INTEGRATING THE KIGALI AMENDMENT INTO HONG KONG'S BUILDING RETROFIT STRATEGY:

From Energy Efficiency to Cooling Efficiency in the Next Climate Action Plan

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ABBREVIATIONS

BEAM Plus	Building Environmental Assessment Method Plus
BEC	Building Energy Code
BEEO	Building Energy Efficiency Ordinance
CFC	Chlorofluorocarbon
CLP	CLP Power Hong Kong Limited
CMVP	Certified Measurement & Verification Professionals
CO2	Carbon Dioxide
COP	Conference of the Parties
EaaS	Energy-as-a-Service
EAC	Energy Audit Code
EEB	Environment and Ecology Bureau
EERSB	Energy Efficiency Registration Scheme for Buildings
EMSD	Electrical and Mechanical Services Department
EPC	Energy Performance Contracting
ESCO	Energy Service Company
EU	European Union
FiT	Feed-in Tariff
GFA	Gross Floor Area
GWP	Global Warming Potential
HFC	Hydrofluorocarbon
HK Electric	Hong Kong Electric Company Limited
HKGBC	Hong Kong Green Building Council
HKIRO	Hong Kong Inland Revenue Ordinance
HKSAR	Hong Kong Special Administrative Region
HKUST	Hong Kong University of Science and Technology
HVAC	Heating, Ventilation and Air Conditioning
IPCC	Intergovernmental Panel on Climate Change
IPMVP	International Performance Measurement and Verification Protocol
KPI	Key Performance Indicator
kWh	Kilowatt-hour
LCGWP	Life-Cycle Global Warming Potential
LCODP	Life-Cycle Ozone Depletion Potential
M&V	Measurement & Verification
NDCs	Nationally Determined Contributions
ODS	Ozone-Depleting Substances
OECD BIAC	OECD's Business and Investment Advisory Committee
OLPAO	Ozone Layer Protection (Amendment) Ordinance
P4P	Pay-for-Performance Energy Efficiency
PBC	Performance-Based Contracting
PMVA	Performance Measurement & Verification Analysts
PNAP	Practice Note for Authorized Persons
PRC	People's Republic of China
SCA	Scheme of Control Agreement
SDGs	Sustainable Development Goals
SME	Small and Medium Entreprise
tCOe	Tonnes of Carbon Dioxide Equivalent
UN IOM	UN International Organization for Migration
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
VRF	Variable Refrigerant Flow

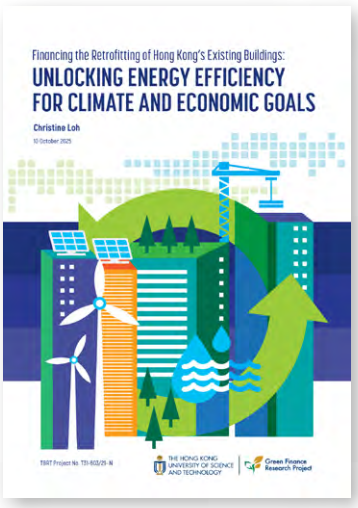
PREFACE

This paper builds on HKUST's earlier report, *Financing the Retrofitting of Hong Kong's Existing Buildings*, published on 10 October 2025. That report examined the structural and market challenges associated with decarbonising Hong Kong's existing building stock and became the basis for constructive engagement with relevant government bureaux and departments responsible for advancing building retrofit policies. One of the key issues identified through this process was the availability of appropriate financing mechanisms to support large-scale retrofitting.

The policy importance of this agenda has since been underscored by the Chief Executive, who in his 2025 Policy Address highlighted the need to "drive the market to accelerate carbon reduction in existing buildings." As Hong Kong prepares its next Climate Action Plan 2050, the treatment of existing buildings will be a critical determinant for the city to advance toward its decarbonisation targets.

This companion paper focuses on the Kigali Amendment to the Montreal Protocol and its relevance to Hong Kong. The HKSAR Government has already taken an important step by amending local legislation to implement Kigali-related controls. The next challenge lies in ensuring wider recognition of the Amendment, understanding the implications of Hong Kong's legal framework, and familiarising stakeholders with how Kigali-aligned measures can support market transformation in the building sector.

