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Hong Kong Green Finance Association

ACTIVATING THE RETROFITTING MARKET IN HONG KONG

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FOREWORD

by Christine Loh

The HKSAR Government must take urgent and decisive action to establish a robust market for retrofitting existing buildings – both to meet its decarbonization targets and to cushion residents and businesses from rising electricity costs. Energy efficiency in buildings is no longer a peripheral concern. It is central to Hong Kong's economic competitiveness, quality of life, and ability to deliver on climate commitments.

Buildings should not be seen simply as sources of emissions or regulatory headaches, but rather as vital city assets – rich with potential to drive decarbonization, attract private investment, and support innovation. They are the physical foundation for a greener, more data-tech-enabled, and more finance-savvy city.

This opportunity, however, will not materialize without government intervention to align policies, de-risk investment, and mobilize cross-sectoral action. Retrofitting is not just a technical challenge; it is a systems challenge that requires strategic coordination between the Environment and Ecology Bureau, Development Bureau, Innovation and Technology Bureau, Financial Services and Treasury Bureau, and the Financial Secretary's Office. Their combined leadership can transform the retrofit landscape.

At present, buildings account for around 90% of Hong Kong's electricity consumption and over half of our carbon emissions. The Climate Action Plan 2050 sets necessary targets: reducing electricity use in commercial buildings by 30%–40% and in residential buildings by 20%–30% from 2015 levels by 2050, with half of the savings to be achieved by 2035. However, the lack of any concerted or coordinated strategic push to meet these goals has meant that, progress in retrofitting existing stock remains too slow, and current incentives have not generated the needed market momentum.

Government officials are understandably concerned that tighter regulations might face pushback from building owners. Stronger regulation and standards have already proven to be effective tools. Meanwhile, financial institutions are increasingly interested in supporting energy efficiency projects, but remain cautious in the absence of a clear, consistent policy signal from the government. Officials working on finance, innovation, and technology must also recognize that building retrofits represent a powerful platform for advancing green finance and green tech. While emerging sectors like FinTech and AI receive significant attention, green building technologies offer practical, scalable, and immediate benefits – with strong links to engineering, data, and systems innovation.

The retrofitting of buildings should be treated as a strategic priority. It can generate green jobs, increase resilience, lower utility bills, and support Hong Kong's ambition to be a leading green finance hub. But the private sector cannot do this alone. The retrofit market remains constrained by high upfront costs, long and uncertain payback periods, and fragmentation among building owners, many of whom lack the necessary technical and financial capacity.

Governments are uniquely positioned to create new markets. A coordinated package of policy tools – led by the Financial Secretary – can unlock investment at scale. Financial instruments such as GFA concessions, loan guarantees, grants, tax credits, and energy performance contracts can accelerate retrofitting while minimizing fiscal impacts. With proper risk-sharing mechanisms and a clearer regulatory path, the government can enable private capital to flow with confidence.

A coordinated, whole-of-government platform is urgently needed to align policies, provide investment certainty, and scale up the retrofit market. Hong Kong's building professionals, developers, contractors, financiers, and technologists are ready to act. What they need is a consistent signal from the government that building retrofits are a long-term priority and a critical pathway to climate and economic goals.

To spark dialogue within the administration, HKGFA stands ready to support the government in aligning its policy levers to unlock this opportunity – creating a retrofit market that delivers climate results, economic gains, and a more liveable city for all.

1 INTRODUCTION

1.1 CONTEXT

The building sector plays a crucial role in Hong Kong's carbon-neutral future. Operational energy from these existing buildings (EBs) constitutes 90% and 60-65% of Hong Kong's electricity consumption and carbon emissions, respectively. Addressing the built environment's operational energy consumption presents a significant opportunity to reduce Hong Kong's energy consumption and carbon emissions.

81% of EBs in Hong Kong are residential; a small percentage are industrial; and most of the rest are commercial. Commercial buildings, however, contribute around two-thirds of the total carbon emissions arising from buildings. Over 80% of buildings in Hong Kong have been operating for over 20 years, with many of built or designed without energy performance or efficiency in mind.

Under the Hong Kong Climate Action Plan 2050 (CAP2050) published in 2021, a key objective is to reduce electricity consumption in commercial buildings by 30% to 40% from 2015 levels by the year 2050, as part of the city's broader decarbonization strategy. Despite this ambitious target, recent data from the Hong Kong Energy End-use Statistics indicates that electricity consumption in the commercial sector has actually increased— from approximately 16.57 million tonnes of CO_2 in 2015 to 16.98 million tonnes in 2021[1] (based on CLP's 2021 emission factor of 0.57 kg CO_2 per kWh[2])—marking a 2.5% rise in carbon emissions. This upward trend underscores the urgency of implementing more effective energy efficiency initiatives, retrofitting outdated systems, and encouraging the adoption of smart energy management practices to reverse the trajectory and align with CAP2050 goals.

Despite isolated success stories in EB retrofitting and retro-commissioning (RCx) initiatives, most of the market remains inactive. Many building owners are taking a passive, wait-and-see approach. Meanwhile, government policy and regulation have not kept pace with the scale of the challenge. Cost and risk remain the primary barriers to retrofitting, yet there is no comprehensive financial strategy in place—nor sufficient engagement with private capital—to bridge the gap.

This white paper outlines a strategic roadmap for government, finance, and the building sector to accelerate retrofitting and RCx. By identifying key market barriers, assessing current efforts, and highlighting policy and data gaps, the paper provides actionable recommendations to unlock capital flows and drive scalable energy improvements. It also explores innovative financing mechanisms for retrofit projects, drawing on international case studies in financial tools and policy frameworks to inform local strategy. The goal: to catalyze cross-sector collaboration that delivers both environmental and financial returns.

1.2 HONG KONG RETROFIT MARKET ESTIMATE FOR OFFICE TOWER BUILDINGS

Understanding the size and potential of the commercial building retrofit market is essential to mobilizing action across stakeholders. A clear market estimate equips the financial sector with data to assess investment opportunities, guides policymakers in targeting resources and incentives, and provides building owners and service providers with greater confidence in the scale and viability of retrofit initiatives. Quantifying the market not only underscores the economic value of energy efficiency but also reinforces the business case for accelerating decarbonization across the built environment.

To support this, a high-level, data-driven analysis was conducted on Hong Kong's existing office buildings under 50 years old. Buildings were segmented by size and age, and matched to appropriate retrofit strategies—ranging from shallow to deep retrofits—based on their characteristics. Estimated cost ranges were applied to each segment to determine the total market potential. The analysis estimates a retrofit market opportunity of **HKD 3.6 billion**[a] for office tower buildings,

a. Number of office tower buildings in Hong Kong is estimated from dataset: Building Information and Age Records by Building Department (accessed on data.gov.hk, dataset updated yearly). The number excludes residential, institutional, industrial, hotels, shopping malls and all non-office commercial buildings. Buildings above the age of 60 are also excluded.
Buildings' retrofit needs are mapped in three classes:
- SHALLOW (lighting fixtures, control, digital optimization)
- MID (mainly HVAC replacement/upgrades)
- DEEP (civil works and major building systems)

Mapping is done according to 1) age, 2) district, 3) equipment provision, and 4) size of building. For example, a 10-year office tower with centralized air-conditioning system only requires shallow retrofit, whereas a 40-year office building without centralized AC may need deep retrofit. A cost range is estimated for each retrofit class. The range represents cost of implementing one main retrofit strategy. The total market estimate is a product of the building number for each class and the cost of each class.

revealing a substantial yet largely untapped potential for emissions reduction and economic activation. The actual market opportunity for all types of commercial buildings should be larger, considering the parallel need for supporting systems such as IoT integration, the growing demand for green technologies, and the potential enhancement of asset value and occupancy rates in modernized, energy-efficient buildings. These co-benefits underscore why accelerating retrofits across Hong Kong's existing building stock is a strategic and necessary move for both climate and economic resilience.

This estimated potential highlights both the scale of investment opportunity and the associated energy and carbon savings achievable through targeted retrofitting. Despite the compelling upside, Hong Kong has yet to fully leverage retrofitting as a strategic lever for decarbonization and growth.

1.3 STRUCTURE OF THIS REPORT

The following chapters examine the policy, finance, and challenges of the retrofitting landscape and provides a snapshot of Hong Kong's efforts in comparison to other jurisdictions with similar building fabric. From this review, key potentials for interventions are identified and policy recommendations are put forward. The report is structured as follows:

- **Chapter 2** provides an overview of the retrofitting landscape, where policies and financing tools adopted internationally including prevalent described. It establishes a framework to facilitate the comparative policy review in Chapter 3. This chapter also outlines the barriers to upscaling retrofitting that are common across markets, which helps to discern whether the policies and financing mechanisms are effectively targeting the barriers.

- **Chapter 3** is a comparative review of policies and financing mechanisms adopted in Hong Kong and other international cities/ city states. The comparison helps understand international practices, reveal policy gaps and identify further potential intervention for Hong Kong.

- **Chapter 4** presents a set of strategic asks for the Hong Kong government (HKSARG) to unlock the full potential of building retrofits based on insights gained from Chapters 2 and 3.

- **Chapter 5** concludes that coordinated leadership and collective action is vital to accelerate market adoption of existing building energy upgrades.

2 OVERVIEW OF THE RETROFITTING LANDSCAPE

This chapter provides a snapshot of the building retrofitting landscape concerning policies and financing mechanisms often used to facilitate improvement in EBs. It also outlines the key challenges, providing a basis for evaluating the effectiveness of existing policies and financing mechanisms in overcoming them.

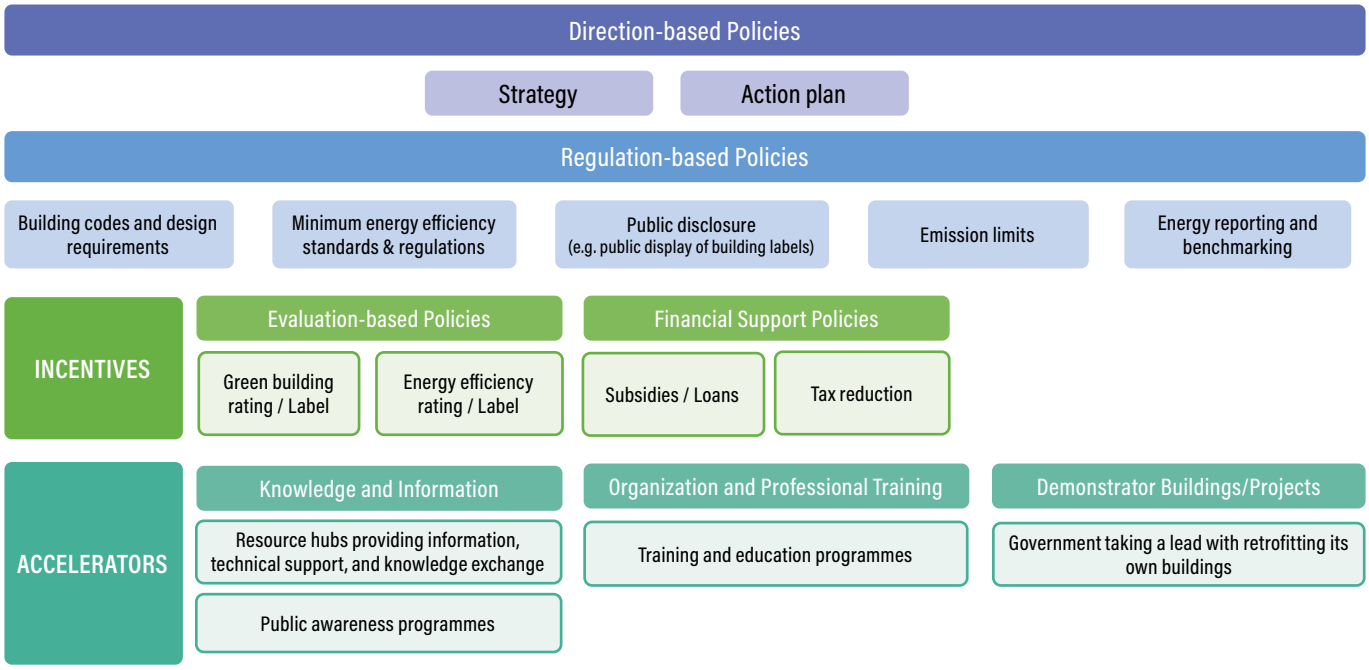
2.1 POLICY ECOSYSTEM

The section provides a framework to facilitate the understanding of the array of policy tools used to address building sector decarbonization and EB retrofitting. Policy types can be grouped into the following categories:[3]

- **Direction-based policies** that provide long-term direction. Examples include plans, strategic roadmaps etc.
- **Regulation-based policies** are those that impose strict requirements to mandate better performance and improvement actions. Examples include building laws, codes, regulations, minimum standards, limits etc.
- **Evaluation-based policies** promote better performance through external accreditation and public recognition. Examples include benchmarking and labelling or certification systems.
- **Financial support policies** supplement other policies to enable parties to meet regulatory requirements or incentivize them to act.
- **Accelerator type policies** are those that aim to better equip parties and create favorable conditions for progress and development. Examples include capacity building programs that offer knowledge and information or professional training, and demonstration projects.[4]

Figure 2.1 below shows the policy types and examples.

