

Hong Kong Green Building Council Limited (HKGBC)

Invitation to Submit Retrofitting Initiatives and Case Studies for HKGBC Retrofitting Hub

Introduction

The HKGBC Retrofitting Guidebook was first released in January 2023 and its revised version was launched in December 2023. The purpose of the guidebook is to drive for mainstreaming retrofitting of existing buildings by providing practical initiatives and successful case studies as reference to the industry. Since its launch, the guidebook has been highly regarded by the industry locally and abroad.

The Retrofitting Hub is designed as a services and knowledge sharing online platform, planned to be updated from time to time, to include all relevant information, guidelines, reference materials, case studies, training and capacity building opportunities, etc. The HKGBC is now collecting further case studies to be included into the Retrofitting Hub, which is targeted to be launched towards end 2024 / early 2025. This round of the case studies collection aims to:

1. Enrich the current showcase areas with more initiatives on new and cutting-edge technologies, such as chilled beam and chilled ceiling system, digital platform & A.I. technologies, solar responsive film/coating on facades, etc.; and
2. Any other new retrofitting initiatives.

The HKGBC would like to extend the invitation to you and your organisations for submission of relevant initiatives and case studies to be included into the Retrofitting Hub. Your contribution will help showcase new retrofitting ideas and best practices in the industry and encourage others to adopt these initiatives and further contribute to the carbon neutrality roadmap of Hong Kong.

The latest Retrofitting Guidebook can be downloaded from:

<https://retrofitting.hkgbc.org.hk/guidebook/download.php?ref=41637781>.

Criteria

1. The submissions shall be related to the following showcase areas:-

Current showcase areas

- HVAC – Waterside Air-conditioning System
- HVAC – Airside Air-conditioning System
- HVAC – Server Room/ Data Centre Air-conditioning System
- Electrical System – Lighting System
- Electrical System – Electricity Distribution System
- Electrical System – Lift & Escalator
- Building Envelope
- Plumbing and Drainage System
- HVAC –Carpark & Kitchen Mechanical Ventilation System
- HVAC – Heating System
- HVAC – External pipework and ductwork
- Commercial Appliance – Green Commercial Kitchen
- Commercial Appliance – Server Room/ Data Center
- Central Control and Monitoring System
- Smart Control Systems
- Energy Management System

Plus any other new showcase areas.

2. The submissions can be:-

- A new case study initiative using current retrofitting initiatives and/or new retrofitting initiatives. For the list of current retrofitting initiatives, please refer to Annex 1 or the guidebook's latest edition.

<https://retrofitting.hkgbc.org.hk/guidebook/download.php?ref=41637781>).

- An update of the existing case study with new retrofitting initiatives added. for enriching the showcase webpage of the Retrofitting Hub.
3. The case studies shall showcase real retrofitting projects in private/public building sector, and are expected to demonstrate remarkable achievement in terms of energy saving and/or pioneering good practices for industry's reference.
 4. The format of the submissions should follow the sample of Reply Slip (Annex 3).
 5. There is no limit on the number of submissions.
 6. The acceptance of the submissions for inclusion into the Retrofitting Hub will be at the sole discretion of the HKGBC.

Submission Details

Any parties who are interested in contributing to the Retrofitting Hub are welcome to submit **by returning the REPLY SLIP (Annex 2) and relevant information to rpe@hkgbc.org.hk on or before 16 Dec 2024 (Monday) 6:00pm**. The submissions will be reviewed against the above mentioned criteria, and those accepted will be featured in the showcase webpage of the Retrofitting Hub. Kindly note that the consent of publishing relevant information in the showcase webpage should be obtained from the building owners before publicity.

Enquiry

Should you have any questions, please feel free to contact Ms Irene WONG at 3994 8809 (email: irene.wong@hkgbc.org.hk) or Ms Fiona CHAN at 3994 8861 (email: fiona.chan@hkgbc.org.hk).