We hope this short paper will help to clarify these linkages and contribute to informed policy implementation and market action, particularly as Hong Kong considers how best to integrate existing buildings into its forthcoming Climate Action Plan.



EXECUTIVE SUMMARY

Hong Kong's building sector lies at the heart of its decarbonisation challenge. Existing buildings account for roughly half of the city's carbon emissions, with space cooling dominating electricity demand. While previous policy efforts have focused primarily on energy saving, a new and binding international obligation now adds urgency and direction to Hong Kong's retrofit agenda: *the Kigali Amendment to the Montreal Protocol*.

This paper examines how Hong Kong's incorporation of the Kigali Amendment through the Ozone Layer Protection (Amendment) Ordinance 2025 fundamentally reshapes the economics, timing, and governance of building retrofits. Unlike voluntary energy saving initiatives, Kigali compliance introduces a legally binding phase-down of high-global-warming-potential (GWP) refrigerants on an accelerated timetable applicable to developed economies. As quotas tighten and high-GWP refrigerants become scarce, older cooling systems will face rising costs, operational risks, and eventual obsolescence.

This paper argues that the refrigerant transition and energy saving should be treated as a single, integrated policy challenge. Kigali-aligned cooling upgrades deliver dual climate benefits by reducing both direct emissions from refrigerant leakage and indirect emissions from electricity use. For Hong Kong, where air-conditioning typically accounts for over 40% of building electricity consumption, this dual mitigation pathway offers one of the most cost-effective and scalable routes to emissions reduction.

Augmenting an earlier HKUST report on retrofit financing, this report shows how Kigali compliance strengthens the investment case for performance-based contracting. Regulatory certainty around refrigerant phase-down reduces asset obsolescence risk, while measurable indicators, such as verified energy savings and avoided refrigerant GWP emissions, enhance finance-grade credibility. This report highlights how existing policy, financing instruments, and tax deductions under the Inland Revenue Ordinance, can be refined to support Kigali-aligned investment.

This paper demonstrates that effective Kigali implementation requires coordination across environmental regulation, building codes, planning incentives, tax policy, and finance. Aligning refrigerant GWP thresholds with building standards, BEAM Plus certification, and incentive frameworks would embed refrigerant transition within Hong Kong's core climate governance architecture and not treat it as a standalone compliance exercise.

Last, this report situates Kigali compliance within the broader international climate context, including the Paris Agreement's ratchet mechanism, the UAE Consensus, and emerging signals on cooling and climate finance. It argues that the forthcoming 2026 update of Hong Kong's Climate Action Plan 2050 provides a key opportunity to integrate cooling efficiency, refrigerant transition, and building retrofitting into a coherent and investable pathway.

Taken together, the Kigali Amendment transforms refrigerant management from a technical environmental issue into a strategic driver of retrofit policy, finance, and governance. By acting now and integrating Kigali compliance into its climate, building, and financial frameworks, Hong Kong can reduce emissions, manage transition risks, mobilise private capital, and position itself as a leading example of how dense, highly urbanised cities translate global climate obligations into effective local action.

I: INTRODUCTION

This paper builds upon the earlier HKUST report, *Financing the Retrofitting of Hong Kong's Existing Buildings: Unlocking Energy Efficiency for Climate and Economic Goals*, which argued that Hong Kong's decarbonization challenge is no longer primarily technical but institutional and financial.[1] It examined how public and private actors could collaborate to unlock large-scale retrofitting through innovative financing and governance models.

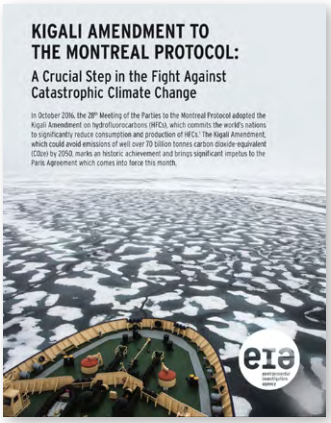
The present paper extends that analysis by examining Hong Kong's retrofit agenda within the international framework of the Montreal Protocol's Kigali Amendment. The Kigali Amendment, which entered into force globally in 2019 and has now been brought into Hong Kong law through the Ozone Layer Protection (Amendment) Ordinance 2025 (OLPAO), represents a new and binding driver for modernizing building systems.