FIGURE 2.1 Policy Types and Examples for Existing Building Decarbonisation



2.2 FINANCING MECHANISMS

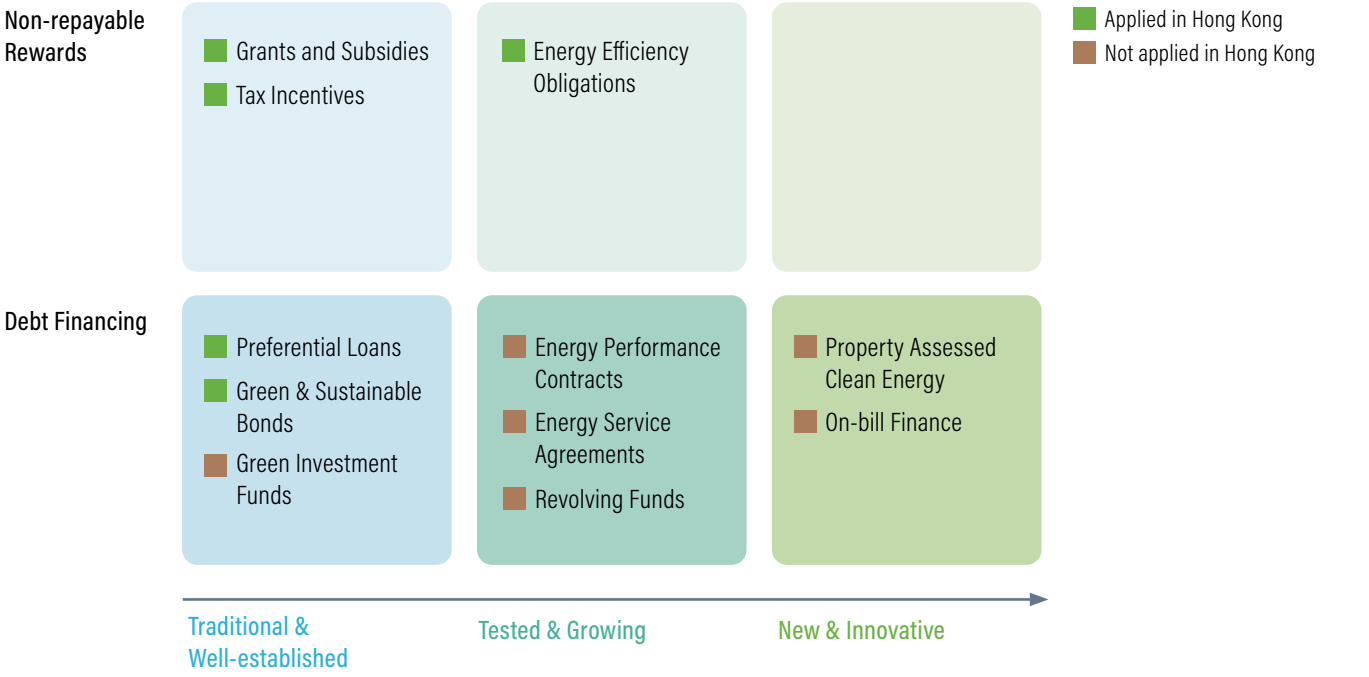
Some notable financing mechanisms for buildings retrofitting are shown in the Figure 2.2, categorised by type (non-repayable rewards and debt financing) and market saturation (Traditional and well-established, tested and growing, new and innovative).5 The mechanisms cover commercial buildings and residential housing in different jurisdictions globally.

There are more studies and applications of the financing mechanisms for residential properties due to a large need for building upgrade and financing challenge in other geographies, such as the EU and the US. The figure also indicates which mechanisms are available in Hong Kong.

Financial solutions for the retrofit challenge generally address two objectives: providing the finance and de-risking the investment.

FIGURE 2.2 Types of Financing Mechanisms for Building Retrofitting

Adapted from Bertoldi et al. (2021)



Non-repayable rewards and debt-based instruments are commonly used to encourage EB retrofitting.

Non-repayable rewards refer to mechanisms where capital flows one way—typically from a government or utility to the building owner—without requiring repayment. The most common examples are grants and subsidies.

For debt instruments, traditional loans often lack appeal due to long payback periods and uncertain returns. In response, innovative financing structures have emerged to stimulate action by sharing risks, aligning incentives and improving cash flow. These include Energy Performance Contracting (EPCs), on-bill financing, and Property Assessed Clean Energy (PACE) programs. By shifting technical, performance, and credit risks away from building owners, and minimizing risks to banks, energy efficiency retrofits become more attractive, accessible and financially viable.

A range of financing options and arrangements are briefly explored below. Examples in Hong Kong are also described where applicable.

- **Grants and subsidies** refer to financial aid usually provided by governments or organisations supporting specific activities. They are one of the most common tools to support energy efficiency retrofits with the aim to help project proponents overcome the high upfront capital cost. However, grants and subsidies place a significant burden on public finances, and therefore are not a sustainable solution.

  APPLICATION IN HONG KONG

  The HKSARG launched the Building Energy Efficiency Funding Scheme (BEEFS) from 2009-2012 to encourage building energy retrofitting.[6] The scheme was discontinued after the enactment of Building Energy Efficiency Ordinance (BEEO). Nowadays, the subsidies for building energy efficiency upgrade are provided by Hong Kong's principal power companies, CLP and HKE.

- **Tax incentives** can be in the form of tax exemptions, allowances, credits etc. The government offers tax incentive to entities investing in energy efficient building equipment or property.

  APPLICATION IN HONG KONG

  The Energy Efficiency Registration Scheme for Buildings (EERSB) started since 2018-2019 and offers tax deduction for procurement of energy efficient building installations.[7]

- **Energy efficiency obligations** are requirements imposed on energy companies to achieve energy savings with activities that promote or fund energy improvements in the premises of end-users.

  APPLICATION IN HONG KONG

  While not a strict requirement, energy companies in Hong Kong are incentivized to help their clients save energy. Under the Schemes of Control Agreements, the energy companies receive incentive for their energy efficiency performance – including the amount of energy saved from energy audits and the number of energy audits completed.[8]

- **Preferential loans** refer to schemes that provide favourable conditions to borrowers such as below-market rates, longer payback periods, or more lenient repayment schedules. They are often provided by governments or backed by public funding. Private debt finance is rather limited for supporting energy efficiency upgrades due to the high uncertainty in payback period and overall perception of high-risk. Green mortgages are loans that offer preferential terms for buying or upgrading properties to meet certain environmental criteria. For example, borrowers may benefit from lower interest rates if they commit to retrofitting the existing property to improve its energy performance. The cost of

CASE STUDY

1. Seoul's Building Retrofit Program (BRP)[10]

Launched by the Seoul Metropolitan Government (SMG), the BRP supports energy efficiency upgrades in government, commercial, and residential buildings, contributing to the city's CO_2 reduction target of 40% by 2030 (from 2005 levels).

In 2012, SMG expanded the program to focus on residential retrofits by introducing a loan support scheme in partnership with six private banks. Two types of low-interest loans are offered: **"Housing BRP"** for residential buildings and **"Building BRP"** for commercial properties.

The loans cover upgrades such as high-performance insulation, windows, LED lighting, AC systems, and renewable energy installations. Eligible participants include:

- Residential buildings (multi-family, apartments, townhouses, detached homes)
- Commercial buildings
- Energy service companies (ESCOs)

The program aims to overcome financial barriers by providing favorable loan terms, including grace periods and accessible financing for essential retrofit technologies.

upgrade can be incorporated into the mortgage itself. In essence, the obligation to improve environmental performance is directly linked to the property being financed.[b]

APPLICATION IN HONG KONG

CLP and HKE have both collaborated with banks to offer favourable loans for energy improvement projects.[9]

- **Green and sustainable bonds** can be used to raise funds for environmentally friendly projects that meet specific environmental criteria and purposes, such as energy efficiency. As one of the principal green finance instruments, green and sustainable bonds have been popular sources of fund raising for both new builds and retrofits but tend to be issued by large scale corporations, property developers and asset owners.

  APPLICATION IN HONG KONG

  In 2021 Hongkong Land issued a green bond for its Central Portfolio for energy efficiency projects. The net proceeds amounted to HKD375 million and were allocated to replacement or upgrade to high efficiency chiller plants at Jardine House, Edinburgh Tower and Gloucester Tower as well as replacement to energy-efficient lightings including LED lights at Jardine House Landmark Atrium and Gloucester Tower. All resulted in a least 20% improvement against original energy consumption.[11]

The following debt financing tools are used in other markets but have yet to be applied in Hong Kong. Energy performance contracts / energy service agreements, on-bill finance and Property Assessed Clean Energy are financing structures that help overcome the initial cost barriers for retrofitting projects. Creation of funds (revolving / green investment) aim to pool capital for the creation of other financial instruments, such as loans, to support retrofit projects.

- **Energy performance contracts (EPCs) and Energy service agreements (ESAs):**

  Reduced upfront capital pressure

  Both EPCs and ESAs eliminate the need for building owners to pay upfront for energy efficiency upgrades. This removes a major financial barrier and shifts project funding responsibilities to specialist third parties.

  EPC: Performance-Based Guarantees, Risk Transfer

  In an EPC, an Energy Services Company (ESCO) audits the facility, designs and installs the upgrades, and finances the project based on projected energy savings. The ESCO guarantees a minimum level of savings and is only compensated if those savings are achieved. This shifts the technical and performance risk from the building owner to the ESCO. Since payment is tied to actual outcomes, the owner is protected from underperformance, ensuring the project remains cost-effective and cash-flow neutral or positive over time.[12]

  ESA: Pay Only for Verified Savings

  An ESA is a performance-based contract where a third-party funds and maintains the upgrades, and the facility owner pays only for verified energy savings, typically as a service fee.[13] This model limits both technical and financial risk for the owner, since payments are based on actual results.

  APPLICATION IN HONG KONG

  While not exactly an ESA, CLPe and Chinachem Group signed a 20-year Build-Own-Operate-Transfer (BOOT) agreement to deliver Hong Kong's first zero-carbon chiller system at Nina Tower, a 180,000 m^2 mixed-use complex. CLPe funded, designed, and now operates a high-efficiency water-cooled air conditioning system, significantly cutting energy use and carbon emissions. The system is managed 24/7 on-site by CLPe, with Chinachem paying a monthly service fee.[14]

  More effective for larger scale projects

  EPCs are generally undertaken by large energy-consuming end-users such as industrial sites, large commercial buildings/ condominiums, or institutional buildings like universities and hospitals. Larger scale projects typically have higher certainty in energy savings, making it more favorable for ESCOs as they have to bear the technical and financial risk.

- **On-bill finance (OBF):** OBF is an innovative financing option where a utility or private lender provides capital for the energy efficiency project or upgrade as a loan and customer repays the loan with interest through regular payments added to their utility bill. The funds of OBF could originate from utilities, the government, or third parties including commercial banks.

b. Green mortgages are most suitable for properties with single ownership, such as single-family houses, where the buyer has full control over both the purchase and any retrofit works. For multi-owner buildings – like most residential buildings in Hong Kong – retrofitting typically apply to shared buildings services such as lifts and lighting. In these cases, green mortgages can stimulate the demand for green buildings, yet the mechanism to further stimulate subsequent building upgrade is to be further explored.

- **Property Assessed Clean Energy (PACE)** is a loan that is repaid through property tax bills. The loan leverages the property's assessed value as collateral, and the debt is attached to the property rather than the owner. PACE programs exist for commercial properties (commonly referred to as Commercial PACE or C-PACE) and residential properties (commonly referred to as Residential PACE or R-PACE).[15]

  - PACE financing is typically facilitated through collaborations between private lenders and local governments, wherein the local government serves as the conduit for financing.

  - Since the loan is tied to the property, the loan repayment obligation transfers with the property ownership to the buyer if the project is sold. This addresses a significant deterrent to investing in energy improvements, as property owners are often hesitant to make such enhancements if they anticipate not staying in the property long enough for the resulting savings to offset the upfront costs. A potential downside is that buyers are less willing to buy properties with a PACE loan attached to it.[16]

- **Revolving funds** dedicated to retrofitting projects are typically established by governments, municipalities, or organizations. The primary objective is to provide accessible and affordable financing options for building owners seeking to undertake energy efficiency upgrades.

  The initial capital for these funds can be sourced from various channels, including public budgets, grants, or contributions from private entities. These funds operate on the principle of recirculating capital, where the repaid funds from completed projects are reinvested into new projects. This sustainable approach ensures a continuous cycle of financing, enabling ongoing support for retrofitting initiatives.

CASE STUDIES

2. Petros PACE Finance[17]

Petros PACE Finance has accomplished a groundbreaking C-PACE transaction in Detroit, Michigan, USA, with the successful retrofitting of The Whitney, a historic landmark mansion constructed in 1894. The Whitney faced issues with its building envelope, resulting in significant, resulting in significant air infiltration due to outdated storm windows which allowed cold air to leak in, causing discomfort for occupants. The inefficient air conditioning system (including a three-decade-old heat pump) and the absence of a centralized air conditioning system meant that portable units used in the summer were inadequate for cooling the entire building.

These inefficiencies imposed substantial costs on the owner. Annual expenses for operations and maintenance reached approximately USD100,000, with an additional USD115,000 spent on utilities. With the support of PACE financing, a comprehensive retrofitting project was successfully undertaken. The retrofit included various improvements, such as the installation of a new AC system, two high-efficiency stoves, an upgraded electrical system, and the replacement of over 200 storm windows. Additionally, energy-efficient LED lighting was implemented, further enhancing the building's sustainability.

3. The Portland State University (PSU)[18]

The State of Oregon granted Portland State University (PSU) seed capital of USD $500,000 to establish a green revolving fund. PSU had established a set of project criteria for the fund, which included both required and preferred elements (tangible return on investment through savings in the utilities budget; energy incentive rebates from local government entities; and showcase sustainability benefits in terms of the environment, economy, and social equity). Since its inception, the fund has experienced significant growth, accumulating over USD $1.5 million in funds, facilitating support for more than 15 projects, with an expected annual energy savings of over USD $250,000.