Issued: Oct 2024

Encl.:

Annex 1 – List of Current Retrofitting Initiatives

Annex 2 – Reply Slip

Annex 3 – Sample of the Reply Slip

Annex 1 – List of Current Retrofitting Initiatives

MEP System	
A. HVAC – Waterside Air Conditioning System	
A1	Replacement of more efficient chiller
A2	Conversion of air-cooled to water-cooled chiller plant
A3	Conversion to variable speed cooling tower fan
A4	Installation of auto-cleaning devices for condensers of water-cooled chillers
A5	Installation of electromagnetic clamp-on devices for condensing water system
A6	Conversion to variable speed chilled water pump
A7	Conversion to primary variable flow system
A8	De-centralised chilled water distribution system with zone in-line pump
A9	Supply and return chilled water temperature differential control with zone control valve
A10	De-centralised chilled water distribution system for equipment with different chilled water operation requirements
B. HVAC – Airside Air Conditioning System	
B1	Replacement of traditional 3-speed FCU to variable speed FCU with permanent magnet motor
B2	Conversion of constant-air-volume (CAV) to variable-air-volume (VAV) system
B3	Conversion of VAV system to sensible space cooling with dedicated outdoor air system (DOAS)
B4	Installation of indirect evaporative cooling System (IEC) for pre-cooling of primary fresh air with exhaust air.
B5	Conversion to demand fresh air control system coupling with exhaust air system
B6	Conversion to radiant cooling technologies (e.g. chilled beam / chilled ceiling) with dedicated air handling system (DAHS)
B7	Using spot cooling for local air-conditioning zone
B8	Using high volume low pressure (HVLP) ceiling fan for ventilated cooling
B9	Using lower pressure drop air filters with new technologies and features that can improve filter efficiency
B10	Using electronically commutated (EC) plug fan in AHU/PAU
B11	Enlargement of fresh air inlet and ductwork for free cooling application with low ambient temperature and relative humidity
C. HVAC – Heating System	
C1	Replacement of electric/gas heater/boiler to heat pump

D. HVAC – Carpark and Kitchen Mechanical Ventilation System	
D1	Zoning the carpark for operation mode
D2	Conversion to demand fresh air control system coupling with exhaust air system
D3	Installation of induction fan unit to minimise fan dust ventilation system
E. HVAC – Server Room/ Data Centre Air Conditioning System	
E1	Installation of cold-aisle enclosure which can totally separate it from hot-aisle
E2	Use of immersion cooling and heat pipe recovery modules for cooling
E3	Conversion of CRAC unit to cold door for server rack cooling
F. HVAC – External pipework and ductwork	
F1	Application of insulated coating / painting at external pipework and ductwork
G. Electrical systems – Lighting System	
G1	Re-allocation of office layout plan and/or lighting distribution plan to maximum daylight penetration and matching the demand
G2	Installation of occupancy/motion sensor for on/off/dimming control of lighting
G3	Use of smart lighting control platform
G4	Adoption of task light with lower background lighting
G5	Adoption of task lighting to lower the background lighting
G6	Replacement of high efficacy lighting source
H. Electrical System – Electricity Distribution System	
H1	Provision of Power and Harmonic Analyser
H2	Provision of Smart Metering
J. Electrical System – Lift and Escalator	
J1	Installation of regenerative drive for lifts
J2	Modernisation of lifts and escalators
J3	Upgrade of lift control platform with energy efficiency features
J4	Optimise the counter weight and decoration weight of lift car
K. Plumbing & Drainage System	
K1	
L. Commercial Appliances - Green Commercial Kitchen	
L1	Conversion to demand control ventilation system
L2	Conversion to heat recovery kitchen appliances
M. Commercial Appliances - Server Room / Data Centre	
M4	Replacement of more energy efficient uninterruptible power system (UPS)
N. Central Control and Monitoring System	
N1	
P. Energy Management System	
P2	

Q. Smart Control Platform	
Q1	Installation of smart energy management platform for data collection and visualisation, performance monitoring and evaluation, demand control and efficiency optimization.
Q2	Using AI solution and data mining technologies to optimize energy efficiency and operational performance for major equipment and building services systems.
Q3	Using web-cam people counting and recognition system for optimizing energy efficiency and operational performance air-conditioning and building transportation system
Building Envelope (BE)	
R. Curtain Wall and skylight System	
R1	Application of solar film / insulated coating at façade / skylight
R2	Application of Ventilation façade
R3	Application of multi-skin façade system
R4	Renewable energy integrated with façade
R5	Replacement of façade system
S. Opaque Wall and Roof System	
S1	Application of vertical green wall and green roof
S2	Application of insulated coating / painting at external wall and roof
S3	Renewable energy integrated with green roof
T. Passive System	
T1	Use of natural ventilation
T2	Use of light shelf and light tube
T3	Use of double door/revolving door or installation of air curtain to reduce infiltration
U. Others	
U1	
U2	

Annex 2 – Reply Slip

1. It is a new case study. Please select the type of your submission and provide the relevant information

- With a list of new retrofitting initiative(s), You can relate your new case study with more than one retrofitting initiatives names (Each name should be not more than 15 words)

Name(s) of the new retrofitting initiatives	1.
	2.
	3.