While the earlier report focused on *how* to finance energy efficiency retrofits, this companion paper explains why such retrofits have become unavoidable under the evolving international climate regime. It shows how Hong Kong's new legal obligations on refrigerant phase-down directly reinforce national and global carbon reduction targets and create an additional economic rationale for early retrofitting.

Finally, this paper argues that building retrofitting must be integrated into the forthcoming 2026 update of *Hong Kong's Climate Action Plan 2050*,[2] in line with the Paris Agreement's "ratchet mechanism", which requires progressively stronger commitments over time.[3]

II: THE KIGALI AMENDMENT AND THE GLOBAL COOLING TRANSITION: LINKING TWO AGENDAS

The Montreal Protocol is often cited as the most successful environmental treaty in history, having eliminated nearly 99% of ozone-depleting substances.[4] The Kigali Amendment to the Montreal Protocol (adopted in 2016, effective in 2019) extended that legacy by targeting a new class of substances (hydrofluorocarbons (HFCs)), which, while not ozone depleting, are potent greenhouse gases used in air-conditioning, refrigeration, foam blowing, and fire suppressants. Some HFCs have global-warming potentials (GWPs) exceeding 10,000, meaning that one kilogram of a given HFC can warm the atmosphere as much as 10 tonnes of carbon dioxide (CO_2).[5]



The Kigali Amendment requires parties to progressively reduce production and consumption of 18 controlled HFCs, aiming for an 80% to 85% cut by mid-century.[6] Crucially, it links energy saving with the refrigerant transition: as parties phase down HFCs, they are encouraged to adopt low-GWP refrigerants and high-efficiency cooling technologies. Efficient chillers and heat pumps not only lower direct emissions (from refrigerant leakage) but also reduce indirect emissions (from electricity use). Improving cooling efficiency alongside the HFC phase-down could avoid up to 0.8°C of global warming by 2100 i.e. double the benefit of refrigerant management alone.[7]

This dual mitigation pathway i.e., cutting both refrigerant and energy emissions, is particularly relevant for urbanized economies like Hong Kong, where space cooling dominates building energy use.

The following should also be noted:

1. United Nations Environment Programme's 2024-2025 Scientific Assessment warns HFC emissions are rising faster than expected due to leakage and illegal trade. It calls for stronger enforcement of licensing/quota systems particularly for re-export hubs, which is directly relevant to Hong Kong.[8]

2. Mainland China is accelerating adoption of natural refrigerants (CO_2, ammonia, hydrocarbons).[9] This suggests Hong Kong should prepare for future transitions beyond R32/HFO blends, improved efficiency, and safer operating properties.

3. The EU F-Gas Regulation's stringent bans on high-GWP refrigerants by 2030 means Hong Kong buildings serving multinational tenants may benefit from Kigali-compliant retrofits.[10]

4. Illegal HFC trade in Southeast Asia has increased, involving mislabelled refrigerants. This underscores the importance of Hong Kong's new import/export licence system under the OLPAO.[11]

5. Global cooling transition finance is expanding rapidly (World Bank Cooling Transition Facility, Asian Development Bank's Asia Cooling Financing Facility), which Hong Kong could consider integrating into its green finance ecosystem.[12]

Water-cooled chillers: Kigali Amendment will progressively reduce the use of HFC in HVAC systems for improved cooling efficiency and reduced global warming.