- **Green investment funds** are financial vehicles that pool public and private capital including institutional investors, governments, development banks, and private individuals. Green investment funds utilize various financing mechanisms, including equity investments, debt financing, and mezzanine financing, to support retrofitting projects. They may provide loans or equity investments to building owners, developers, or energy service companies (ESCOs) involved in retrofit initiatives. The financial instruments offered by these funds are designed to align with the specific requirements and risk profiles of retrofitting projects, ensuring flexible and accessible financing options. These funds are commonly directed towards retrofitting EBs to enhance energy efficiency and mitigate greenhouse gas emissions.

APPLICATION IN HONG KONG

Hong Kong's Green Tech Fund is a government initiative that supports research and development (R&D) projects advancing decarbonization and energy efficiency, including in the building sector, such as smart energy management, green retrofits, and low-carbon materials.[19] Despite being a positive step, it does not serve as a direct incentive for retrofit implementation, as it focuses on innovation and research rather than funding actual building retrofit projects.

CASE STUDY

4. Aviva Investors Climate Transition Real Assets Fund[20]

The fund's objective is to provide various client channels with access to private real assets, emphasizing their alignment with the transition to a low-carbon economy. Energy consumption and operational emissions reduction are key priorities in building refurbishment projects supported by the fund.

As part of the fund's approach to climate transition real assets, its initial investment is in Curtain House, a multi-let office building located in Hoxton, London N1, is currently undergoing extensive refurbishment and decarbonization to transform it into office spaces. The retrofitting work includes transitioning the site to operate solely on renewable electricity, installing a solar array, and implementing an air source heat pump system for heating and cooling. Smart technology will be utilized to minimize energy usage in the building. Consequently, the building's Energy Performance Certificate (EPC) rating is expected to improve from an 'E' (lowest) to an 'A' (highest).

It should be noted that financial tools are neither independent nor exclusive and may be used in tandem and supplement each other. For example, funds can be set up to provide seed capital for preferential loans, or offer subsidies are given to support EPC projects. Financial instruments and policy measures are also highly linked, such as incentives being awarded based on performance beyond building code. Therefore, having a clear and well-established policy structure, such as a standardized energy performance certification system, can facilitate compliance checks and verification that underpin financing decisions.

Furthermore, most of the financing tools address the upfront cost barrier, and some also lower the cost of finance or attempt to reduce the split incentive barrier. However, upscaling building retrofitting faces a breadth of other challenges that cannot be addressed by simply providing capital. These are explored in the next section.

TABLE 2.1 Summary Analysis of Financial Instruments for Building Retrofitting

Adapted from Bertoldi et al. (2021)

Financial Instrument	Short Description	Adoption	Source of Finance	Barrier Addressed	Advantages	Challenge / Limitation	Type of Building Best Suited
Grants & Subsidies	Financial aid provided to support specific projects	Common in all jurisdictions	Government	Upfront cost	Support new emerging technologies; Help kick start the market	Heavy burden on public budget; Free riders; Mostly shallow measure support	All types
Tax Incentives	Reduction in tax payment due to certain projects or activities	Common in all jurisdictions	Government	/	Lower burden to public resources; Promote new technologies	Reduced tax revenue; Less attractive than other measures	All types
Energy Efficiency Obligations	Energy companies are required to achieve a specific energy savings target	EU; HK (CLP and HKE receive an incentive under SoC agreement)	Energy companies	Upfront cost	No public budget burden; Wide range skills offered by energy companies; Third party involvement	Potential energy bill surcharge; Mostly shallow measure support	All types
Preferential Loans	Loans that offer more favourable conditions to borrowers, e.g. lower interest rates	EU; HK	Government/ Private investors	Upfront cost; Cost of finance	Less burden on public resources than grants; Support to deeper renovations	Upfront cost barrier due to down payment; Reluctance to take on additional debt; Large transaction cost in small projects	Parties with high credit score
Energy Performance Contracts/ Energy Service agreements	Energy service company implements energy-saving projects and gets repaid based on energy cost savings achieved	US; China; EU	ESCO/ Client	Upfront cost	No upfront cost for consumers; Know-how of ESCO	Performance risks; Usually most effective for large projects (e.g. industrial facilities, large condominiums)	Large projects (e.g. industrial)
Property Assessed Clean Energy	A loan that is repaid through property tax bills. The loan is attached to the property rather than the owner	Common in the US; Trials in Europe	Municipal bonds	Upfront cost; Cost of finance	Long repayment period; Lower transaction costs by streamlining application processes; Support to deeper renovations	Available only to property owners; Not available to small investments; High set up costs for municipalities	Owned properties
On-bill Finance	A loan for the project is repaid through regular payments in addition to the utility bill	Mainly in US; Some examples in Europe	Utility or third party	Upfront cost; Split incentive	Attractive option for leased properties; No upfront cost to consumer; Easy repayment	Potentially high-interest rate attached to on-bill loans; Not suited for very large projects	Rented properties
Revolving Funds	Self-sustaining fund where repayments replenish the withdrawals made	EU; US	Government / Private investor / Repayments	Upfront cost	Repayments are cycled back in the fund for future projects	Fund may "revolve" quite slowly; Limited short-term impact of public funds	Depends on financial product supported by the fund

2.3 COMMON CHALLENGES TO UPSCALING THE RETROFITTING MARKET

There has been extensive literature analyzing the challenges to upscale the retrofitting market. Many of the challenges are common across jurisdictions as they are intrinsically linked to the inherent characteristics of the real estate market.[21]

Structural Challenges

- **Highly Fragmented Market**
  - **Outside of large property holders** (e.g. government, real estate conglomerates, hotel chains), many buildings—especially in dense, high-rise cities like Hong Kong—have multiple individual owners. This fragmented ownership is common in strata-titled or multi-owner buildings, where each unit is owned separately.

  - **Coordination Challenges in Multi-Owner Buildings**
    Deep, whole-building retrofits offer the highest energy savings, but are difficult to implement when agreement is required among multiple owners. Varying financial priorities, decision-making timelines, and risk appetites can stall or derail projects entirely.

  - **Lack of Scale Increases Costs**
    Retrofitting projects are more cost-effective when aggregated at scale. Fragmented markets lead to many small, isolated projects, which suffer from high transaction costs, duplicated efforts (e.g. separate contractors), and limited negotiating power.

  - **Lack of Aggregation Limits Impact**
    Aggregating smaller retrofit projects can reduce costs and attract financing, but fragmented ownership makes coordination difficult, especially in multi-owner buildings. As a result, retrofits remain small-scale and inefficient, missing out on the economies of scale needed for profitability, operational efficiency, and market growth.

- **Split Incentive Between Landlord and Tenant - Commercial Buildings**
  - **Landlords Pay, Tenants Save — Misaligned Financial Incentives**
    In typical commercial lease structures in Hong Kong—especially triple-net leases—landlords are responsible for capital improvements, such as energy retrofits, while tenants pay for utilities and benefit from any reduction in energy costs. This creates a misalignment of financial incentives: landlords bear the upfront investment, but receive no direct return, while tenants enjoy the cost savings without contributing to the retrofit expenses. As a result, landlords have little motivation to pursue energy efficiency upgrades.

  - **Short Ownership Horizons and Lease Turnover**
    In Hong Kong's commercial market, short lease terms, high tenant turnover, and frequent changes in ownership make it difficult for landlords to recoup long-term retrofit investments. Uncertainty around future tenancy or asset holding periods discourages upgrades with longer payback periods, as returns may not materialize before tenants or owners change.

  - **Limited Collaboration or Data Sharing**
    Without transparent energy data or collaboration between landlords and tenants, it is hard to measure and verify savings, making performance-based financing models (like EPCs or ESAs) particularly difficult to implement in multi-tenant commercial properties. For tenants whose energy costs are bundled with management fees, the lack of cost transparency obscures potential savings from efficiency upgrades, reducing their incentive to conserve energy or support retrofits.

Financial Challenges

- **Cherry-Picking Locks in Underinvestment**
  - Owners frequently pursue only low-cost, high-return measures—the so-called "low-hanging fruit"—while deferring deeper retrofits with higher capital requirements and longer paybacks. This sub-optimal, incremental approach locks in higher energy use and emissions, delaying more impactful upgrades. Additionally, once the easiest components are addressed, financing the remaining, less attractive measures becomes more difficult, as they can no longer be cross subsidized through a blended payback model.

  - By contrast, a whole-of-building retrofit approach enables bundling of high- and low-return measures into a single investment decision, allowing for blended returns, unified financing, and shared disruption costs, especially for long-term tenants. This integrated model enhances both the environmental and economic performance of the retrofit, but is rarely pursued due to structural and market barriers.

- **Low Return and Long Payback**
  - Energy efficiency retrofits often face a difficult cost-benefit balance, particularly in older buildings where impactful upgrades require high upfront investment. These projects typically generate modest cost savings, leading to low internal rates of return and long payback periods. This is especially true in markets with low utility prices—such as Hong Kong—where operational savings are less compelling.

  - Further compounding the challenge is the uncertainty around payback periods and performance outcomes. Limited confidence in the tangible financial benefits discourages both asset owners and financiers. Even as interest in green finance grows, the number of credible, investable retrofit projects remains low, creating a gap between capital availability and viable demand.

- **Financing constraints**
  - Retrofitting existing buildings often faces financing hurdles because the underlying asset—the building—is already pledged as collateral for existing loans. This limits the ability of commercial banks to issue new loans for retrofit projects, especially when they cannot secure additional collateral. As a result, retrofit projects may struggle to access funding despite their environmental benefits, highlighting the need for alternative financing models.

- **Lack Economies of Scale**
  - The energy efficiency retrofit landscape is highly fragmented, consisting of millions of small, isolated projects that individually lack the scale to attract institutional capital or deliver cost efficiencies. Without mechanisms to aggregate these opportunities into investable portfolios, transaction costs remain high and project delivery inefficient. This absence of scale undermines the economic viability of retrofits, despite their collective potential to achieve significant, cost-effective emissions reductions across the building sector.

- **Energy Savings May Not Translate to Profit**
  - Energy savings are often seen as sustainability wins rather than financial gains. Unlike revenue-generating investments, retrofits typically do not lead to increases in rents or asset values, making them hard to justify on financial grounds alone—especially when savings are not capitalized or monetized. As a result, retrofits are often treated as cost centers, reducing their attractiveness to profit-driven investors.

3 LOCAL AND OVERSEAS REVIEW

This chapter reviews the suite of policy tools adopted in Hong Kong and different jurisdictions to promote EB retrofits. The review is done according to the framework of policy tool types presented in Chapter 2 - direction-based policies, regulation-based policies, evaluation-based policies, and financial support policies.

The experiences of other cities demonstrate what is possible, offering inspiration and practical models that can be adapted to accelerate progress locally. This review helps identify gaps, benchmark best practices, and inform the development of more effective and scalable policy, regulatory and financing strategies tailored to Hong Kong's context.

3.1 POLICIES

3.1.1 Overview of Local Policies

The following table summarizes past and existing efforts in promoting retrofits in Hong Kong.

TABLE 3.1 Summary of Local Policies for Existing Building Retrofitting

Strategy	Policy Tool	Government-led Initiative (Year launched)	Industry-led Initiative (Year launched)
Direction-based Policy	Action plan	Hong Kong Climate Action Plan 2050 (2021) Energy Saving Plan for Hong Kong 2015-2025+ (2015)	HKGBC HK3030 – Roadmap to Deep Energy Reduction (2014)
Regulation-based Policy	Building code and design requirement	Building Energy Code (Since 2012, updated every 3 years)	N/A
	Audit requirement	Energy Audit Code (Since 2012, updated every 3 years)	
	Energy reporting	EUI disclosure	
Financial-support policies [Incentives]	Subsidies / Loans	Buildings Energy Efficiency Funding Scheme (2009-2012)	CLP's Eco-Building Fund (2014) /Energy Saving Loan Scheme (2019) HKE's Smart Power Building Fund/ Smart Power Load Fund
	Tax incentive	Energy Efficiency Registration Scheme for Buildings (2018)	N/A
Evaluation-based policies [Incentives]	Public recognition	Energy Saving Charter (Annually since 2012) Energy Saving Championship Scheme (Annually since 2016)	BEC Low Carbon Charter (2019) HKGBC BEAM Plus - Existing Building HKGBC Climate Change Framework (2023)
Accelerators	Information support	Technical Guidelines on Retro-commissioning (First launched in 2018, updated in 2023) Retro-commissioning Resources Centre	HKGBC Retrofitting Guidebook (2021)
	Demonstrator buildings / projects	Government taking a lead to do retrofitting	N/A

3.1.2 Comparison of Direction-based Policies

Table 3.3 synthesizes key strategic plans from leading global cities, focusing on policies targeting EBs. It evaluates the presence of building-specific roadmaps, year of adoption, retrofit-related targets, and the nature of those targets—whether outcome- or output-based. The comparison underscores the variation in strategic depth, performance orientation, and policy integration within urban decarbonization frameworks.

The comparison of direction-based policies reveals the following insights:

- **Potential to update Hong Kong's building decarbonisation roadmap**
  - "Energy Saving and Green Buildings" is one of the four decarbonisation strategies under the Hong Kong CAP2050. Targets include reducing electricity consumption in buildings by 30–40% by 2050 compared to 2015 levels, with an interim target of 20–30% by 2035.[22] Key strategies include:
    1. Strengthening regulation (tighten requirements, expand scope of regulation, more frequent energy audits)
    2. Strengthening promotion of RCx
    3. Encourage smart management

  - The last building sector roadmap (*Energy Saving Plan for Hong Kong's Built Environment 2015-2025+ ("Energy Saving Plan")*) was released in 2015. The main target has been to reduce the city's energy intensity by 40% by 2025 against the 2005 baseline[23,b]. Key strategies include:
    1. Government taking a lead in energy saving and green buildings
    2. Strengthen regulations
    3. Public education and energy saving

  - Since the release of CAP2050, EEB has subsequently released roadmaps for air quality, waste, and transport sector. It is worthwhile to review Hong Kong's progress against the targets set in the Energy Saving Plan and CAP2050 and update the building sector roadmap. The city has performed well on the regulatory front, but more efforts must be made targeting EBs.

