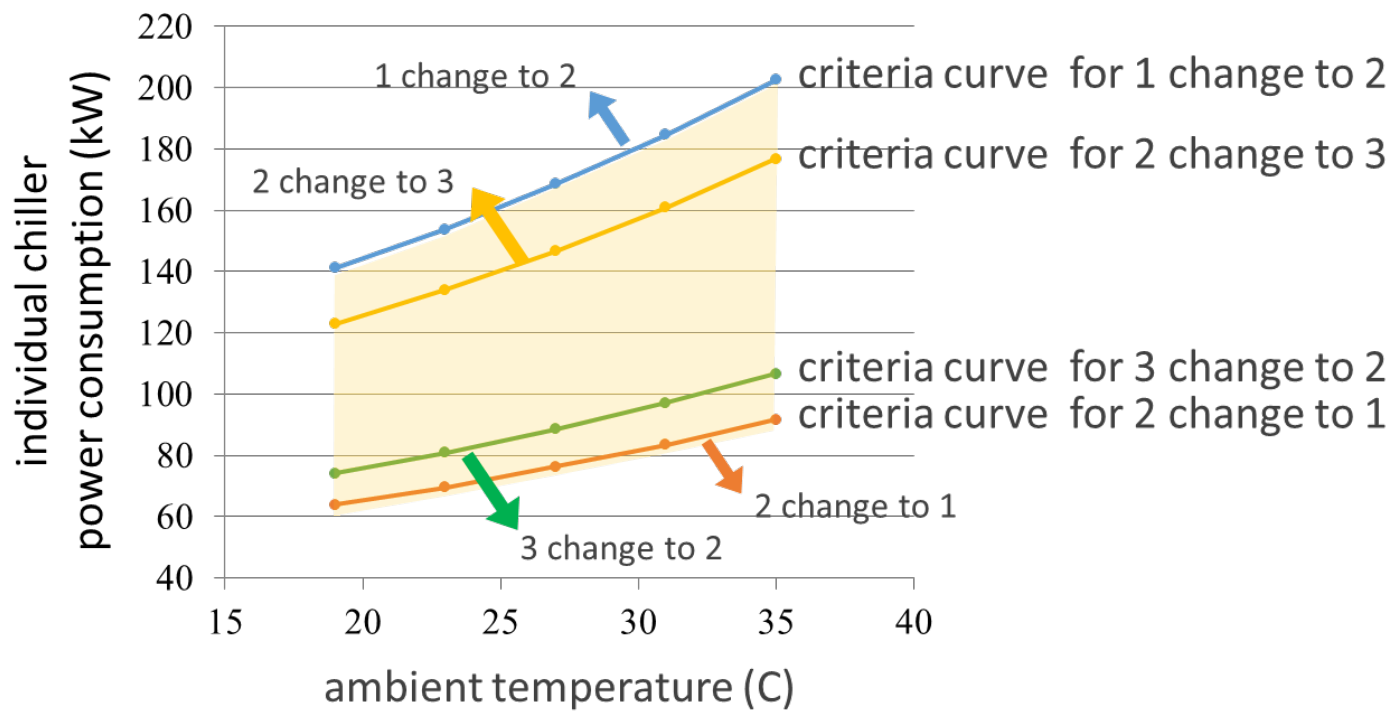
# Engineer

## How to treat data & info?

operating parameter		summer	spring & autumn	winter
indoor temperature (C)		23	23	20
chilled water supply temperature (subject to lease condition) (C)		7	7~10	10
condensing water S / R ΔT (C)		5		
cooling tower approach temperature (C)		4	4~7	7
chilled water mains S / R ΔP (kPa)		150	80~150	80
chilled water index S / R ΔP (kPa)		100	60~100	60
AHU supply air	temperature (C)	13	13~18	18
	quantity (%)	100%	70~100%	70%
primary air supply temperature (C)		16	16~20	20



## How to identify ESO?



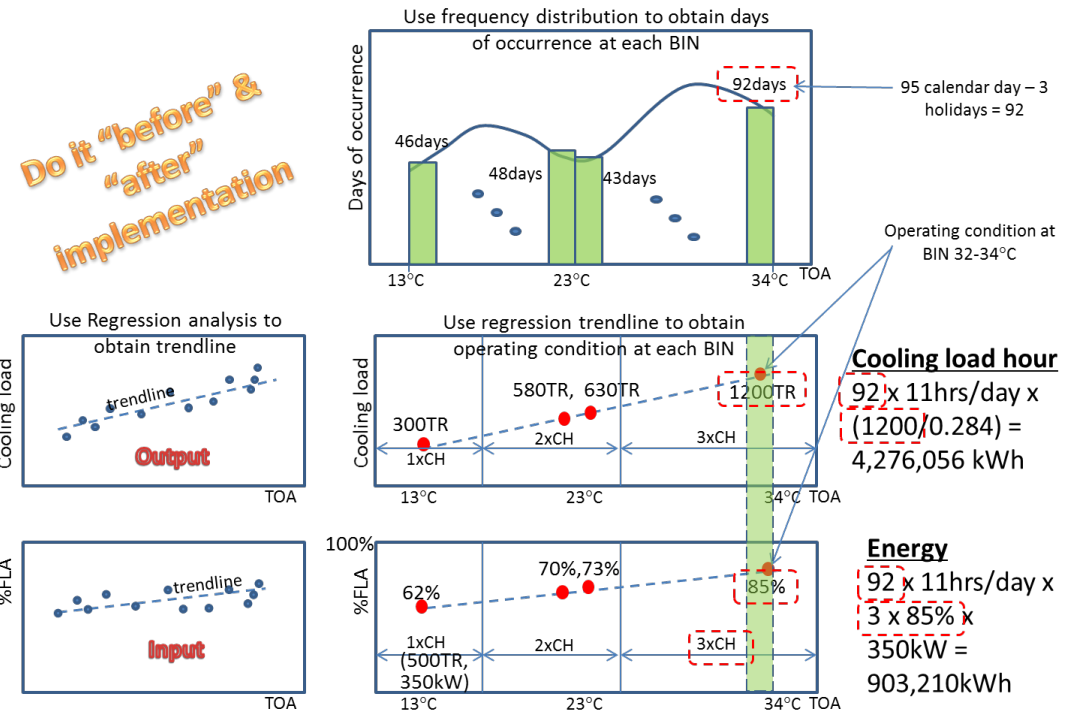
system operating parameter	effect on A/C equipment power consumption				
	chiller	CT	ChWP	CWP	AHU
ChW S temperature	↑	↓	↑		↑
CW S temperature	↑	↑	↓		
CW S/R ΔT	↑	↑	↓	↓	
ChWS pressure	↑		↑		