III: THE 2025 OZONE LAYER PROTECTION (AMENDMENT) ORDINANCE

Although Hong Kong is not itself a Party to the Montreal Protocol or its amendments, these instruments were signed and ratified by the People's Republic of China and subsequently extended to the Hong Kong Special Administrative Region under Article 153 of the Basic Law. When accepting the Kigali Amendment, China entered a reservation clarifying that Hong Kong would be treated as a non-Article 5 (developed) region for purposes of the HFC phase-down schedule.[13]

As a result, Mainland China, as an Article 5 (developing country) Party, follows a later and more gradual HFC phase-down schedule,[14] whereas Hong Kong is required to comply with the accelerated timetable applied to developed economies. This distinction reflects Hong Kong's advanced economic development and administrative capacity to implement earlier targets through local legislation and regulatory measures. It also means Hong Kong will experience high-GWP substance constraints earlier than Mainland China, increasing the urgency of timely retrofits.

Hong Kong ratified its obligations through the OLPAO, passed by the Legislative Council in April 2025. The amendment updates the city's existing regulatory framework under the Ozone Layer Protection Ordinance (Cap. 403) to control HFCs consistent with the Kigali Amendment schedule.

Hong Kong's baseline HFC consumption is 1,682 kilotonnes of CO_2-equivalent, calculated as the average annual consumption during 2011-2013 in accordance with the Montreal Protocol methodology. Under the Kigali schedule applicable to developed economies, Hong Kong must achieve an 85% reduction by 2036.[15] The OLPAO introduces:

- Import and export licensing for all controlled HFCs, including mixtures or blends containing controlled HFCs;
- A quota allocation system limiting total annual HFC imports, effective 1 December 2025;
- Record-keeping and reporting obligations for traders and importers; and
- Penalties for unlicensed transactions or quota breaches.

This phased reduction creates a predictable compliance timetable and a tightening supply of high-GWP refrigerants. The declining allowable consumption directly affects the availability of high-GWP blends including R410A (a common HFC blend used in residential and commercial air conditioners), thereby accelerating the need to retire or retrofit legacy equipment.

TABLE 1. HONG KONG'S HFC PHASE-DOWN SCHEDULE (BASED ON THE 2011-2013 BASELINE) AND RETROFIT IMPLICATIONS

Period	Allowable HFC Consumption	Reduction from Baseline	Retrofit Implications
2024-2028	60% of baseline	-40%	Early adoption of R32/HFO blends; initiate recovery and training programs.
2029-2033	30% of baseline	-70%	Retrofit older chillers; mandate refrigerant recovery; restrict R410A supply.
2034-2035	20% of baseline	-80%	Only low-GWP refrigerants allowed; expand reclamation capacity.
2036 onwards	15% of baseline	-85%	Mature recycling market, and legacy systems phased out.

Note: Hong Kong's baseline HFC consumption (1,682 $ktCO_2$-e) is calculated as the average annual consumption during 2011-2013, in line with the Montreal Protocol methodology.

This staged approach functions as both a regulatory constraint and an economic signal. As the quota tightens, high-GWP refrigerants will become increasingly scarce and costly. Building owners operating older chillers and variable refrigerant flow (VRF) systems that rely on these refrigerants will face rising maintenance risks, higher service costs, and eventual unavailability of compatible refrigerants.

As a result, Kigali implementation accelerates the turnover of outdated cooling equipment. For large commercial buildings, where air-conditioning typically accounts for over 40% of electricity use, upgrading to low-GWP, high-efficiency systems becomes both a compliance imperative and a cost-effective retrofit strategy.[16]

IV: FROM COOLING TRANSITION TO RETROFIT IMPERATIVE

The Kigali Amendment's impact on Hong Kong's building sector is direct and structural. Over 90% of Hong Kong's electricity consumption occurs in buildings.[17] Within that, air-conditioning and ventilation systems dominate both energy use and refrigerant consumption.

Given Hong Kong's small market size, the availability and timing of next-generation low-GWP chillers, VRF systems, and unitary air-conditioning and refrigeration equipment will depend heavily on availability from manufacturers for import. Government engagement with major suppliers might be important to secure early access to compliant technologies.

Compliance with the Kigali Amendment therefore acts as an external catalyst for large-scale retrofitting. The logic is threefold:

1. **Regulatory Risk Management**

   Building owners that delay replacing outdated chillers, VRF systems and unitary air-conditioning and refrigeration equipment risk stranded assets once high-GWP refrigerants are no longer available or serviceable. Retrofitting early with low-GWP systems mitigates compliance risk and supply disruptions.