- **Setting actionable targets**
  - Outcome vs output-based targets: Targets are an essential component of roadmaps or action plans. Quantitative targets can be categorised as output-based or outcome-based, each with their strengths and weaknesses.[24]

  - Output-based targets (e.g. the number/area of retrofits completed) are easier for authorities to follow and monitor progress since they are based on discrete projects. However, it is difficult track the actual impact these actions have on the energy consumption or carbon emissions of buildings.

  - On the other hand, outcome-based indicators (e.g. percentage reduction of electricity consumption), while easier to understand ultimate performance, they are difficult to track unless the city has a well-established system and monitoring indicators connected to the building sector. Energy and carbon outcomes are also affected by a myriad of factors such as weather conditions, floor area, energy price or emission factors. Energy and carbon intensity will also need to be tracked to complement the absolute figures.

- The table below compares output-based and outcome-based target setting approaches, highlighting key differences in metrics, advantages, and limitations when applied to building energy performance.

TABLE 3. 2
Comparison of Output-based and Outcome-based Targets

	Output-based Target Setting	Outcome-based Target Setting
Example	No. of buildings with Green Building Certification	% of energy saving in a building
Pros	Easy to track progress and improvement	No need translation to energy/ carbon terms
Cons	Difficult to translate to carbon emission savings	The "saving" may be a result of other factors (e.g. energy price, floor area, weather...), rather than improvements in building equipment efficiency

b. Although the Energy Saving Plan is a strategy catered to the built environment, the energy intensity target is not building sector specific but instead applies to the whole city. The energy intensity is a ratio of energy demand per unit of economic output calculated by energy demand divided by Gross Domestic Product.

TABLE 3.3 Comparison of Direction-based Policies (Cities / City-states)

	Hong Kong		Singapore	New York City	Tokyo	Sydney	Shenzhen
Plan / Strategy / Roadmap	Energy Saving Plan for Hong Kong 2015-2022+	Hong Kong Climate Action Plan 2050	Singapore Green Building Master Plan 2030[25]	PlaNYC: Getting Sustainability Done[26]	Zero Emissions Tokyo[27]	Sydney's Sustainable Office Buildings Plan[28]	Shenzhen Green Building High-Quality Development Action Plan[29]
Building specific?	Yes	No	Yes	No	No	Yes (Office buildings only)	Yes
Year Published	2015	2021	2021	2023	2019	2018	2021
Target (only those related to EBs / retrofits are quoted)	By 2025, 2005 baseline: Reduce energy intensity by 40%	By 2050, 2015 baseline: Reduce electricity consumption in commercial buildings by 30-40% Reduce reduction consumption in residential buildings by 20-30%	By 2030: 80% of buildings (by GFA) to be green	By 2050: Reduce energy consumption for government-owned buildings by 20%	By 2030, 2000 baseline: Reduce GHG emissions by 30% Reduce energy consumption by 38%	No building-specific target	Complete 10 million m^2 of green / energy retrofits
Outcome or Output-based Target?	Outcome	Outcome	Output	Outcome	Outcome	N/A	Output

TABLE 3.4 Comparison of Direction-based Policies (Country/ Region)

	China	European Union	Canada
Plan / Strategy / Roadmap	14 FYP Buildings Energy Saving and Green Building Development Plan[30]	EU Renovation Wave Strategy[31]	Canada Green Buildings Strategy[32]
Building specific?	Yes	Yes	Yes
Year Published	2020	2020	2024
Target (only those related to EBs / retrofits are quoted)	By 2025: Complete 0.35 billion m^2 of energy retrofits, including 0.25 billion m^2 of public buildings	Renovate 35 million buildings Double the annual energy renovation of buildings by 2030	No specific retrofit target
Outcome or Output-based Target?	Output	Output	N/A

3.1.3 Comparison of Regulation-based policies

Table 3.5 outlines the regulatory landscape for building energy performance disclosure across selected global cities. It compares key dimensions such as code implementation, disclosure mandates, data transparency, reporting frequency, coverage thresholds, and public accessibility. The table illustrates varying levels of policy maturity and enforcement, reflecting each city's strategic approach to driving energy efficiency through regulatory mechanisms.

The comparison of regulation-based policies reveals the following insights:

- **Building codes set the baseline for energy performance.**
  - Building codes across jurisdictions serve as a baseline for energy performance, with most governments implementing minimum performance standards that are gradually tightened over time. However, these typically apply only to new buildings (NBs) or major retrofits. Unless subject to major retrofits, the building codes do not stimulate EBs to improve or keep improving.

  - More importantly, although buildings are designed to code, there may be discrepancies between the designed energy performance and the actual energy performance during operation.[33] This is known as the building energy performance gap. This is why regulation on actual performance, and not just on design, is essential.

- **All comparison cities have some form of energy data disclosure requirement. Differences lie in the implementation details.**
  - Mandatory energy reporting is a key enabler of data-driven policy. All comparison cities have adopted some form of mandatory energy data disclosure, but the implementation varies significantly in scope and detail. Key differences include:

    1. **Frequency of reporting and targeted buildings:** Annual reporting is common, but only for large buildings. Disclosure usually begins with large buildings, often commercial and institutional buildings (e.g. healthcare, education, sports facilities). Under Singapore's Annual Mandatory Submission, a total of 708 buildings were recorded in its publicly available database in 2024.[34]

    2. **Progressive implementation and thresholds:** The threshold for mandatory reporting can be gradually broadened to include smaller properties after the program is launched for a few years and reviewed. The implementation can also be progressive, first starting with government-owned or leased buildings, coupled with voluntary disclosure, then progressing to mandatory disclosure. In Australia, the government first put out a requirement in 2005 where all offices leased by the Government must have a NABERS Energy rating. Then in 2011, attainment of NABERS Energy rating became mandatory through enactment of the Commercial Buildings Disclosure.[35]

    3. **Scope of building energy:** Importantly, effective disclosure frameworks overseas often include tenant energy use (such as Singapore and New York City's case), unlike Hong Kong's current system, which focuses only on central building services installations (CBSI)—limiting the usefulness of the data. Access to whole-building energy data (i.e., covering both landlord area and tenant area) is essential for building robust performance benchmarks and guiding future regulatory action. However, in Hong Kong, tenant energy data is not transparent to even landlords or the government authorities. The power companies have this data, but obtaining this data is difficult due to complexities of data privacy regulations, e.g. Personal Data (Privacy) Ordinance (Cap.486).

  - These variations reflect each city's regulatory maturity, data infrastructure, and policy priorities, and they influence how effectively energy data can inform benchmarking, public transparency, and policy design.

- **Use of energy efficiency rating that gives normalized performance data**
  - To make energy performance data more accessible and comparable, some cities use normalized rating systems such as NABERS (Australia) or ENERGY STAR (U.S.). These systems adjust raw energy use for key variables—such as climate, building size, hours of operation, and occupancy—to produce a standardized score or rating (e.g. 0–6 stars or score out of 100). This allows stakeholders to:
    1. Quickly assess performance relative to peers,
    2. Track improvements over time, and
    3. Support market recognition of energy-efficient buildings.
  - However, implementing such a system requires a mature and comprehensive building energy database to establish reliable benchmarks. Building this capacity involves years of consistent data collection, verification, and refinement, making it a strategic but long-term investment for cities aiming to improve energy transparency and drive performance. **Hong Kong's current data system under EMSD requires major upgrades and better alignment to support such an approach.**

TABLE 3.5 Comparison of Regulation-based Policies

	Hong Kong	Singapore	New York City	Tokyo	Sydney	Shenzhen
Building Code	In place, with continuous efforts to raise minimum standards					
Energy Performance Disclosure	Yes (Energy Audit Code)	Yes (Annual Mandatory Submission of Building Information and Energy Consumption Data[36])	Yes (Local Law 84[37])	Yes (Tokyo Carbon Reduction Reporting[38])	Yes (Commercial Building Disclosure (CBD)[39])	Yes (has a city-wide energy data monitoring platform)
Information Reported	EUI (of central building service installations, CBSI, excluding tenant areas)	- Whole building energy consumption - Ownership and Activity - Building characteristics	- Whole-building energy consumption - Energy efficiency score (ENERGY STAR, 1-100) and grade (A-F) - Building characteristics	Annual CO_2 emissions	Energy efficiency information (NABERS Energy rating)	Energy consumption by building system
Frequency	Every 10 years (to be updated to every 5 years)	Annual	Annual	Annual	At the time of sale, lease, or sub-lease	Real time monitoring, with annual public reporting
Targeted Buildings	13 building types	Buildings with GFA ≥ 5,000 sqm	Buildings with GFA ≥ 50,000 sqft (around 4,700 sqm)	Large facilities with energy consumption > 1,500kL crude oil equivalent	Commercial office space > 1,000 sqm	Large public buildings
Public Disclosure	Publicly available on EMSD website	Publicly available on BCA website	Publicly available on NYC Open Data portal	Publicly disclosed on government website	Publicly available on CBD register	Energy consumption report is published annually

3.1.4 Comparison of Financial Support Policies

Table 3.6 below provides a comparative overview of financial support policies in selected global cities to drive energy efficiency improvements and retrofits in buildings. It outlines the types of incentives offered, sources of capital, and repayment mechanisms, highlighting the diversity of policy and market approaches to supporting decarbonization in the built environment.

Government plays an essential facilitator role and risk bearer

- Based on our comparison of the financial support policies which have been adopted internationally and which may be applicable in Hong Kong, it is clear that Government involvement is essential in driving financial-based policies, especially in debt financing. Whether acting as a guarantor to reduce risk for private lenders or as a facilitator in setting up loan schemes and green finance platforms, the government's role is often the catalyst that makes financing viable and scalable. Without this support, many energy efficiency projects—particularly those with longer payback periods or higher upfront costs—would struggle to attract private investment.

TABLE 3.6 Comparison of Financial Support Policies

	Hong Kong	Singapore	New York City	Tokyo	Sydney	Shenzhen
Non-repayable rewards						
Subsidy	CLP / HKE subsidies	GMIS-EB 2.0*[40] GMIS-EBP**	Efficiency rebates offered by energy companies or Government[41]	Various[42]	Discounts for energy efficiency appliances / systems	City-level subsidies, RMB 20-40/m^2
Source of capital	Private	Public	Private / Public	Public	Public	Public
Tax reduction	Energy Efficiency Registration Scheme for Buildings (EERSB)	Nil	J-51 Tax Benefits	Corporate tax credit scheme	Nil	Nil
Debt financing						
Loans	CLP / HKE loans	Building Retrofit Energy Efficiency Financing (BREEF) Scheme[43] (Non-active)	NYC PACE[44] - Commercial buildings - Multi-family buildings	Low interest loans for energy efficiency improvements	Environmental Upgrade Agreements[45] (New South Wales initiative)	Low interest loans
Source of capital	Private Power companies as facilitator	Private Government as facilitator	Public + Private (Bonds are used to raise funds) Government as facilitator	Public (offered by state-owned bank)	Private Government as facilitator	Private
Repayment mechanism / Security	Loan repayment	EPCs; Government risk share	Property tax charge; Property as collateral	Loan repayment	Loan repayment	Loan repayment

Note:

* GMIS-EB 2.0: Green Mark Incentive Scheme for Existing Buildings (targets large buildings)

** GMIS-EBP: Green Mark Incentive Scheme for Existing Buildings and Premises (targets SMEs tenants and building owners)

3.2 KEY CHALLENGES IN HONG KONG

Hong Kong increasingly recognizes building retrofits as a crucial strategy for reducing energy use. While existing efforts—such as regulatory measures and monetary incentives—have led to improvements in selected buildings and enabled a number of successful retro-commissioning (RCx) projects, the overall scale of impact remains limited. Public and utility-funded schemes have been effective in lowering project costs and sparking private sector participation.

However, widespread adoption remains limited due to persistent challenges ranging from regulatory, institutional, financial, technical, or even social and environmental.

Chen et al. (2024) conduced semi-structured interviews with professionals who have rich experience and participated in real existing office building energy retrofitting projects in Hong Kong. The professionals were also engaged in a questionnaire on the criticality of challenges faced by existing office building energy retrofitting projects. The top 10 challenges are identified as below:

TABLE 3.7 Top 10 challenges of existing office building energy retrofitting in Hong Kong identified by Chen et al. (2024)[46]

#	Challenges	Regulatory	Financial	Institutional	Technical
1	Lack of government incentives	●			
2	Lack of knowledge about building energy retrofitting				●
3	Lack of policies, legislation and regulations	●			
4	Building owners lack motivation to retrofit			●	
5	Long payback period of building energy retrofitting		●		
6	Lack of actual data on existing building performance				●
7	Lack of established benchmarks and criteria for building energy retrofitting	●			
8	High investment cost in building energy retrofitting		●		
9	Stakeholder's insufficient awareness and knowledge of building energy retrofitting			●	
10	Deficiencies in the skills and training on building energy retrofitting				●

This section outlines these barriers faced in Hong Kong —from policy gaps and organizational inertia to funding constraints and technical hurdles—that collectively hinder large-scale implementation.

Regulatory Constraints

Lack of regulatory pathway and established benchmark for energy reduction: The Hong Kong CAP2050 targets a 30–40% cut in electricity use in commercial buildings by 2050, but current regulations such target setting has not been supported by any strategic guidance, policy or regulation to support or steer this ambition. While NBs must meet energy efficiency standards, no such requirements exist for EBs. In contrast, countries like the UK and Australia mandate minimum energy performance for leased buildings, driving retrofits and improving underperforming assets. Other jurisdictions, such as New York City, Singapore, and Tokyo[c], have introduced building-level energy or carbon caps, creating clear compliance pathways and stronger incentives for emissions reduction.