system	COP	efficiency
CAV AHU (W per l/s)		1.6
VAV AHU (W per l/s)		2.1
water cooled centrifugal chiller plant (<1000kW capacity) :-		
water cooled chilled water plant (power / cooling)	0.263 (*)	
water cooled chiller (power / cooling)	5	0.2
chilled water pump( kW power / kW cooling)		0.023 (*)
cooling water pump + cooling tower (power / cooling)		0.04 (*)

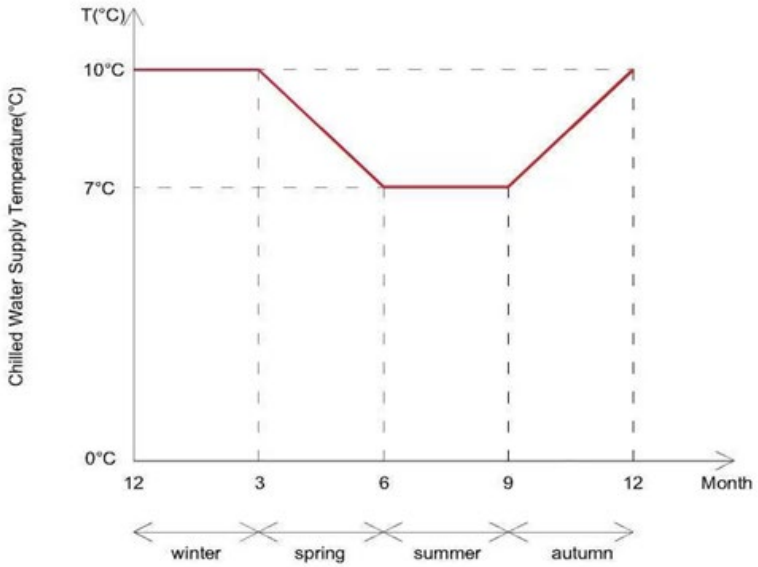


A/C equipment	ChWP	chiller evaporator	chiller condenser	cooling tower
controlled operating parameter	ChW supply pressure	ChW supply temp	refrigerant saturation temp	CW supply temp
	CSD ChWP	constant ChWS temp	CSD CWP	CSD CT
	VSD ChWP w/ ChW index ΔP F/B	ChWS temp reset w/ mains S/R ΔT F/B	VSD CWP w/ CW S/R ΔT F/B	VSD CT w/ CW S temp F/B
	VSD ChWP w/ control valve opening F/B	ChWS temp reset w/ AHU S/R ΔT F/B	VSD CWP w/ condenser LMTD F/B	VSD CT w/ CW S / WB ΔT F/B