2. **Energy and Carbon Synergy**

   Many low-GWP refrigerant equipment enable higher energy efficiency through advanced controls, improved equipment design and/or modern technologies. Thus, retrofitting under the Kigali Amendment compliance yields dual climate benefits – lower direct refrigerant emissions and enable lower indirect CO_2 emissions from reduced energy use.

   Evidence from retrofit programmes indicates that replacing cooling equipment alone typically delivers modest but meaningful energy savings, while integrated retrofit approaches combining Heating, Ventilation and Air Conditioning (HVAC) upgrades with controls optimisation and targeted envelope improvements can achieve substantially higher reductions in building energy use. Analysis of large-scale retrofit programmes shows that bundled, whole-building approaches can approximately double energy savings compared with equipment-only interventions, particularly in complex commercial buildings.[18]

3. **Lifecycle Cost Reduction**

   Although initial capital costs are higher, total lifecycle costs fall due to improved system efficiency, reduced refrigerant replenishment, and alignment with forthcoming efficiency codes.

In effect, the Kigali Amendment transforms refrigerant management from a peripheral environmental issue into a core economic driver of retrofitting.

For policy purposes, the Kigali Amendment aligns directly with *Hong Kong's Climate Action Plan 2050*, which should emphasize retrofitting buildings to achieve energy savings, as ~50% of the city's CO_2 emissions arise from existing buildings. The Kigali framework adds a legally binding obligation that reinforces and accelerates these goals.

V: CONNECTING THE KIGALI FRAMEWORK TO HONG KONG'S RETROFITTING BUILDINGS FINANCE AGENDA

This paper builds upon the HKUST's report Financing the Retrofitting of Hong Kong's Existing Buildings published on 10 October 2025, which argued that Hong Kong's decarbonization challenge is not primarily a technical but also an institutional and financial challenge. Fragmented ownership structures, high upfront costs, and limited trust in energy performance outcomes arising from retrofits have slowed progress. The Kigali Amendment, and the OLPAO now adds a powerful compliance dimension to this picture. In finance terms, it converts what was previously a voluntary energy efficiency opportunity into a mandatory transition pathway.

1. De-risking Retrofit Investment

The OLPAO acts as a regulatory 'stick'. As high-GWP refrigerants become scarce and costly, non-compliant systems will face rising maintenance costs and functional obsolescence, creating strong economic incentives for timely retrofits.

As presented in *Financing the Retrofitting of Hong Kong's Existing Buildings,* Performance-Based Contracting (PBC) and its variants – such as Energy Performance Contracting (EPC) and Energy-as-a-Service (EaaS) – rely on predictable savings and stable asset performance. Kigali compliance ensures that new systems will remain serviceable under future refrigerant regimes, thereby reducing both policy and obsolescence risks. Financial institutions can thus treat Kigali-aligned retrofits as lower-risk assets under established green finance criteria.

In addition, the HKSAR Government could consider transforming existing subsidies into a *Pay-for-Performance Energy Efficiency (P4P) Scheme*, an approach like the Feed-in Tariff (FiT) that rewards renewable energy generation. Under a P4P scheme, building owners would receive payments for each verified kilowatt-hour (kWh) of energy saved through retrofits, at a rate higher than the standard electricity tariff (e.g., HK$ 2.5 per kWh saved). Such an incentive would extend and modernize the current New Eco-Building Fund / New Smart Power Fund, whose current HK$500,000 cap per building is insufficient for major chiller replacements (see below).

Delivery experience from commercial building decarbonisation programmes shows that the most durable energy and carbon reductions are achieved when incentives are tied to verified performance outcomes rather than to the installation of specific technologies. This aligns directly with the Kigali framework, which defines a mandatory transition in refrigerant use but does not prescribe how buildings should achieve optimal system performance. PBC and pay-for-performance mechanisms therefore provide a natural bridge between Kigali compliance and finance, ensuring that refrigerant transition is embedded within solutions that deliver measurable, finance-grade outcomes over time.[19]

Bending the Curve: Cost-effective cooling emission reduction pathways for commercial real estate in China and the U.S. (2026)

NEW ECO-BUILDING FUND / NEW SMART POWER FUND

The two funds are mandated under Schedule 5 of the Scheme of Control Agreements (SCAs) between the two power companies and the government. They were set up to support the carrying out of retrofitting and retro-commissioning works, and implementation of building-based smart/IT technologies, or other improvement measures to be agreed with the government.