Regulatory gaps prohibit mature energy data landscape: Data is essential to addressing the retrofitting challenge. Hong Kong's city-level data environment on building energy performance is lacks maturity. Some key elements are present, but the overall data ecosystem lacks granularity, transparency and coherence all of which are critical if we are to deliver the required reductions. On the regulatory front, current mandatory disclosures are limited, and there are no standardized criteria to guide retrofitting in commercial buildings, hindering informed action.

c. Japan's CASBEE Cap-and-Trade system is a market-based mechanism that incentivizes energy-efficient buildings by allowing tradable credits based on building environmental performance assessed through the CASBEE rating system.

Institutional Constraints

Passive approach to decarbonization among mid-sized: Unlike leading developers with clear and ambitious long-term climate goals, mid-sized commercial asset owners often take a reactive stance, driven more by regulation than ambition. Without strong incentives, many see little urgency to pursue carbon reduction beyond minimum compliance requirements.

Awareness gaps in energy retrofitting: Mid-sized developers may also have inadequate awareness and knowledge on building energy retrofitting. Facility managers (FMs) tend to prioritize the building's functionality, often equating smooth daily operations with satisfactory performance, which may lead to overlooking potential improvements.

Limited insights from featured retrofits: Project showcases, such as those featured in the HKGBC Retrofitting Guidebook, typically highlight prominent buildings owned by large scale developers. This limits their relevance for smaller EBs, making it harder for those owners to recognize the potential of retrofitting. While key figures like project costs, payback periods, and actual savings are often shared, the percentage of energy savings relative to total consumption is rarely disclosed, reducing the usefulness of these cases as benchmarks for others.

Financial Constraints

High costs undermine retrofit viability: A wide range of financial challenges is outlined in Section 2.3, and these are particularly pronounced in the Hong Kong context—especially when it comes to achieving a viable cost-benefit balance. For older buildings, deep and impactful retrofits often require substantial upfront investment. Long payback periods and uncertainty around return on investment make such projects financially unattractive. Additionally, Hong Kong's relatively low electricity and water costs further diminish the appeal of operational savings as a motivating factor.

Incentives failed to serve mid-tier asset owners: Most monetary incentives by government were generally accessed by large scale developers or well-established organizations. It failed to drive mid-tier EB owners to actively engage in RCx and retrofitting projects.

Technical Constraints

Insufficient building knowledge and knowledge translation: Many stakeholders lack understanding of building systems, energy-saving technologies, and the benefits of retrofitting—such as energy savings, comfort, and asset value. Technical information is often poorly communicated, leading to inaction. This is worsened by limited transparency in building characteristics (e.g. size, system type), which makes energy data hard to interpret. While proposed BEEO updates may improve visibility into equipment performance, broader building context remains essential for effective knowledge transfer and decision-making.

Poor building-level data environment affecting Energy Utilisation Index (EUI) comparability: Energy data quality in Hong Kong is inconsistent, especially in older buildings lacking smart metering. EUI figures are difficult to compare due to missing building context and incomplete data. This inconsistency, combined with missing building context and incomplete datasets, makes EUI figures difficult to compare across buildings. A key issue is the lack of whole-building energy data, including tenant usage. The lack of consistent and comprehensive data also hampers effective benchmarking under regulatory constraints, making it difficult to set fair and realistic performance targets. Mandating anonymised, aggregated annual submissions—especially for large buildings—would improve performance tracking. A centralised disclosure platform, following models like Singapore's BESS, would enhance transparency, enable fair benchmarking, and support policy evaluation.

INSIGHT

Government initiative is key

Strong government leadership is essential to overcome the systemic barriers hindering large-scale retrofitting in Hong Kong. A coordinated policy framework, targeted incentives, and data-driven regulations can catalyze market transformation. Without sustained public-sector commitment, the city risks falling short of its decarbonization goals.

TABLE 3.8 Building Data Useful for Benchmarking

Category	Data Type	Content	Potential Source	Disclosure	Implication Without Such Data
Building Characteristics Data	General Information	• Age / OP date • Address / District • Gross Floor Area • Type (e.g. residential, commercial...) • Number of Storeys	• Buildings Dept • Rating & Valuation Dept • Census & Statistics Dept	No mandatory disclosure; Scattered in public domain	Difficult to compare EUI performance across different buildings
	System Specifications	• Centralized / non-centralized HVAC • Lighting System • Vertical Transport System (Lift / Escalator)	• EMSD • Property Owner • Property Manager	Proposed mandatory disclosure in new BEEO	
	Usage and Occupancy	• Space Use • Tenant Type • Operating Hours • Occupancy Rates	• Property Owner • Property Manager	No mandatory disclosure	
Building Energy Data	Landlord Areas (Base Building Data)	Central Building Services Installations (CBSIs) • Centralized HVAC system • Lighting at common area • Vertical transport (lift/escalators) • Other common electrical appliances	• EMSD (via energy audits) • Utility bills (CLP/HKE) • Building owner	Mandatory disclosure Energy Utilisation Intensity (EUI) for CBSI every 10 years	No full picture of total energy consumption within buildings, leading to limited visibility on HK's building sector energy and carbon performance
	Tenant Areas	Non-centralized HVAC system (e.g. split-type) • Lighting at tenant area • Electrical appliances owned and used by tenants	• Utility bills (CLP / HKE) if tenant provides consent • Property managers	No mandatory disclosure	

4 KEY ASKS AND RECOMMENDATIONS

This chapter presents a focused set of strategic asks for the HKSARG to support the active development and promotion of a building retrofit to support Hong Kong's climate action goals market and to unlock the full potential of building retrofits. Informed by critical market gaps, structural and financial barriers, and lessons from global and local innovative financial tools, these recommendations call for decisive action to scale up retrofit adoption and improve long-term building performance. The table below summarises the chapter, and maps recommendations with key challenges outlined in Section 3.2.

TABLE 4.1 Key Asks and Recommendations with respect to Hong Kong's Retrofit Challenges

Aspect	Key Challenges	Key Asks
Policy	• Lack of regulatory pathway and established benchmark	Design an actionable buildings decarbonisation roadmap with detailed and granular targets and timelines for building industry
	• Lack of regulatory pathway and established benchmark	Conduct interim reviews and progress tracking, where performances are publicly disclosed
	• Awareness gaps in energy retrofitting	Demonstrate leadership and commitment by further decarbonising governmental buildings
	• Insufficient building knowledge and knowledge translation • Awareness gaps in energy retrofitting	Establish dedicated cross-bureau retrofit working group and cross-government platform
Data	• Insufficient building knowledge and knowledge translation	Improve transparency of building-level data for meaningful benchmarking
	• Poor building-level data environment • Passive approach to decarbonization among mid-sized	Push disclosure to whole-building energy data (including tenant areas)
	• Poor building-level data environment	Enhance city-wide energy data disclosure system
Finance	• High costs undermine retrofit viability • Incentives miss mid-tier owners	Expand public financing to accelerate deep building retrofits
	• High costs undermine retrofit viability	Partner with financial institutions to unlock retrofit capitals
	• Lack of regulatory pathway and established benchmark	Align cross-governmental coordination with green finance policies
	• High costs undermine retrofit viability • Incentives miss mid-tier owners	Scale up financial innovations

4.1 POLICY – DEDICATED BUILDINGS DECARBONISATION PLAN

1. **Hong Kong needs a more actionable buildings decarbonisation roadmap with detailed and granular targets and timelines to guide industry.**

   While *Hong Kong's CAP 2050* sets a broad energy reduction goal, it lacks clear, actionable targets for the building sector. A robust roadmap with interim milestones, building-type-specific goals, and quantified retrofit commitments is essential to guide industry action and attract green investment. Without such targets, it won't be possible to meet the goals. Leading economies like Singapore and the EU demonstrate that clear timelines and policy certainty are critical to mobilising large-scale decarbonisation in buildings.

2. **Interim reviews and progress tracking of the Roadmap's targets should be conducted and disclosed to public.**

   Progress reviews—annually until 2050[d]—should be supported by systematic collection of building energy data to enable meaningful assessment. Transparent disclosure of target and performance outcomes will build accountability and strengthen market and public confidence.

3. **HKSARG can display action and leadership with commitments to reduce energy consumption of its own buildings.**

   The Government should set example for action and commitment with its own dedicated strategic plan for the energy consumption and targets for its own building properties. Such a plan would include:

   - Disclosures of its own energy consumption (on a publicly available building energy data repository, on which other owners can also submit their data) with a yearly update, or disclose details of energy audits at a minimum.

   - Publishing and reviewing its own decarbonization targets, strategies and milestones by buildings/department, together with cost and efficiency data.

   Such action would create a positive signal to the market that the Government considers decarbonization of the built environment to be a priority and that the direction of travel will be increased regulation to ensure that the rest of the market follows suit.

4. **Establishment of a committee or working group under the Cross Agency Steering Group dedicated to building decarbonisation.**

   Given the importance of the property market to Hong Kong and the level of emissions from the built environment, it is critical to prioritise efforts to decarbonize so that the targets set out in the next iteration of the Climate Action Plan can be met. As such, dedicated cross-bureau and cross-government platform, led by the Development Bureau should be established under the CASG to drive this forward. Such a committee can engage experts from across the real estate, engineering and finance sectors to further support and advise on achieving the goals of the roadmap.

4.2 DATA – SYSTEMIC AND GRANULAR ENERGY DISCLOSURE SYSTEM

1. **Hong Kong needs to enhance its energy data disclosure system to pave the way for benchmarking and (mandatory) building system energy labelling/rating scheme.**

The system should address the following action points:

a. **Improve transparency of building-level data to enable meaningful benchmarking.**
   Energy data disclosure should include key building characteristics—such as size, type, and usage—to provide essential context for EUI comparisons. All relevant data should be consolidated into a single, accessible platform to avoid fragmentation and improve usability. It should also help building owners identify energy / emissions reductions opportunities and navigate relevant green finance resources and mechanisms for retrofit.

b. **Whole-building energy consumption, including tenant data, should be made visible through annual energy consumption submission.**
   While the EAC mandates EUI disclosure which reflects energy use intensity of central building service installations (CBSIs), the lack of visibility on combined landlord and tenant energy use hinders performance tracking and policy evaluation. HKSARG must require annual energy submissions and proactively collaborate with utilities to secure aggregated tenant data, ensuring comprehensive, anonymised disclosure that supports accountability and action.

The 2020 report Improving Data Transparency in Buildings Energy Performance, published by the Business Environment Council, puts forward concrete proposals to enhance the data landscape in the sector, laying a strong foundation for accelerating the decarbonization of both NBs and EBs.[48]

d. Both EMSD and EPD have a long history of annual energy consumption reporting practices. A building sector specific reporting should be implemented for annual progress review.

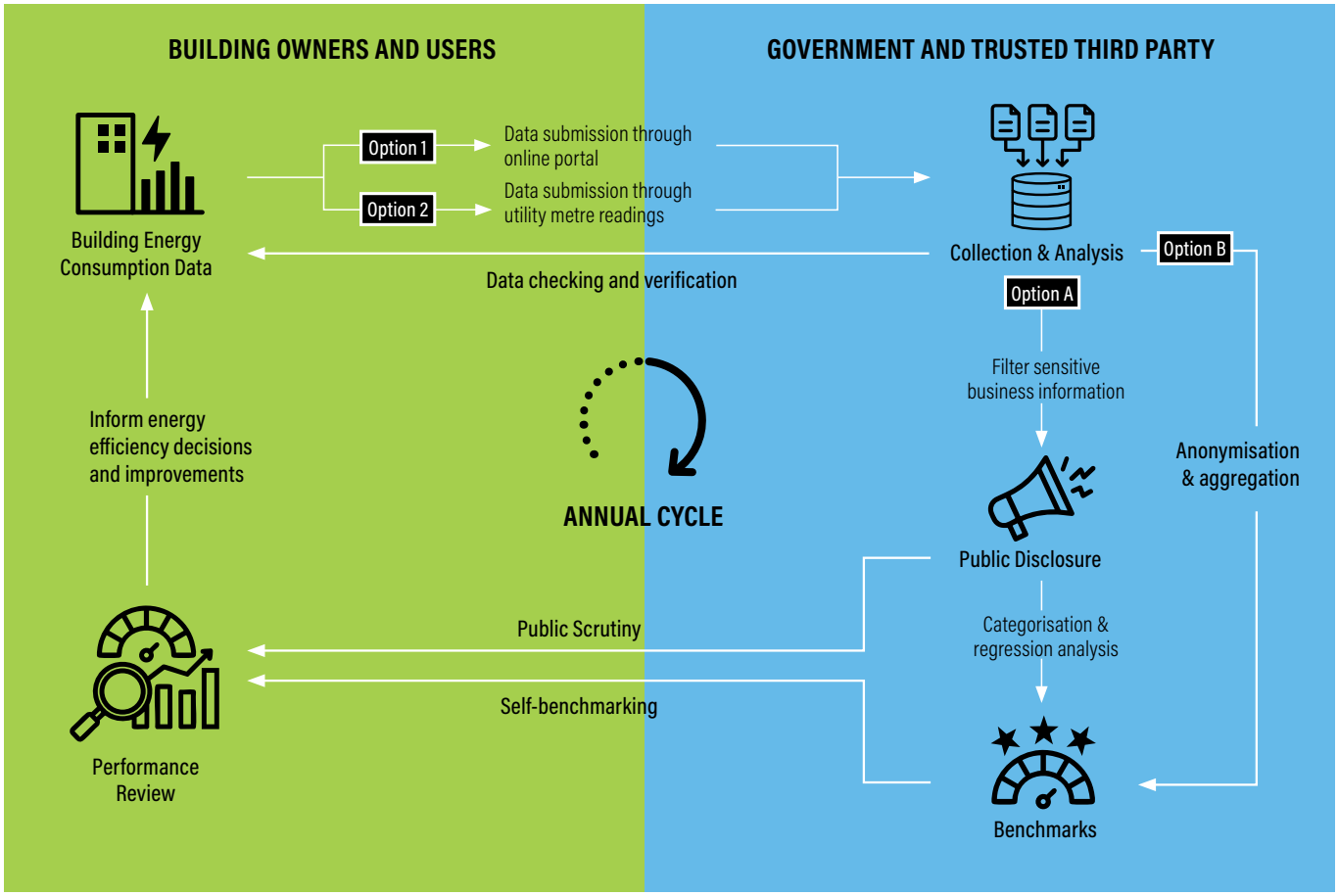
CASE STUDY

New York City's Aggregated Tenant Energy Data via Utility[47]

Con Edison, NYC's primary utility, provides aggregated monthly electricity usage data for whole buildings to support compliance with NYC's Local Law 84. To protect privacy, data is only shared if a building has four or more tenant accounts, and no single account makes up more than 50% of total usage. If these thresholds are met, ConEd aggregates tenant consumption into a single dataset and delivers it through the Energy Usage Data System (EUDS).