## Annual Energy estimated by “BIN method”



## How to conduct M&V?

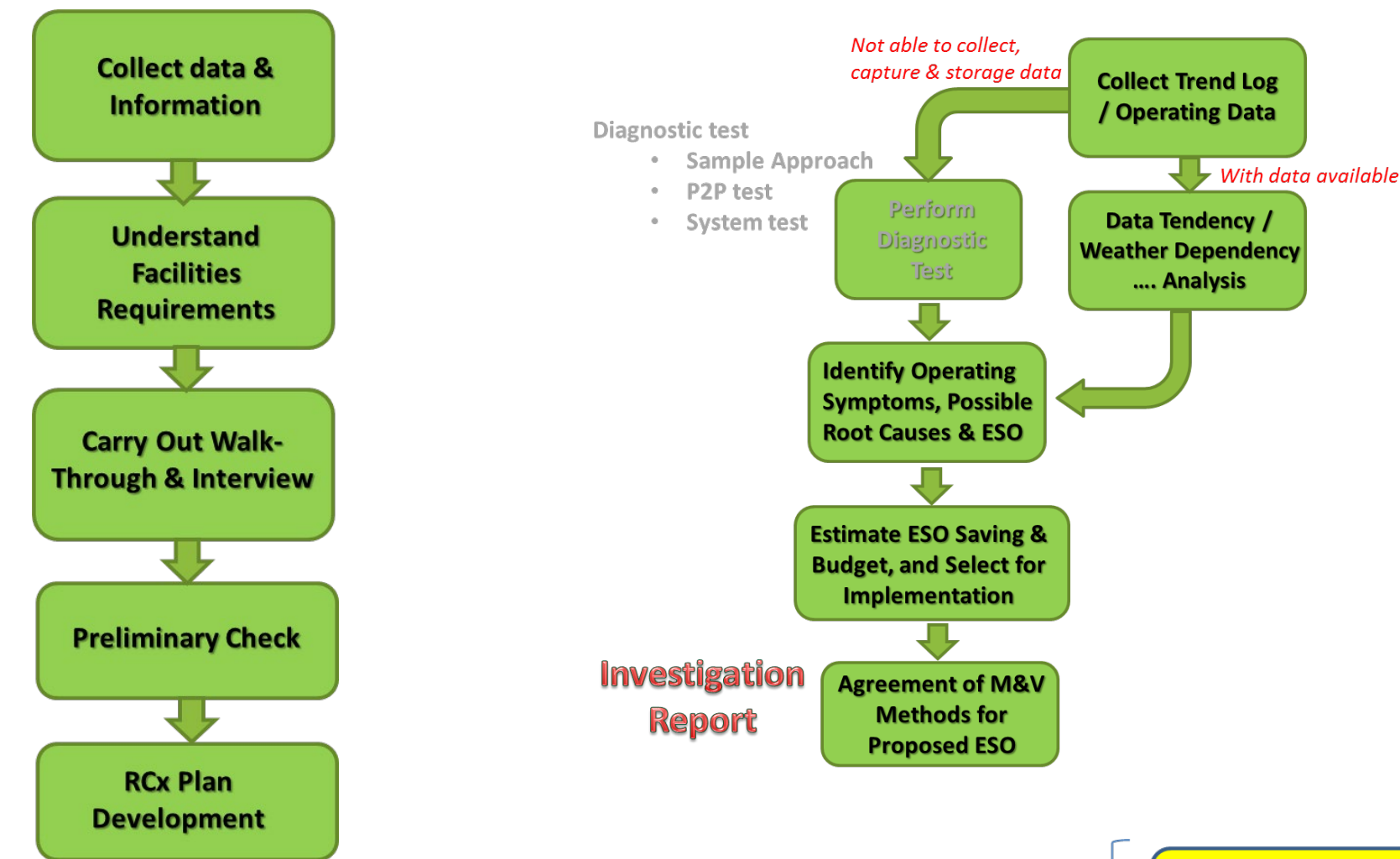


operating parameter		control device action	relationship
space temperature control	SA / RA (ΔT)	valve opening (VO)	$\Delta T \propto 1/(VO)$
	SA flow rate (Q)	fan operating speed (N)	$Q \propto N$
pump head (P)		pump operating speed (N)	$P \propto N^2$
CW S/R ΔT		pump operating speed (N)	$\Delta T \propto 1/N$
CT approach temperature		fan operating speed (N)	$\Delta T \propto 1/N$