- For CLP Power Hong Kong Limited (CLP), New Eco-Building Fund is part of their Low Carbon Solutions programme. CLP injects $100 million to the fund annually.
- For The Hongkong Electric Company Limited (HK Electric), New Smart Power Fund falls under their Smart Power Services – Building Fund initiative. HK Electric injected $25 million to the fund annually.

Both utilities manage and disburse the funds, but the government oversees the programme under the SCA regulatory framework, ensuring that funds are allocated to subsidise energy-saving improvement works in communal areas of shopping arcades, housing estates, and commercial and industrial buildings, including replacing air-conditioning and lighting systems, conducting retro-commissioning and installing smart devices

Verification of savings should follow the International Performance Measurement and Verification Protocol (IPMVP)[20] and be performed by accredited professionals, such as Certified Measurement & Verification Professionals (CMVP) or Performance Measurement & Verification Analysts (PMVA).[21] Establishing a registry of certified verifiers would strengthen confidence in performance-based subsidies and green-finance products.

International Performance Measurement and Verification Protocol (IPMVP):	Certified Measurement & Verification Professional (CMVP):
• **What it is:** The global standard framework for quantifying energy savings in retrofits and energy saving projects. • **Published by:** The Efficiency Valuation Organization, a nonprofit body headquartered in Washington, D.C. • **Status:** Accepted worldwide and referenced by the World Bank, US Department of Energy, the European Commission, and China's National Development and Reform Commission in energy performance guidelines.	• **What it is:** A globally recognized professional certification awarded jointly by the Association of Energy Engineers and Efficiency Valuation Organization. • **Purpose:** Confirms competence in applying the IPMVP to verify savings in energy performance projects. • **Recognition:** Widely accepted in North America, the EU, and Asia, often specified in tender documents for energy related projects.

2. Expanding Green Finance Eligibility

The Hong Kong Taxonomy for Sustainable Finance (Phase 2A), published by the Hong Kong Monetary Authority on 22 January 2026,[22] defines "green activities" as those that make a substantial contribution to one or more environmental objectives (such as climate change mitigation, climate change adaptation, or pollution prevention) while avoiding significant harm to others. The Phase 2A update broadens sectoral coverage and introduces explicit transition activities and climate adaptation categories, reflecting market feedback and enhancing the practicality and clarity of the framework.

For retrofit projects in Hong Kong, the Taxonomy's criteria indicate that activities which (i) deliver verifiable energy savings, and (ii) transition to low-GWP refrigerants or more efficient cooling equipment, could qualify either as "green activities" or as "transition activities/transition measures" depending on the extent of alignment with technical criteria and technological maturity. The inclusion of transition elements in Phase 2A specifically recognises that some investments may not yet meet full "green" thresholds but still make substantial near-term emissions reductions and thus are eligible under "transition" status.

In practice, therefore, retrofit projects combining dual metrics – kWh saved and GWP-tonnes avoided – align well with the Taxonomy's expanded logic: they address both energy (indirect emissions) and refrigerant-related (direct emissions) environmental objectives. This positioning supports the case for classification as sustainable finance-eligible activities in the Hong Kong market. Although the Taxonomy remains voluntary and is a "living document" that will continue to evolve, its formal publication and expanded coverage strengthen the reference point for instruments such as Sustainability-Linked Loans and Green Bonds, and for aligning project documentation with taxonomy criteria.

3. Creating New Performance Metrics

The Kigali Amendment enables the development of new dual Key Performance Indicators (KPIs) in financing agreements:

i. Energy intensity reduction (kWh/m^2/year), and
ii. Refrigerant GWP reduction (tCO_2e avoided).