This system enables accurate whole-building benchmarking without breaching tenant confidentiality, supporting enforcement of energy disclosure and emissions caps under Local Law 97. Such approved could be adopted in Hong Kong. It shows how utilities can securely share anonymised data to enable whole-building transparency, balancing privacy with performance accountability.

FIGURE 4.1 Data collection, analysis, benchmarking and reporting system proposed by BEC (2020)



EXTENDED DISCUSSION

Energy Rating System and the Role of Data in Driving Performance-Based Policy

A robust energy data disclosure system is a critical enabler of performance-based policy tools in Hong Kong's building sector. Verified, standardized data lays the foundation for credible benchmarking, targeted interventions, and financeable energy retrofit projects. It also supports the implementation of advanced tools such as an Energy Rating System similar to Australia's NABERS and US's ENERGY STAR.

There is growing interest in exploring an energy labeling framework for building system equipment in Hong Kong. A more granular, component-based rating system — such as a letter-grade scale — is being discussed as a way to complement existing whole-building energy metrics in other regions. Unlike aggregated EUI figures, which may obscure inefficiencies in specific systems, this bottom-up approach could enable more meaningful benchmarking across buildings with diverse uses and configurations. It may also offer clearer guidance for identifying retrofit priorities and improving overall energy performance.

To be effective, however, the labeling system depends on structured, verifiable data collection—including building and equipment characteristics, operational profiles, and performance metrics over time. Without this, benchmarking becomes unreliable, policy enforcement is weakened (and decarbonization targets hard to achieve). Establishing a standardized digital platform for data reporting is therefore essential to support labeling efforts and broader policy integration.

Labeling as a Policy Enabler

Mandatory energy labeling not only drives market transparency but also serves as an anchor for other performance-based policies. For instance:

- Rates concessions or tax incentives could be tied to energy grades, rewarding high-performing buildings.
- Rental eligibility criteria could use energy labels to screen premises for government tenancy or green lease programs.
- Financing becomes more accessible when building performance is communicated through a simple, standardized metric—bridging the knowledge gap between technical audits and financial risk assessment and ultimately enabling performance based green finance.

The finance sector in particular stands to benefit. A letter-grade system helps banks and investors evaluate retrofit potential without needing to interpret complex technical data. This could unlock funding opportunities for mid- and lower-tier commercial buildings, which often face capital constraints but hold significant energy savings potential.

Global Best Practices

International experience validates this approach. Australia's NABERS program, for example, provides verified performance ratings that enhance asset value, reduce operating costs, and improve tenant satisfaction. Its success is grounded in strong data governance and a performance-based certification model, rather than design-based estimations. Similarly, Singapore's Building Energy Submission System (BESS) mandates annual energy data reporting for large buildings, supporting national benchmarking and policy planning.

CASE STUDIES

Singapore's Annual Mandatory Submission of Building Energy Performance[49]

In Singapore, buildings with GFA ≥5,000 sqm are required to submit the following building information and energy consumption data to the Government:	1. Ownership and Activity Type (Ownership, occupancy type, activity type etc.) 2. Building Data (Gross floor area, air-conditioning floor area, renovation/retrofitting works etc.) 3. Service Information (Lifts, air-conditioning and mechanical ventilation, lightings and hot water systems) 4. Energy Consumption (electricity, diesel, natural gas, town gas, etc.)
The Building Energy Performance Data is publicly accessible with the following information:	▪ Building Characteristics (Building type, main function, building size (large/medium), year of completion, GFA, green building certification, if applicable) ▪ EUI (current year and previous year, EUI quartile/energy ranking of current year and previous year) ▪ AC characteristics (AC area, area percentage, type, age of chiller, system efficiency)
Such information is useful for:	▪ Establishing performance benchmarks, which informs asset owners as to their existing energy consumption/ carbon emissions, relative to their peers ▪ Defining carbon or energy reductions targets, which inform on technical actions asset owners will need to take to support Hong Kong's climate action goals ▪ Designing applicable technical retrofitting options and plans, which may be unique or specific to the age, design and characteristics of the building, as well as the type, level and availability of financial resources ▪ Identifying financing options, which match the level and type of retrofitting to be conducted

Carbon Inclusion for Commercial Retrofit – Voluntary Data Disclosure[50]

China's "carbon inclusion" (碳普惠) initiative allows small-scale building owners to earn verified carbon credits by undertaking low-carbon actions such as energy-efficient retrofits. In Guangdong, for example, owners who install high-efficiency air conditioning systems can receive credits based on standardized methodologies, tracked through digital platforms and eligible for financial or non-monetary rewards.

Applied to Hong Kong, a similar mechanism could incentivize small to mid-tier commercial building owners to voluntarily track, disclose, and improve their energy performance—an area often hindered by fragmented ownership and limited data transparency. Verified energy savings could be converted into tradable "green points" or carbon credits, which unlock innovative benefits such as reduced insurance premiums, access to ESG-linked financing, expedited government approvals for renovation works, or public recognition on a city-run building portal. Rather than mandating disclosure, this approach would build a positive feedback loop between data transparency, retrofit investment, and reward-driven climate action.

4.3 FINANCE – PUBLIC SECTOR MUST ADDRESS WHAT THE MARKET CANNOT EFFECTIVELY RESOLVE

1. **HKSARG should expand public financing to accelerate deep building retrofits.**

   Public funding is essential to overcome the high upfront costs and slow ROI that deter private investment in energy upgrades. Utility-led retrofit funding programs like those from CLP and HKE offer valuable support but remain limited in scale and scope. The Government must scale up financial commitment to drive large-scale, impactful retrofits across the building sector.

2. **HKSARG should partner with financial institutions to unlock retrofit capital.**

   The Government should collaborate with FIs to offer low-interest loans, provide guarantees, and subsidize green certification fees. This stimulates the market, de-risks investment and builds confidence among lenders, asset owners, and investors to encourage more action.

3. **Cross-government coordination should align with green finance policies.**

   HKMA, EEB, CEDB, FSTB and other agencies must coordinate efforts to align climate goals with fiscal strategies. A unified policy approach will mobilize private capital and mainstream green finance for building decarbonisation.

4. **HKSARG should scale up financial innovation to unlock capital for building retrofits.**

   The Government should reduce lending risks and improve access to capital through loan guarantees, catalytic funds, and public-private financing models. Targeted support for SMEs—including preferential loans, professional fee subsidies, and recovery loan schemes—can mobilize widespread retrofit action and ensure inclusive participation.

Below are some examples of potential financial incentives:

- **Extension of Government Sustainable Bond Programme** – Expand eligibility to include existing building retrofits. HKSARG should collaborate with FIs and the private sector to develop innovative financing models that channel bond proceeds into large-scale retrofitting of private commercial buildings.
- **Cluster-Based Retrofit Financing** – Support neighbourhood-scale retrofits by aggregating demand across building clusters, enabling shared services, bulk procurement, and easier access to financing, with government and local bodies as facilitators.
- **Preferential Loans through Programme Lending** – Partner with FIs to offer attractive loans tied to government incentives like the HK's EERSB accelerated tax deduction.
- **Subsidies for Professional Fees** – Extend HKMA's Green & Sustainable Finance Grant Scheme to SMEs seeking retrofit financing.[51]
- **Recovery Loan Scheme via HKMC** – Provide partial guarantees to loans made to SMEs for retrofitting to reduce credit risk for banks.
- **Catalytic Funds** – Use family office or public grants to de-risk and attract private investment into SME-focused retrofit financing.
- **Public-Private Funding Schemes** – Public-Private Co-Financing Models – Combine government funding with private capital through matched investment, guarantees, or concessional terms to reduce project risk, lower costs, and scale up retrofit implementation.
- **Ensure Policy Alignment** – Align green finance criteria (e.g. from HKMA) with technical standards from EMSD to reduce compliance burdens and improve uptake.

CASE STUDIES

HKJC Funding Program[52]

Currently, under the HKJC funding program, the HKJC Charities Trust works in partnership with Government and non-profit-making agencies to improve the quality of life of the Hong Kong people in 10 major areas which also including Environmental Protection. Building retrofitting should be added to this kind of funding initiatives and FIs can also provide a portion of funding (i.e. co-funded) in collaboration with HKJC and other public funding available towards the financing of building retrofitting projects. A lower carbon footprint, lower energy bills, etc. equate to a healthier, more climate resilient city and future, which aligns with the goals and objectives of HKJC.

EXTENDED DISCUSSION

Accelerating Neighborhood-Scale Retrofits through Cluster-Based Approaches

While building-level retrofits remain crucial, targeting clusters of similar buildings can unlock greater impact, particularly among small property owners who often lack the resources to act independently. With the availability of GIS and building energy data, clusters of older or inefficient buildings can be identified across Hong Kong. This enables area-based retrofit strategies where multiple owners benefit from:

- Shared technical and project management services
- Bulk procurement of energy-efficient equipment and materials
- Better access to financing through aggregated demand
- Improved governance and coordination via local facilitation bodies

These neighborhood-scale efforts not only lower individual costs but also create tangible community benefits, such as improved public realm and local air quality.

Global Best Practice

Bloomsbury, London is a dense, historic area in central London with a mix of commercial offices, institutions, and small private buildings under fragmented ownership—similar in complexity to several districts in Hong Kong.

To address retrofit challenges, local stakeholders—including the University of London, Camden Council, and the Better Buildings Partnership (BBP)[53]—collaborated to support area-based energy upgrades:

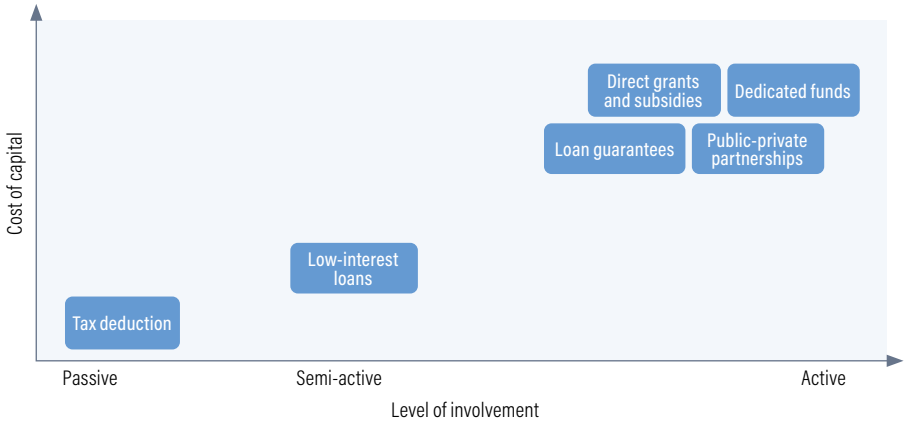
- Shared energy audits and retrofit planning across nearby buildings.
- Bulk procurement of lighting and controls to reduce costs for smaller owners.
- Use of green lease toolkits to align landlord-tenant incentives.
- Support from the Camden Climate Change Alliance with technical advice and access to suppliers.

Another notable case from the UK is The Leeds Low Carbon Accelerator, supported by the UK Infrastructure Bank.[54] It offers a compelling example of how strategic government advisory and financial innovation can unlock retrofit activity in the able-to-pay segment. By addressing barriers such as fragmented supply chains and weak financial propositions, the project designed a "**One Stop Shop**" model that integrates customer support, financial products, and delivery planning. This model, tested in Chapel Allerton, shows potential for broader national scalability.

Though buildings remained independently owned, coordination allowed property owners to benefit from economies of scale, reduce administrative burden, and access financing more easily. This model demonstrates how cluster-based retrofits can succeed in non-uniform, multi-owner urban districts, offering a practical path for similar efforts in Hong Kong.

The diagram on the right illustrates the potential financing initiatives that HKSARG can adopt mapped against the level of "proactiveness" and cost of capital. To date, policy efforts have primarily supported passive, lower-cost measures. To achieve broader and deeper decarbonization, a strategic shift toward higher public agency and capital input is recommended.

FIGURE 4.2: Spectrum of Financing Policies by "Proactiveness" and Cost of Capital



EXTENDED DISCUSSION

Building Cap and Trade Mechanism

As the holder of a large property portfolio, the Government is well-positioned to pilot a cap-and-trade mechanism for buildings, whereby each government-owned asset is assigned a target for reducing energy consumption or greenhouse gas (GHG) emissions. Properties consuming or emitting above their designated caps must acquire remedial units (or "emission credits") to offset their excess, while those performing below target will be eligible to generate bank credits based on their surplus performance.

Assets exceeding their limits may balance their deficits by:

1. Transferring surplus credits from other better-performing government buildings within the same portfolio;

2. Redeeming credits previously banked through earlier overperformance.

This creates a closed-loop, performance-based system that incentivises continuous improvement and allows portfolio managers to optimise performance across assets.