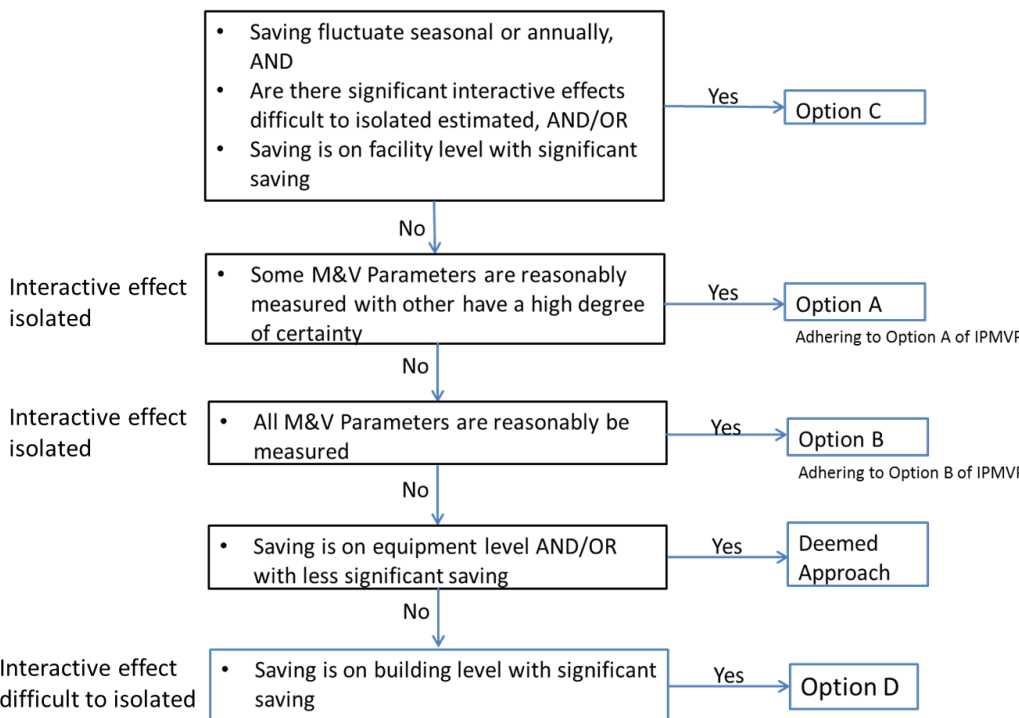


# Professional

## How to manage RCx, M&V?

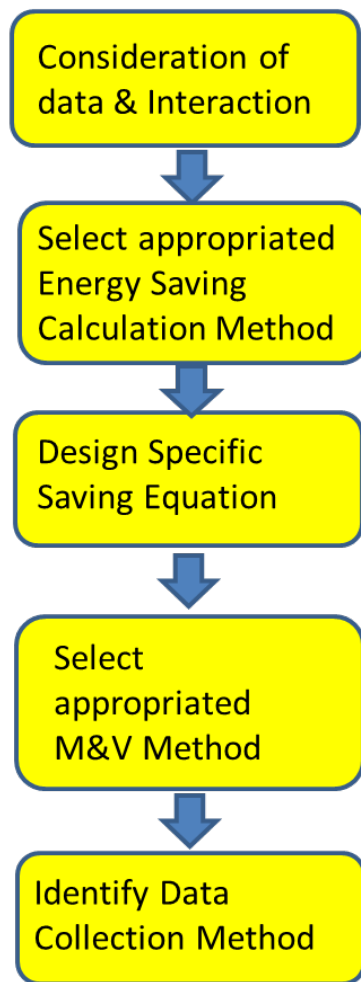


### Selection of M&V Methods

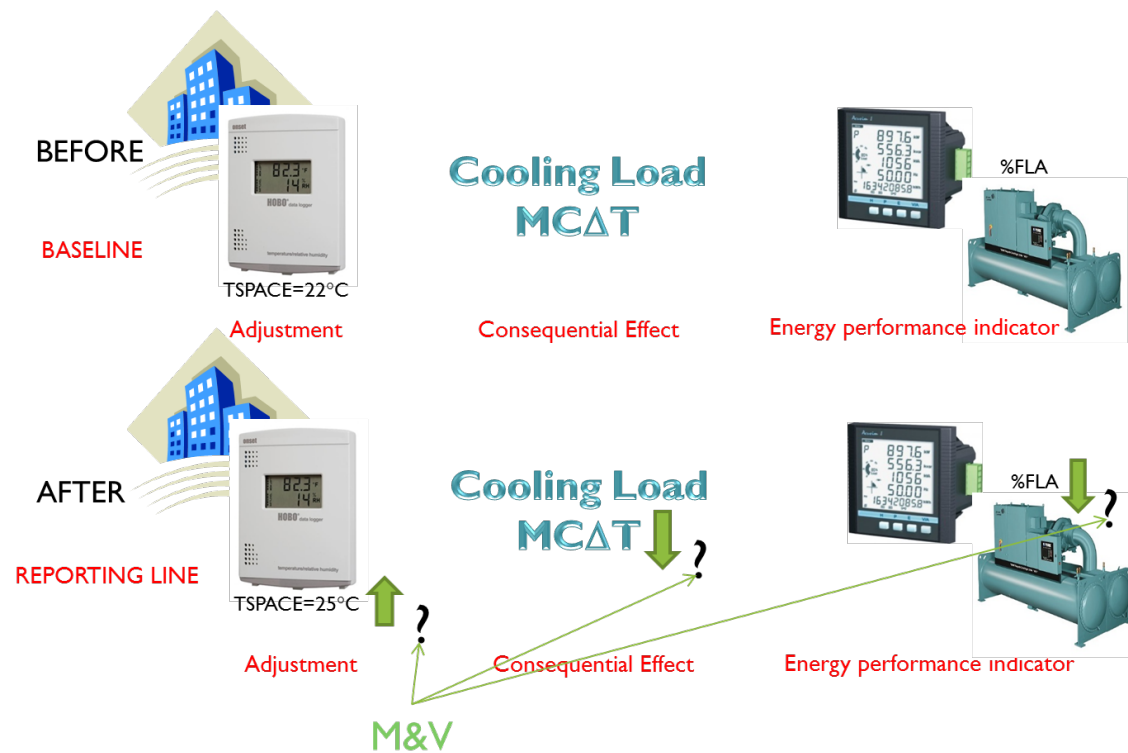