Both indicators can be tracked using established Measurement and Verification (M&V) frameworks commonly applied in PBC, with energy savings verified through IPMVP methodologies and refrigerant impacts assessed using lifecycle-based accounting approaches. Together, these provide measurable outcomes that appeal to both regulators and investors. Where carbon impacts are reported, verification should be undertaken by appropriately qualified carbon auditors rather than relying solely on financial assurance processes.

4. Stimulating Service and Recycling Markets

The OLPAO's provisions on refrigerant recovery, recycling, and technician certification will generate demand for new green collar jobs in refrigerant handling, auditing, and maintenance. This expands the retrofit ecosystem beyond engineers and financiers to include others, such as reclamation operators, certification bodies, and logistics providers who are integral to Hong Kong's emerging green economy.

VI: CONNECTING THE KIGALI FRAMEWORK TO HONG KONG'S INLAND REVENUE ORDINANCE

Like the green finance instruments discussed in the previous section, Hong Kong's tax framework already contains mechanisms that could be refined to support Kigali-aligned investment. Provisions under the Hong Kong Inland Revenue Ordinance (HKIRO) provide a ready policy lever to lower the capital cost of transitioning to low-GWP cooling technologies.

Under general tax principles, capital expenditures are not immediately deductible in computing assessable profits.[24] Instead, capital assets are written down over time through depreciation allowances under Part 6 of the HKIRO. However, Hong Kong has deliberately carved out an exception for environmental investments. Schedule 17 of the HKIRO, together with sections 16H–16L, allows 100% immediate deduction for qualifying environment-friendly capital assets.[25] This framework reflects a government policy choice to accelerate environmental investment by reducing after-tax capital costs and improving cash flow for investors.

1. Tax Structure for Environment-Friendly Capital Assets

The environmental deduction regime was introduced through the Revenue Bill 2008, which simultaneously enacted Schedule 17 and sections 16H–16J (effective from the 2008/09 year of assessment).[26] Initially, the regime granted 100% immediate expensing for low-noise construction equipment, air pollution control machinery, and waste treatment and wastewater treatment equipment. At that time, renewable energy systems and energy efficient building installations registered under the Energy Efficiency Registration Scheme for Buildings (EERSB) were eligible for accelerated deductions of 20% per year over five years under section 16I(3). Subsequent amendments expanded both scope and generosity:

- 2010: Hybrid and electric vehicles were added to Schedule 17 and granted 100% immediate deduction.
- 2018: Renewable energy systems and EERSB-registered energy efficient building installations were upgraded to 100% immediate expensing.

Today, all assets listed in Schedule 17 qualify for immediate deduction under sections 16I(2) and 16I(3B). To safeguard fiscal integrity, the regime includes apportionment rules for mixed-use facilities and recapture provisions upon disposal, destruction, or cessation of business. Importantly, Schedule 17 itself is purely classificatory; the legal authority flows from sections 16H-16L, allowing future amendments to asset categories without restructuring the core deduction mechanics.

2. Policy Rationale

The gradual expansion of Schedule 17 reflects an increasingly proactive government stance toward environmental investment. Immediate expensing does not reduce tax rates; rather, it accelerates deductions, providing upfront liquidity while maintaining medium-term revenue neutrality. Restrictions on leased assets ensure benefits accrue to capital investors rather than users, limiting arbitrage opportunities. This structure demonstrates that Hong Kong already accepts differentiated tax treatment where strong environmental policy rationales exist.

3. Current Schedule 17 Coverage Gap for Kigali-Compliant Assets

Despite this evolution, a significant gap remains. While Schedule 17 covers energy efficient building installations registered under the EERSB, Kigali-compliant refrigeration and air-conditioning equipment does not

automatically qualify. This gap arises because the Kigali Amendment targets refrigerant GWP rather than energy efficiency. A system using a low-GWP refrigerant may consume less, the same, or even more electricity than an HFC-based system. Energy saving and climate impact are related but distinct environmental attributes. The current Schedule 17 framework recognises energy saving but does not recognise refrigerant-based climate mitigation. As a result, certain capital investments required to meet Hong Kong's legally binding Kigali obligations could fall outside the scope of existing tax incentives.