And / Or

- With a list of current retrofitting initiatives that refer to Annex 1 for the relevant numbering, i.e. A1, A2, A3, etc. You can relate your new case study with more than one retrofitting initiatives numbers

Number(s) of the current retrofitting initiatives:	
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2. Please select ONE relevant showcase areas for the new case study

- | | |
|--|---|
| <input type="checkbox"/> HVAC – Water-side Air-conditioning System | <input type="checkbox"/> HVAC – Carpark & Kitchen Mechanical Ventilation System |
| <input type="checkbox"/> HVAC – Air-side Air-conditioning System | <input type="checkbox"/> HVAC – Heating System |
| <input type="checkbox"/> HVAC – Server Room/ Data Centre Air-conditioning System | <input type="checkbox"/> HVAC – external pipework and ductwork |
| <input type="checkbox"/> Electrical System – Lighting System | <input type="checkbox"/> Commercial Appliance – Green Commercial Kitchen |
| <input type="checkbox"/> Electrical System – Electricity Distribution System | <input type="checkbox"/> Commercial Appliance – Server Room/ Data Center |
| <input type="checkbox"/> Electrical System – Lift & Escalator | <input type="checkbox"/> Central Control and Monitoring System |
| <input type="checkbox"/> Building Envelope | <input type="checkbox"/> Smart Control Systems |
| <input type="checkbox"/> Plumbing & Drainage System | <input type="checkbox"/> Energy Management System |

Others _____

1. Please provide the details of the case study.

Information of Building	
Building owner:	
Building name:	
Photo of the building: (At least 300 dpi)	*Please attach the photo as Annex
Description of the building:	

Information of Retrofitting Project	
Retrofitted initiative(s): (Current)	

Name of the 1 st new retrofitting initiatives:	
Suggested consideration (if any):	
Name of the 2 nd new retrofitting initiatives:	
Suggested consideration (if any):	
Name of the 3 rd new retrofitting initiatives:	
Suggested consideration (if any):	
Schematic diagram/ photo indicating the changes/ implementation (optional): (At least 300 dpi)	* Please attach the diagram/photo as Annex
Observed benefits other than energy saving:	
General observations of the retrofitting project:	
Name of consultant and contractors (optional):	

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Cost	
Total cost (in HKD):	
Cost breakdown (optional):	
Saving	
Total savings/year (in HKD):	
Savings/year breakdown (optional):	
Payback:	
Subsidy/ Funding	
The project is supported by (if any):	

Awards	
Award(s) received by the project (if any):	

2. Please provide the contact information for onward liaison. The contact information will not be disclosed in the website.

Contact person:	
Organisation:	
Position:	
Contact no.:	
Email:	

Annex 3 – Sample of the Reply Slip

2. It is a new case study. Please select the type of your submission and provide the relevant information

- With a list of new retrofitting initiative(s), You can relate your new case study with more than one retrofitting initiatives names (Each name should be not more than 15 words)

Name(s) of the new retrofitting initiatives	1.
	2.
	3.

And / Or

- With a list of current retrofitting initiatives that refer to Annex 1 for the relevant numbering, i.e. A1, A2, A3, etc. You can relate your new case study with more than one retrofitting initiatives numbers

Number(s) of the current retrofitting initiatives:	A6, A9, B5, B8, C7, C14
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3. Please select ONE relevant showcase areas for the new case study