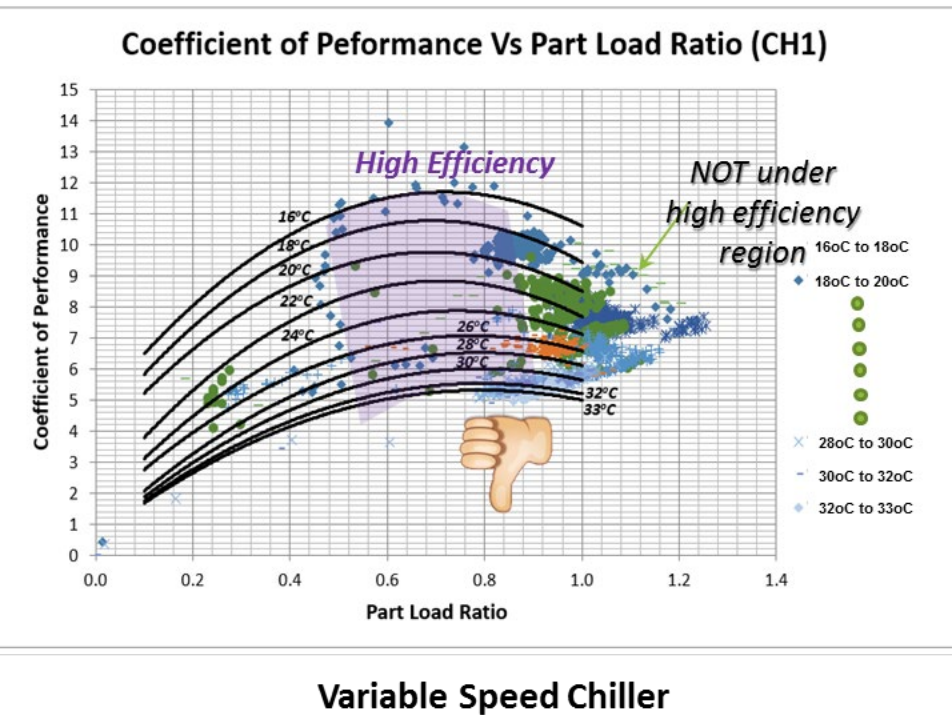
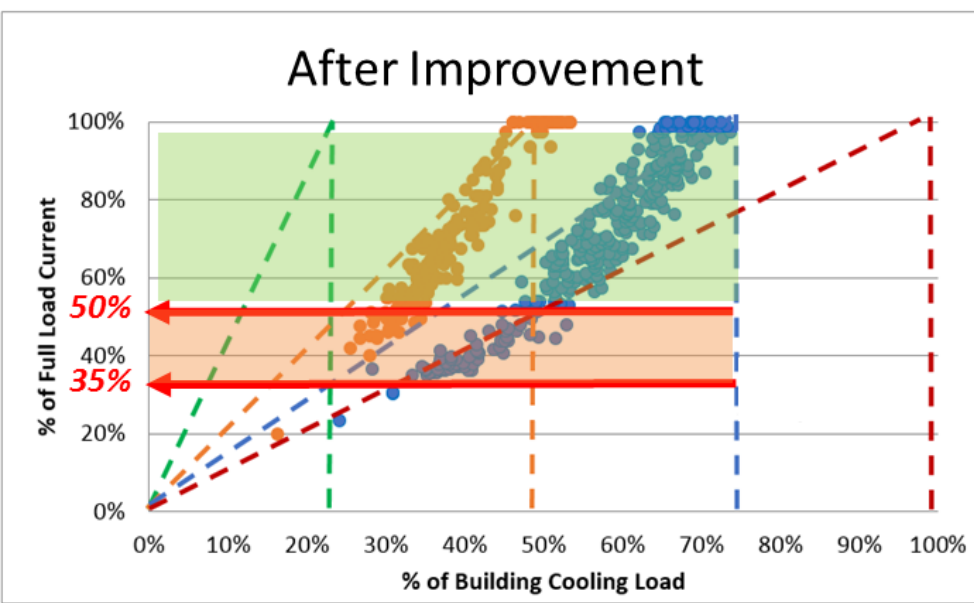
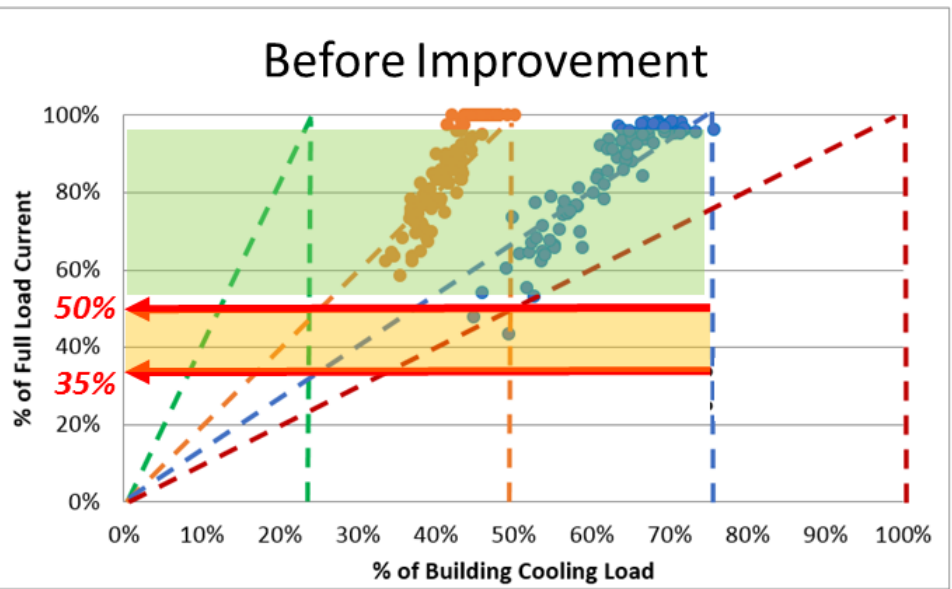
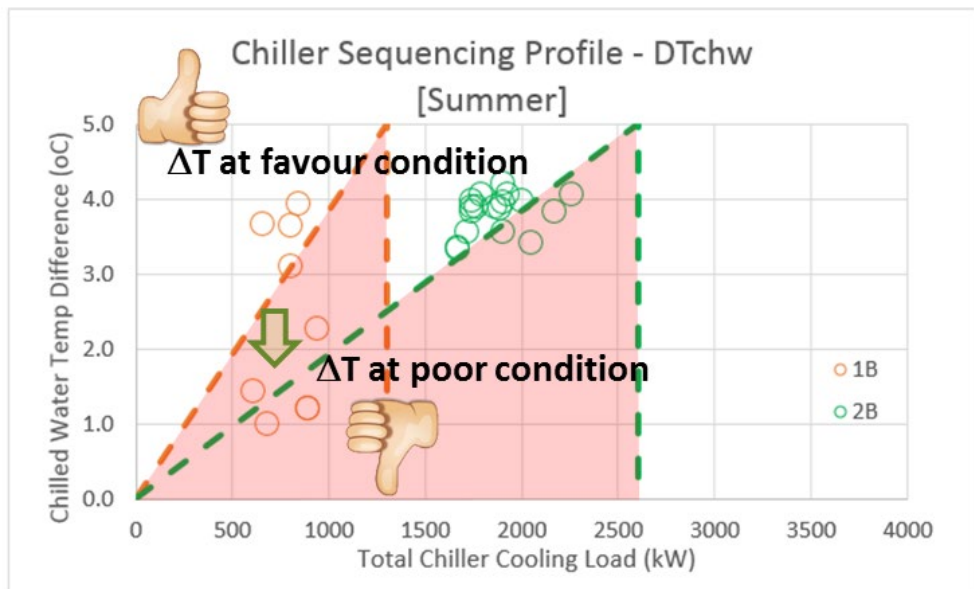
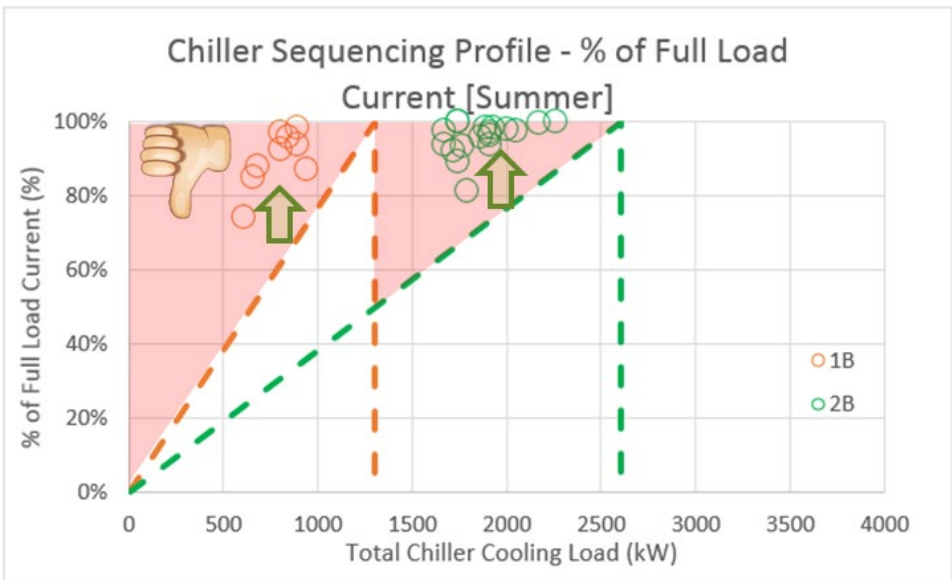