A relevant international precedent is the Tokyo Cap-and-Trade Program, launched in 2010, which applies to large commercial and industrial buildings.[55] It was the world's first urban cap-and-trade scheme targeting the building sector, requiring facilities to reduce emissions by a set percentage (e.g. 15–17% in the first compliance period), with mechanisms for credit trading, banking, and external project offsets. The program achieved high compliance rates and demonstrated that a cap-and-trade system can drive measurable emissions reductions in dense urban portfolios.

Once tested within the public sector, a similar mechanism could be extended to the private market, where owners of large commercial, retail, or office portfolios — for example, those exceeding 100,000 sq. ft. of gross floor area — would be required to:

- Disclose whole-building energy performance annually,
- Set and report on decarbonisation targets, and
- Participate in a regulated credit trading system based on actual performance.

This approach aligns with international best practices and provides a flexible, market-based mechanism to scale retrofits and drive energy efficiency across the sector.

CASE STUDY

Hong Kong Growth Portfolio[56]

The Financial Secretary announced in the 2020-2021 Budget that he would use 10% (about HKD22 billion) of the Future Fund to establish a new portfolio, named "Hong Kong Growth Portfolio", with the objectives of reinforcing Hong Kong's status as a financial, commercial, and innovation and technology (I&T) center, and raise the productivity and competitiveness of Hong Kong in the long run. A "Strategic Tech Fund" and "GBA Investment Fund" 5 has already been set-up under the "Hong Kong Growth Portfolio" and it is suggested that a building retrofitting fund should also be introduced to delivering social and economic benefits which aligned with the HK CAP2050 for Energy Saving and Green Buildings6 and successive strategic action plans.

The funding portion from the public grant is interest free and can be acted as the first-loss capital towards the lending extended by FIs. This could help to reduce the capital at risk and lending cost of FIs who lend to SMEs for the purpose of building retrofitting and motivate FIs to finance building retrofit.

5 LOOKING AHEAD

Building retrofitting is a critical pathway for Hong Kong to enhance energy efficiency and reduce carbon emissions. While this paper has outlined a range of regulatory and financial mechanisms to support retrofitting, their success ultimately hinges on strong leadership and commitment from HKSARG. In order to meet our climate action ambitions, public authorities must not only drive the implementation of these mechanisms but also be prepared to shoulder a greater share of the associated costs to accelerate market adoption.

KEY ACTIONS

1. Send a clear market signal that decarbonization of the built environment is a strategic priority

To do this, HKSARG should:

A. **Determine a roadmap for decarbonization of the existing building stock** with clear and measurable targets. The roadmap must contain granular targets with interim milestones and quantified commitments — such as establishing retrofit benchmarks or introducing mandatory energy disclosure and labelling.

B. **Lead by example** and establish and disclose targets for its OWN buildings and develop a technical plan for its own retrofits.

C. **Establish a cross agency task force** to commit to advancing retrofitting across Hong Kong, to provide strategic oversight, increase accountability and collaboration, in particular with the financial sector to coordinate appropriate financial measures to support retrofitting efforts and ultimately to reduce fragmentation.

These actions will provide strong market signals, encouraging stakeholders to align their priorities with long-term climate goals. At the same time, fostering cross-disciplinary and cross-bureau collaboration will be essential to ensure policy coherence and maximize the impact of retrofit initiatives.

2. Promote policies and standards that drive the retrofitting market forward

To do this:

A. **Energy audits and disclosures are a MUST.** It is essential that technical audit details such as energy efficiency coefficients and year of service of major equipment are disclosed so that appropriate measures can be taken. Phasing in of disclosure requirements, with government, large/listed companies providing such details followed by SMEs

B. **Mandatory action for underperformers.** Results of audits must lead to action or commitments in order to ensure that the disclosure regime is effective and leads to genuine decarbonisation efforts.

C. **Establishing performance benchmarks**, such as energy labelling systems, drives transparency and serves as an anchor for other performance-based policies – rates/tax concessions; better financing, etc.

Collaboration across government, the building sector, and the financial industry is essential to develop a transparent and robust data environment. Improved data access and standardization will enable better decision-making, support performance benchmarking, and unlock new opportunities for innovation and investment.

3. Unlock the financial hurdles through incentives

To do this:

A. **HKSARG must shoulder more risk** to incentivize asset owners, through dedicated funding efforts to accelerate retrofits and energy efficiency upgrades. Determining the appropriate measure and finding the right balance can be challenging but the precedent examples both within Hong Kong and internationally are useful reference points for discussion between the government and market participants. Such discussions can be led by the cross- agency task force.

Through coordinated leadership, ambitious goal-setting, and collective action, Hong Kong can position itself at the forefront of building decarbonization and shape a more resilient, low-carbon urban future.

LIST OF ACRONYMS

Acronym	Full form
AC	Air-conditioning
BEAM	Building Environmental Assessment Method
BEC	Building Energy Code
BEEFS	Building Energy Efficiency Financing Scheme
BEEO	Building Energy Efficiency Ordinance
CAP2050	Climate Action Plan 2050
CBSI	Central building services installations
CLP	China Light and Power Company Ltd
EAC	Energy Audit Code
EB	Existing building
EERSB	Energy Efficiency Registration Scheme for Buildings
EPC	Energy Performance Contract
ESA	Energy Service Agreement
ESCO	Energy service company
EUI	Energy Utilization Index
FIs	Financial Institutions
HKE	Hong Kong Electric Company
HKSARG	Hong Kong Special Administrative Region Government
NB	New building
OBF	On-bill finance
PACE	Property Assessed Clean Energy
RCx	Retro-commissioning

LIST OF REFERENCES

1. Electrical and Mechanical Services Department. (2021). Hong Kong energy end-use data 2021 [PDF report]. Hong Kong SAR Government. https://www.emsd.gov.hk/filemanager/en/content_762/HKEEUD2021.pdf
2. CLP Holdings Limited. (2022). Climate-related disclosures report 2022 [PDF report]. CLP Group https://www.clpgroup.com/content/dam/clp-group/channels/sustainability/document/sustainability-report/2022/CLP_Climate_Related_Disclosures_Report_2022_en.pdf.coredownload.pdf
3. Tan, Y., Liu, G., Zhang, Y., Shuai, C., & Shen, G. Q. (2018, August). Review of green retrofit technologies and policies for aged residential buildings in Hong Kong. In *International Conference on Construction and Real Estate Management 2018* (pp. 38-44). Reston, VA: American Society of Civil Engineers.
4. JLL. (2022, May). Decarbonizing Cities and Real Estate.
5. Bertoldi, P., Economidou, M., Palermo, V., Boza-Kiss, B., & Todeschi, V. (2021). How to finance energy renovation of residential buildings: Review of current and emerging financing instruments in the EU. WIREs *Energy and Environment*, 10(1), Article e384. https://doi.org/10.1002/wene.384
6. The Government of the Hong Kong Special Administrative Region. (2013, June 19). *LCQ17: Buildings Energy Efficiency Funding Scheme*. https://www.info.gov.hk/gia/general/201306/19/P201306190385.htm
7. Electrical and Mechanical Services Department. (n.d.). *Energy Efficiency Registration Scheme for Buildings*. https://www.emsd.gov.hk/en/energy_efficiency/energy_efficiency_registration_scheme_for_building/index.html
8. Government of the Hong Kong Special Administrative Region, CLP Power Hong Kong Limited, & Castle Peak Power Company Limited. (2017). *Scheme of Control Agreement: Between the Government of the Hong Kong Special Administrative Region and CLP Power Hong Kong Limited and Castle Peak Power Company Limited* [PDF]. https://www.clp.com.hk/content/dam/clphk/documents/about-clp-site/corporate-information-site/scheme-of-control-site/new_CLP_SCA_eng.pdf
9. CLP Power Hong Kong Limited. (2023, September 18). CLP Power supports Far East Consortium to secure its first sustainability-linked loan to fund energy-saving hotel project [PDF report]. CLP Group. https://www.clpgroup.com/content/dam/clp-group/channels/media/document/2023/20230918_en.pdf.coredownload.pdf
10. C40 Cities. (n.d.). *Building Retrofit Program (BRP); Loan Support Scheme - Seoul.* Copenhagen Centre on Energy Efficiency. https://c2e2.unepccc.org/kms_object/building-retrofit-program-brp-loan-support-scheme/
11. Hongkong Land Holdings Limited. (2023). *Green Finance Report 2022.* https://hklandblob.blob.core.windows.net/assets/sustainability/Green%20Finance/hll_green-finance-report-2022.pdf
12. European Commission, Joint Research Centre. (n.d.). *Energy performance contracting. Energy Efficiency in Buildings*. https://e3p.jrc.ec.europa.eu/articles/energy-performance-contracting
13. US EPA. (2023). Performance Contracting and Energy Service Agreements. https://www.epa.gov/statelocalenergy/performance-contracting-and-energy-service-agreements
14. CLP Group. (2023, February 13). CLPe signs deal with Chinachem Group to launch Hong Kong's first zero-carbon chiller system project [PDF press release]. CLP Group. https://www.clpgroup.com/content/dam/clp-group/channels/media/document/2023/20230213_en.pdf.coredownload.pdf
15. U.S. Department of Energy. (n.d.). *Property assessed clean energy programs. Office of Energy Efficiency & Renewable Energy*. https://www.energy.gov/scep/slsc/property-assessed-clean-energy-programs
16. Green Finance Institute. (2020). *Financing energy efficient buildings: The path to retrofit at scale* [Report]. https://www.greenfinanceinstitute.com/wp-content/uploads/2020/06/Financing-energy-efficient-buildings-the-path-to-retrofit-at-scale.pdf
17. PetrosPACE. (n.d.). *C-PACE case study: Five years later.* https://petros-pace.com/c-pace-case-study-five-years-later/
18. Portland State University. (n.d.). *Green Revolving Fund*. https://www.pdx.edu/sustainability/green-revolving-fund
19. Hong Kong SAR Government. (n.d.). *Green Tech Fund*. Innovation and Technology Commission. https://www.gtf.gov.hk/en/index.html
20. Aviva Investors. (2023, February). *Decarbonising the built environment*. AIQ Investment Thinking. https://www.avivainvestors.com/en-gb/views/aiq-investment-thinking/2023/02/decarbonising-built-environment/
21. Sweatman, P., & Managan, K. (2010). Financing energy efficiency building retrofits. *International Policy and Business Model Review and Regulatory Alternatives for Spain*. Climate & Strategy Partners, Madrid.
22. Environment Bureau, Hong Kong Special Administrative Region. (2021, October). *Hong Kong's Climate Action Plan 2050* [PDF]. https://cnsd.gov.hk/wp-content/uploads/pdf/CAP2050_booklet_en.pdf
23. Environment Bureau. (2015). *Energy Saving Plan for Hong Kong's Built Environment 2015~2025+* [PDF report]. Hong Kong SAR Government. https://www.eeb.gov.hk/sites/default/files/pdf/EnergySavingPlanEn.pdf
24. OECD. (2022). *Decarbonising Buildings in Cities and Regions.* OECD Urban Studies. OECD Publishing. Paris. https://doi.org/10.1787/a48ce566-en.
25. Building and Construction Authority. (2021). *Green Building Masterplans.* https://www1.bca.gov.sg/buildsg/sustainability/green-building-masterplans
26. PlaNYC: Getting Sustainability Done. (2025). *NYC Mayor's Office of Climate and Environmental Justice.* https://climate.cityofnewyork.us/initiatives/planyc-getting-sustainability-done/
27. Tokyo Metropolitan Government. (2019). *Outline of Zero Emission Tokyo Strategy.* https://www.kankyo.metro.tokyo.lg.jp/documents/d/kankyo/outline-of-zero-emission-tokyo-strategy
28. City of Sydney. (2018). *Sydney's sustainable office buildings plan* [PDF]. https://www.cityofsydney.nsw.gov.au/-/media/corporate/files/2020-07-migrated/files_s-3/sydneys-sustainable-office-plan-final.pdf
29. Guangdong Builders Association. (n.d.). 《深圳市绿色建筑高质量发展行动实施方案（2021-2025年）》（征求意见稿）. https://www.gba.org.cn/h-nd-1928.html
30. 中华人民共和国住房和城乡建设部. (2022, March 12). "十四五" 建筑节能与绿色建筑发展规划的通知. https://www.gov.cn/zhengce/zhengceku/2022-03/12/content_5678698.htm
31. European Commission. (2021, September 24). Renovation wave. Energy - European Commission. https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficient-buildings/renovation-wave_en
32. Natural Resources Canada. (2024). *The Canada green buildings strategy: Transforming Canada's buildings sector for net-zero and resilient future*. https://natural-resources.canada.ca/transparency/reporting-and-accountability/plans-and-performance-reports/departmental-strategies/the-canada-green-buildings-strategy-transforming-canadas-buildings-sector-for-net-zer/26065
33. Menezes, A. (2012, February). *The performance gap* [PDF]. Chartered Institution of Building Services Engineers (CIBSE). https://www.cibse.org/media/a1skdgsi/cb11.pdf
34. Building and Construction Authority. (n.d.). *BCA building energy benchmarking and disclosure.* https://www1.bca.gov.sg/buildsg/sustainability/regulatory-requirements-for-existing-buildings/bca-building-energy-benchmarking-and-disclosure
35. Wurfel, L. (2024). *A history of NABERS*. Bueno Analytics. https://buenoanalytics.com/news/the-history-of-nabers/
36. BCA. (2020). Annual mandatory submission of building information and energy consumption data 2020. *Circular No: BCA/BESS/202001-ES*. https://www1.bca.gov.sg/docs/default-source/docs-corp-news-and-publications/circulars/bess-circular-2020.pdf
37. NYC Gov. (2025). Local Law 84: NYC Benchmarking Law. https://www.nyc.gov/site/buildings/codes/ll84-benchmarking-law.page#:~:text=Local%20Law%2084%3A%20NYC%20Benchmarking,making%20for%20NYC%20building%20owners.
38. Tokyo Metropolitan Government, Environment Bureau. (n.d.). *Tokyo Cap-and-Trade Program; Carbon Reduction Reporting Program* [PDF]. https://www.kankyo1.metro.tokyo.lg.jp/archive/en/climate/index.files/summary_English_Part2.pdf
39. Australian Government, Department of Climate Change, Energy, the Environment and Water. (n.d.). *Commercial Building Disclosure Program*. https://www.cbd.gov.au/