- | | |
|--|---|
| <input type="checkbox"/> HVAC – Water-side Air-conditioning System | <input type="checkbox"/> HVAC – Carpark & Kitchen Mechanical Ventilation System |
| <input type="checkbox"/> HVAC – Air-side Air-conditioning System | <input type="checkbox"/> HVAC – Heating System |
| <input type="checkbox"/> HVAC – Server Room/ Data Centre Air-conditioning System | <input type="checkbox"/> HVAC – external pipework and ductwork |
| <input type="checkbox"/> Electrical System – Lighting System | <input type="checkbox"/> Commercial Appliance – Green Commercial Kitchen |
| <input type="checkbox"/> Electrical System – Electricity Distribution System | <input type="checkbox"/> Commercial Appliance – Server Room/ Data Center |
| <input type="checkbox"/> Electrical System – Lift & Escalator | <input type="checkbox"/> Central Control and Monitoring System |
| <input type="checkbox"/> Building Envelope | <input type="checkbox"/> Smart Control Systems |
| <input type="checkbox"/> Plumbing & Drainage System | <input type="checkbox"/> Energy Management System |

Others _____

3. Please provide the details of the case study.

Information of Building	
Building owner:	ABC Limited
Building name:	ABC Building
Photo of the building: (At least 300 dpi)	*Please attach the photo as Annex
Description of the building:	<ul style="list-style-type: none"> • Grade A Commercial complex with 23 floors of offices , 4 floors shopping centre, 3 floors basement carpark • Fully air-conditioned with air-cooled central chilled water system, deferential pressure by-pass, constant speed pumps • Fan-coil unit for offices and shopping centre with pre-treated fresh air • Generator set lift • T-8 light tube

Information of Retrofitting Project	
Current retrofitted initiative(s):	<p>HVAC Chilled water system: Converted the chilled water system to variable flow system. All pumps fitted with variable speed drives and necessary controls to control the flowrate of the chilled water by differential temperature of chilled water supply and return header and override by pressure differential of the critical circuit point</p> <p>HVAC primary Fresh air system: Converted the primary fresh air system to demand control. Fresh air flow rate on every floor is controlled by resetting the set point of a constant air value flow according to a carbon dioxide sensor. Speed of fresh air fan is controlled by a pressure sensor at the supply air duct</p> <p>Lift: modernise the existing Generator set lift to VVVF lift control</p> <p>Lighting: replace all common area lighting to LED lighting panel</p>

Name of the 1 st new retrofitting initiatives:	
Suggested consideration (if any):	
Name of the 2 nd new retrofitting initiatives:	
Suggested consideration (if any):	
Name of the 3 rd new retrofitting initiatives:	
Suggested consideration (if any):	
Schematic diagram/ photo indicating the changes/ implementation (optional): (At least 300 dpi)	* Please attach the diagram/photo as Annex
Observed benefits other than energy saving:	<ul style="list-style-type: none"> • Reduced maintenance resources in plant operations and future retro-commissioning and balancing • More information for plant monitoring and reporting • Smoother operation, shorter waiting time for passengers • Resolved the problem of sourcing lift spare parts • Better light quality
General observations of the retrofitting project:	<ul style="list-style-type: none"> • HVAC system retro-fit have not affected the tenants • Standard retro-fitting initiatives with proven technologies and straight forward • Lift retro-fit requires shut down of lift services one by one. Some disturbance to tenants but manageable • Lightings for offices are replaced during weekends • Lightings for shopping centres are replaced area by area during non-business hours. Slightly affected on aesthetics of the mall during the retro-fit period. Posters advising customers of the enhancing project was

	<p>posted. No complaints received.</p> <ul style="list-style-type: none"> Overall a well justified project with good outcomes with tangible and non-tangible benefits
Name of consultant and contractors (optional):	

Cost	
Total cost (in HKD):	HKD 6.8 million
Cost breakdown (optional):	Chilled water system HKD 300,000 Primary air system HKD 120,000 Lift modernization HKD 4,000,000 Lighting HKD 800,000
Saving	
Total savings/year (in HKD):	HKD 580,000
Savings/year breakdown (optional):	Chilled water system: HKD 60,000 Payback: 5 yr Primary air system: HKD 40,000 Payback: 3 yr Lift modernization: HKD 80,000 Payback: 50 yr Lighting: HKD 400,000 Payback: 2 yr
Payback:	11.7 yr
Subsidy/ Funding	
The project is supported by (if any):	Green Building Fund

Awards	
Award(s) received by the project (if any):	Green Building Award Innovation and Technology Award

4. Please provide the contact information for onward liaison. The contact information will not be disclosed in the website.

Contact person:	
Organisation:	
Position:	
Contact no.:	
Email:	