Saving Calculation Method

M&V Method



## How to evaluate overall performance?







## RCx Training and Registration Scheme – Individuals






# RCx Training and Registration Scheme – Individuals

	RCx Practitioner (Level 1)	RCx Practitioner (Level 2)	RCx Professional
Normal Route	Engineering Discipline (Building Services/ Mechanical/ Heating, Ventilation & Air-conditioning/ Electrical/ Energy or equivalent)		
	Certificate or above	Degree or above	Professional qualified Full member
	1 year relevant experience	1 year relevant experience	3 year relevant experience + 2 project references
	6 hours training + examination	8 hours training + examination	12 hours training + examination
Mature Route (2022)	7 years working experience (include 5 years or above in Facility Operator position)	10 years working experience (include 7 years or above in Facility Engineer position)	15 years or above in Facility Engineer/ Management position



# RCx Trainings for RCx Practitioner/ RCx Professional

Training fee (with early bird discount)

	RCx Practitioner (Level 1)	RCx Practitioner (Level 2)	RCx Professional
	HK\$1,200/head	HK\$3,600/head	HK\$6,400/head
	HK\$1,050/head	HK\$3,150/head	HK\$5,600/head
	HK\$900/head	HK\$2,700/head	HK\$4,800/head
Company package (10 -30 participants)	HK\$750/head	HK\$2,250/head	HK\$4,000/head



# Registration Scheme – Individual Registration

Registration fee (1<sup>st</sup> to 5<sup>th</sup> year)

RCx Practitioner (Level 1)	RCx Practitioner (Level 2)	RCx Professional
HK\$200/year or HK\$640 for 1 <sup>st</sup> to 5 <sup>th</sup> year	HK\$500/year or HK\$1,600 for 1 <sup>st</sup> to 5 <sup>th</sup> year	HK\$800/year or HK\$2,560 for 1 <sup>st</sup> to 5 <sup>th</sup> year

Renewal requirement and fee (every 5 years)

	RCx Practitioner (Level 1)	RCx Practitioner (Level 2)	RCx Professional
Renewal Requirement	3 CPD hours/ year	6 CPD hours/ year	6 CPD hours/ year + 2 project references
Renewal Fee	HK\$100/ year or HK\$400/ 5 years	HK\$250/ year or HK\$1,000/ 5 years	HK\$400/ year or HK\$1,600/ 5 years