40. Building and Construction Authority. (2022). *Green Mark Incentive Scheme for Existing Buildings 2.0*. https://www1.bca.gov.sg/buildsg/sustainability/green-mark-incentive-schemes/green-mark-incentive-scheme-for-existing-buildings-2.0
41. Kelvin. (2024, December 18). *2025 incentives and rebates for NYC building owners.* https://kel.vin/news/2025-incentives-and-rebates-for-nyc-building-owners
42. C40 Cities. (2022). *Urban efficiency II: Seven innovative city programmes for existing building energy efficiency* [PDF]. https://www.c40knowledgehub.org/s/article/Urban-Efficiency-II-Seven-Innovative-City-Programmes-for-Existing-Building-Energy-Efficiency?language=en_US
43. Building and Construction Authority. (n.d.). *Building Retrofit Energy Efficiency Financing (BREEF) Scheme*. https://www1.bca.gov.sg/buildsg/sustainability/green-mark-incentive-schemes/building-retrofit-energy-efficiency-financing-breef-scheme
44. City of New York, Mayor's Office of Climate and Environmental Justice. (2025, July 31). *NYC Accelerator PACE financing*. https://accelerator.nyc/resources/finance/PACE
45. Building Upgrade Finance. (n.d.). *About* [Website]. https://buildingupgradefinance.net.au/about/
46. Chen, L., Darko, A., Adegoriola, M. I., Chan, A. P., Yang, Y., & Tetteh, M. O. (2024). Challenges to energy retrofitting of existing office buildings in high-rise high-density cities: The case of Hong Kong. Energy and Buildings, 312, 114220.
47. Consolidated Edison Company of New York, Inc. (n.d.). *Aggregated consumption frequently asked questions* [PDF]. New York City. https://www.nyc.gov/html/planyc2030/downloads/pdf/120222_Con_ed_faq_external_final_version.pdf
48. BEC. (2020). *Improving Data Transparency in Buildings Energy Performance.* https://www.bec.org.hk/sites/default/files/publications/Improving_Data_Transparency_in_Buildings_Energy_Performance.pdf
49. Building and Construction Authority. (n.d.). Building energy benchmarking and disclosure. Singapore Government. https://www1.bca.gov.sg/buildsg/sustainability/regulatory-requirements-for-existing-buildings/bca-building-energy-benchmarking-and-disclosure
50. Department of Ecology and Environment of Guangdong Province. (2022). 附件3: 广东省使用高效节能空调碳普惠方法学2022年修订版. 编号2017004-V03
51. Hong Kong Monetary Authority. (n.d.). Tax concessions and incentive schemes. Hong Kong SAR Government. https://www.hkma.gov.hk/eng/key-functions/international-financial-centre/bond-market-development/tax-concessions-and-incentive-schemes/
52. The Hong Kong Jockey Club. (2021). Environmental report 2021 [PDF report]. https://corporate.hkjc.com/corporate/common/english/pdf/Environmental-Report_2021Dec10.pdf
53. Better Buildings Partnership. (n.d.). Better Buildings Partnership. https://www.betterbuildingspartnership.co.uk/
54. National Wealth Fund. (2025). Accelerating building decarbonisations in Leeds. https://www.nationalwealthfund.org.uk/local-authority-case-studies/accelerating-building-decarbonisation-leeds
55. Tokyo Metropolitan Government. (2025). Japan - Tokyo Cap-and-Trade Program [Online program description]. International Carbon Action Partnership. https://icapcarbonaction.com/en/ets/japan-tokyo-cap-and-trade-program
56. Financial Services and the Treasury Bureau. (n.d.). Hong Kong Growth Portfolio. Hong Kong SAR Government. https://www.fstb.gov.hk/en/financial_ser/hong-kong-growth-portfolio.htm

APPENDIX

FACT SHEET OF BUILDING ENERGY POLICIES IN HONG KONG

Regulatory instruments

The key regulations governing energy efficiency of buildings in Hong Kong are:

- Building Energy Efficiency Ordinance (BEEO)
- Building Energy Code (BEC)
- Energy Audit Code (EAC)

BEEO is the overarching law that governs the energy efficiency of buildings and BEC and EAC are subsections of the BEEO. The EAC sets out the technical guidance for energy audit requirements, while the BEC regulates the minimum energy efficiency standards for central buildings services installations, namely air-conditioning, lighting, electrical installations, and lifts and escalators. The BEC is mostly relevant to new buildings, but it applies to EBs when major retrofitting works of buildings services occurs.

The BEEO mandates commercial buildings and commercial portions of a composite building (e.g. malls under residential storeys) to conduct an energy audit every 10 years. The BEEO also mandates disclosure of energy audit results (i.e., the Energy Utilisation Index (EUI)) by exhibiting the Energy Audit Form at the main entrance of the buildings. The database of EUI results is also publicly available on the EMSD website.

Since 2012, BEEO has covered over 2,200 new buildings and 14,000 major retrofitting works of existing buildings. In addition, over 2,600 commercial buildings have carried out their first round of energy audit. In 2023, amendments are proposed to the BEEO to further improve the energy efficiency of buildings in Hong Kong. The proposed amendments include:

- Extending the scope of regulation to mandate more types of buildings to conduct energy audits
- Mandate the disclosure of technical information in energy audit reports
- Shortening the interval of energy audit from every 10 years to 5 years

Effectiveness of regulatory instruments: The BEC sets the regulatory floor for minimum energy efficiency standards. However, it does not actively push for improved performance in existing buildings. The EAC holds an important role in mandating periodic energy audit and energy performance disclosure. Energy audit requirement set a promising foundation for stimulating RCx and retrofitting projects as opportunities for improvement (i.e., Energy Management Opportunities (EMO)) are identified because of the audit. However, the optional nature of EMOs means that actual improvement after an energy audit depends on whether the building owner acts on the identified EMOs or not.

Financial Incentives

The following financial incentives are available in Hong Kong:

Government Funding: The Government has launched the following schemes to promote energy efficiency in buildings. In the past, the government provided direct subsidies for building energy retrofitting. At present, uptake of energy efficient building installations is encouraged though tax deduction.

- **Building Energy Efficiency Funding Scheme (BEEFS):** The Building Energy Efficiency Funding Scheme (BEEFS) was implemented from 2009-2012 to encourage building owners to carry out building energy retrofitting after conducting energy audits.. Over 6,400 buildings (around one seventh of total buildings in Hong Kong) have received subsidies under BEEFS, with the highest amount capped at $0.5 million per building. An estimated 180 million kWh annual savings were yielded from this program.

- **Energy Efficiency Registration Scheme for Buildings (EERSB)** – The intention of the scheme is to encourage procurement of energy efficient building installations through subsidizing related costs in the form of tax deduction. Since the 2018-2019 financial year, capital expenditure incurred during installation or construction of energy efficient building installations registered under EERSB is eligible for accelerated deduction under profits tax. All types of new and existing buildings that outperform the minimum statutory requirements under the BEEO can be registered under EERSB.

- **Effectiveness of government funding:** As of December 2023, 135 buildings are registered under EERSB. 38 of them (28% of the total) are EBs or Retrofitting/RCx projects, while the rest are new buildings. 30 out of 34 (88%) of privately owned EB projects belong to large, listed property developers or companies, while the remaining assets are owned by well-established NGOs such as HKGBC and HKJC. This reflects that in the case for existing buildings, the EERSB has been well utilized by top-tier organisations for their retrofitting, but not as effective in motivating smaller developers and property owners to go beyond BEC requirements.

Power Company Funding: Both CLP and HKE have funds and loan schemes aimed at promoting energy efficiency and assisting their customers to undergo energy efficiency improvement projects.

- **Direct subsidies** – CLP's Eco Building Fund and HKE's Smart Power Building Fund offer subsidies for energy efficiency improvement initiatives. The scope of projects includes retrofitting, retro-commissioning, and implementation of smart technologies. CLP targets to provide subsidies for 400 buildings and save 48 GWh of energy per year, and to allocate a greater share of the fund the residential buildings and commercial / industrial buildings used by small and medium sized businesses.

	CLP Eco Building Fund	HKE Smart Power Building Fund
Eligible buildings	Communal areas in residential, commercial, industrial buildings	Communal building equipment in non-governmental assets
Amount of subsidy	Differs for different types of buildings and installation categories Maximum HKD$500,000 per building per year	Depend on estimated annual energy saving amount

- **Loan scheme/fund** – Under the Energy Saving Loan Scheme, CLP helps arrange interest free loans for implementation of saving opportunities identified through its free energy audit service. For HKE's Smart Power Loan Fund, applicants can receive loan interest subsidies when loaning from collaborating banks. These schemes serve to encourage uptake of EMOs post-energy audit through lowering the cost of lending.

	CLP Energy Saving Loan Scheme	HKE Smart Power Loan Fund
Eligibility	Energy saving projects identified through CLP's Energy Audit Service	Energy efficiency enhancement projects identified through Smart Power Energy Audit or approved under Smart Power Building Fund
Loan amount	Up to 100% of project cost and maximum of HKD 5 million	Up to 80% of project cost and maximum HKD 3 million

- **Effectiveness of power company funding:** Exact figures on the number of projects or buildings awarded under each scheme are not available, so it is unclear how well utilized these funds are. The application procedures for subsidies from the power companies need to be strictly followed by the owners while the subsidies are limited. Building owners need to bear their own share of capital cost, and they need to prove that the initiatives can save the required amount of electricity before they can successfully get the subsidies from power companies. Nonetheless, the direct subsidy schemes are the most direct and effective in bringing about energy improvement projects by lowering project costs. Individual successful cases of retrofitting and retro-commissioning utilizing CLP's Eco Building Fund have been shared widely among the industry.

Evaluation Schemes

The following certification programs are available in Hong Kong:

Building certification programs: Certification schemes serve to recognize and publicize good performance. There are two local building certification schemes that target existing buildings, including energy performance.

- **BEAM Plus Existing Buildings (EB):** The Hong Kong Green Building Council (HKGBC) operates the BEAM Plus EB scheme to evaluate the environmental performance of existing buildings. It covers various aspects including management, site aspects, materials and waste, energy use, water use and indoor environmental quality. The Selective Scheme enables assessment and certification to be carried out on selected aspects only.

The Energy Use (EU) category of BEAM Plus EB offers detailed guidance on how to enhance energy performance of existing buildings, recognizing the role of management, operation, and maintenance. Credits are awarded for having energy management policy and plans, sub-metering systems, completion of energy audits and identifying and implementing EMOs. Bonus credits are awarded for RCx-related actions in the case of Selective Scheme. It possibly has a slight effect on promoting RCx but is not a key strategy since a large proportion of credits lie in energy efficient practices and measures.

Overall, the main role of BEAM Plus certification is to encourage best practices. It does not merely reflect actual energy performance of a building, meaning a higher BEAM Plus EU rating does not directly equate to better energy saving performance. Therefore, the BEAM Plus EB label is not a pure indicator of actual energy performance that may be demanded by some initiatives (e.g. financing schemes). If actual energy performance is required, certain scheme documents (e.g. green taxonomies) may specify the required amount of energy saving within a certain BEAM Plus credit.

- **Zero-Carbon-Ready Building Certification Scheme:** HKGBC launched the Zero-Carbon-Ready Building Certification in 2023 which is part of the "HKGBC Climate Change Framework for Built Environment". It is a benchmarking scheme and target setting tool for building energy performance. An energy performance calculator is developed for the "Energy Performance Certificate", using EUI as a performance indicator. For existing buildings, a building's performance can be asserted in two ways: through benchmarking against the city-wide database (benchmarking method), or by comparing against its own performance from a baseline year (% reduction method). The rating levels range from Low, Extra Low, Super Low, to Zero-Carbon-Ready which highest performance rating if the benchmarking method is used, and from Level 1 to Level 4 improvement if the % reduction method is used.

  The benefit of the Energy Performance Certificate is that it is specific to actual energy consumption. The level of improvement can be shown clearly to third parties, such as to financers, which justifies financing decisions.

Accelerators

Technical Guidance on Retro-commissioning: The EMSD's 2023 Technical Guidance on Retro-commissioning (TG-RCx) provides comprehensive guidelines for conducting effective RCx projects in Hong Kong's existing buildings. It covers the four main stages of RCx, including preparation, data management, and Measurement & Verification advice. The guide aims to identify Energy Saving Opportunities (ESOs), improve operational performance, and enhance occupant comfort. It includes practical tools and serves as a key reference for local and international RCx projects due to its thoroughness.

The TG-RCx has been well-received as an educational tool, bridging knowledge gaps in the industry's RCx promotion. It enables structured assessments by asset owners and FMs. The 2023 edition emphasizes CCMS data collection and quality, crucial for understanding operational performance like accuracy, consistency, completeness, etc. It highlights the importance of data quality management in RCx projects, setting the stage for improved building energy performance initiatives.

HKGBC Retrofitting Guidebook: The 2023 HKGBC Retrofitting Guidebook showcases over 33 successful local retrofitting cases, serving as a crucial reference for industry professionals. It details project costs, payback periods, and savings, demonstrating the profitability of retrofitting in Hong Kong. The guide includes system-specific strategies and prerequisites, along with useful resources from government and corporate sources to encourage retrofitting initiatives.