By one-off payment  
**20% OFF**





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## Registration Scheme – Services Provider Registration



# Registration Scheme – Services Provider Registration

Registration requirement and fee

**Type A**  
**(RCx Facility Management Firms)**

3 years in the business of facilities management or property management

5 numbers of RCx Practitioner with at least 1 number of RCx Professional

HK\$6,000/ 3 years

<b>Type B</b> <b>(RCx Consultants)</b>	<b>Type C</b> <b>(RCx Contractors)</b>
Provide RCx and building energy related consultancy service	Provide RCx or RC related retrofitting works, modification





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**HKGBC RCx Website**



# HKGBC RCx Website





# RCx Practitioner/Professional Directory



**Retro-Commissioning**  
Significant Savings at Minimal Cost

[Join Now](#)

[Registration Scheme](#) [RCx Directory](#) [CPD Events](#) [Trainings](#) [Resources](#) [Contact Us](#) [Login](#)

## RCx Directory

☐ RCx Practitioner (Level 1) ☐ RCx Practitioner (Level 2) ☐ RCx Professional

Search

119 records found

**Ir Au Sun Tung**  
Technical Director  
Ultra Power E&M Eng. Co., Ltd.

RCx Pro

**Ir Au Tat Kay**  
Director  
Green Champ Technology and Consulting Engineers Ltd.

RCx Pro

**Mr CHAN Chun Kit**  
Chartered Engineer

RCx Pro

**Ir Chan Chun Tao**  
Assistant Project Manager  
Swire Properties Limited

RCx Pro

# RCx Services Provider Directory



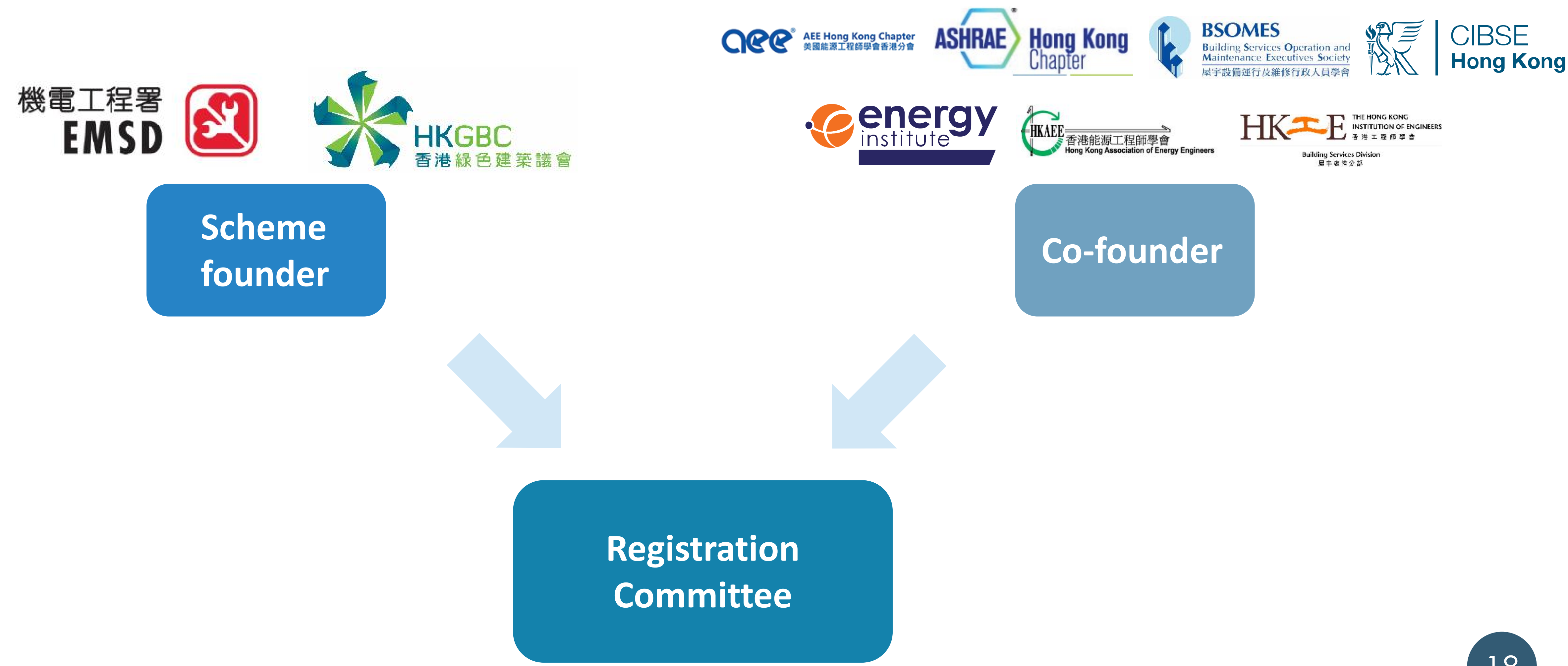


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## **Roles of EMSD, HKGBC, and the Registration Committee**



# Roles of EMSD, HKGBC, and the Registration Committee





# Memorandum of Collaboration (MOC)

Registered RCx Services Provider



Facilitator (HKGBC)



FM Team (Registered RCx Practitioner/Professional)



MOC

Non-profit making RCx Project





# Green Schools 2.0 for Retro-commissioning

## WORKSHOP CUM SEMINARS

**Date: Late Jan to early Feb 2021 (1 hour)**

1. Online demonstration video
  - RCx site evaluation
  - Implementation of energy saving measures, measurement and verification process
2. RCx services and products sharing
3. Q&A







# Green Schools 2.0

## for Retro-commissioning

Enquiry: 3994 8818

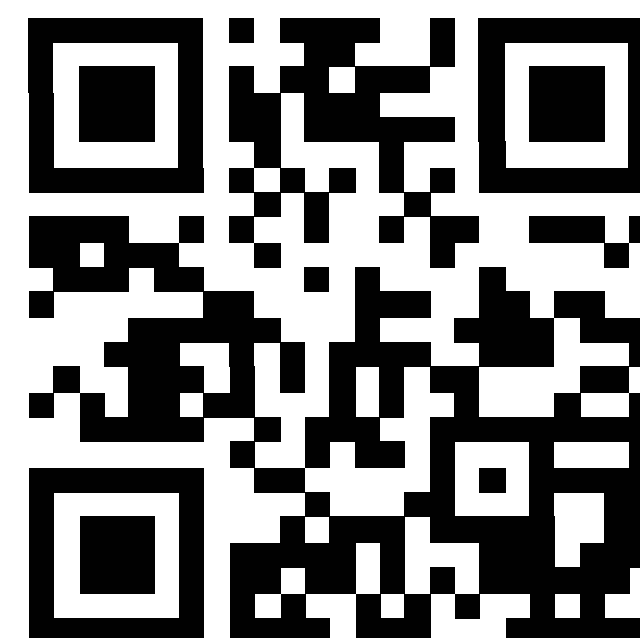
## REGISTER NOW FOR FREE

- Engagement Meeting (Pre-recorded video)
- Induction Talks (Pre-recorded video)
- Professional Talks (Pre-recorded video)
- Workshop cum Seminars

If you are interested, please refer to our website for details and registration:

<http://greenschools2.hkgbc.org.hk/>

### Register NOW!



EMSD RCx  
Resources  
Centre

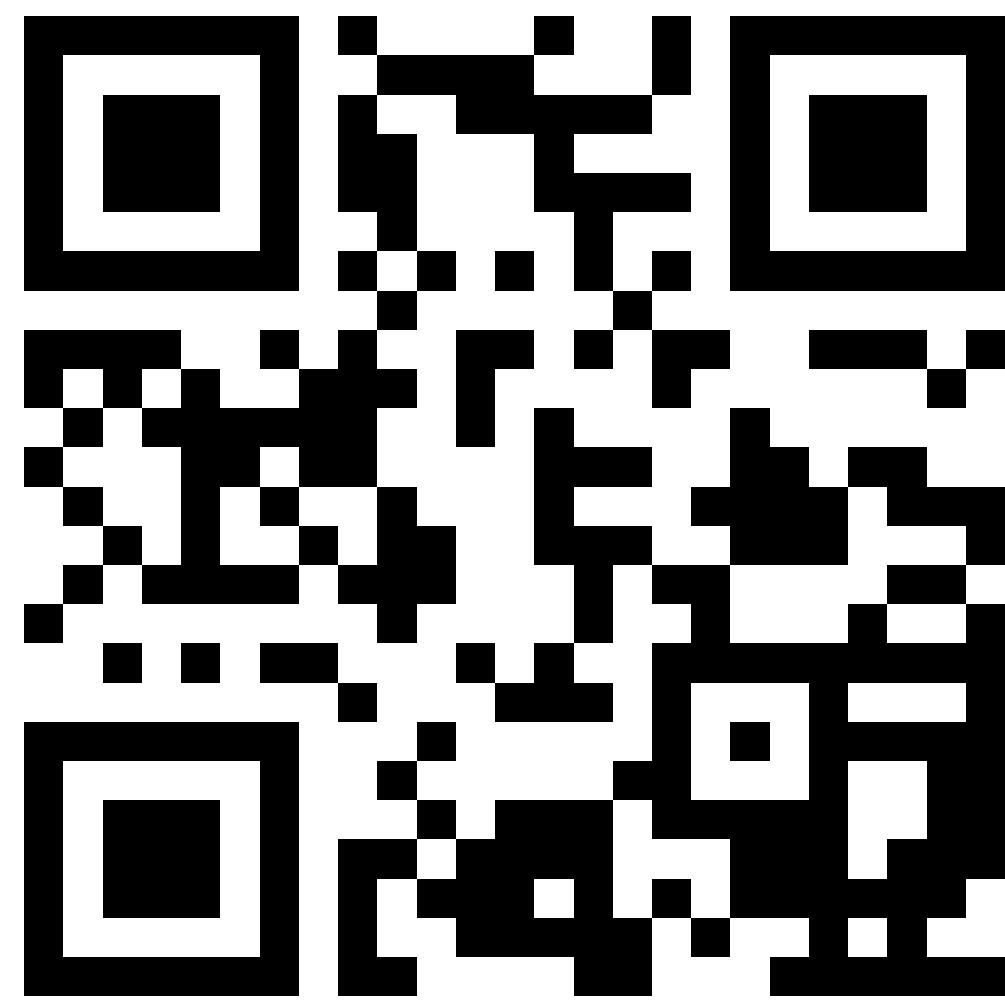


HKGBC RCx Training  
and Registration  
Scheme





**Your feedback is  
important to us!**



<https://forms.gle/1n5YhkWsB1iX1fY17>