4. Proposed Extension to Kigali-Compliant Assets (Schedule 17)

To align tax policy with international climate obligations, Schedule 17 should be amended to include refrigeration, air-conditioning, and heat pump equipment certified by the Electrical and Mechanical Services Department (EMSD) as compliant with the Kigali Amendment using refrigerants with GWP below applicable phase-down thresholds.

Such an amendment would achieve several policy objectives:

1. **Alignment with international obligations**
   Hong Kong is legally required to phase down HFCs under the OLPAO. Tax incentives would lower compliance costs and facilitate timely transition.

2. **Recognition of distinct environmental benefits**
   Low-GWP refrigerants deliver climate mitigation benefits independent of energy efficiency. Schedule 17 already recognises multiple environmental pathways – pollution control, renewable energy, and efficiency; Kigali-compliant cooling warrants equivalent treatment.

3. **Avoidance of perverse incentives**
   Requiring Kigali-compliant equipment to also meet energy efficiency registration criteria could delay refrigerant transitions, undermining phase-down timelines. Decoupling the two objectives preserves policy coherence.

4. **Consistency with precedent**
   When policy urgency increased, Hong Kong upgraded environmental assets from accelerated to immediate expensing. The urgency and binding nature of Kigali obligations justify similar treatment.

Amendment should specify:

- EMSD certification mechanisms (e.g., manufacturer documentation of refrigerant GWP or a specifically derived BEAM Plus theme certificate to be developed);
- Eligible equipment categories (commercial refrigeration, air conditioning systems, chillers, heat pumps);
- GWP thresholds aligned with Hong Kong's Kigali phase-down schedule; and
- Transitional provisions for early or anticipatory investments.

This would mirror the 2010 and 2018 legislative amendments: adding a new qualifying category to Schedule 17, with consequential alignment under sections 16H-16L.

Extending Schedule 17 to Kigali-compliant cooling equipment would integrate tax policy into Hong Kong's broader climate governance architecture. It would transform refrigerant transition from a pure compliance cost into an investable, finance-ready activity – complementing green finance tools, PBC, and the forthcoming Climate Action Plan update.

VII: INSTITUTIONAL AND GOVERNANCE IMPLICATIONS

Industry practitioners indicate that awareness of the OLPAO and its practical implications remains uneven among HVAC suppliers, building managers, developers, and financiers. Without targeted communication, technical guidance, and capacity building, there is a risk that near-term investment decisions may lock in non-compliant or sub-optimal systems, increasing future transition costs.

Beyond market awareness, effective Kigali implementation raises broader institutional and governance challenges for Hong Kong's energy and building policy architecture.

1. Cross-Bureau and Departmental Coordination

Kigali compliance cuts across multiple policy domains and administrative responsibilities, including:

- Environment and Ecology Bureau (overall climate and refrigerant policy),
- EMSD (equipment standards, certification, and enforcement),
- Environmental Protection Department (refrigerant management and recovery),
- Development Bureau and Buildings Department (planning, codes, and incentives),
- Financial Services and the Treasury Bureau (finance policy), and
- Inland Revenue Department (tax incentives).

Effective implementation therefore depends on coordinated action to ensure that refrigerant regulation, building energy codes, planning incentives, and financial measures operate in a mutually reinforcing manner, rather than as fragmented or sequential interventions.

2. Integration with Existing Codes and Standards

Revisions to the Building Energy Code (BEC) and Energy Audit Code (EAC) in 2024 have strengthened system-level energy performance requirements. Future code updates provide an opportunity to integrate maximum allowable refrigerant GWP thresholds at defined intervention points, such as major retrofits or equipment replacement cycles. This would embed Kigali compliance directly into Hong Kong's core building governance framework rather than treating refrigerant transition as a parallel regulatory stream.

3. Leveraging BEAM Plus and Planning Incentives

Refrigerant GWP is already incorporated into the BEAM Plus, Hong Kong's principal green building rating system. BEAM Plus awards credits for low-GWP refrigerants and effective refrigerant management, meaning that Kigali-aligned retrofits directly support higher certification outcomes.[23]

This linkage is institutionally significant because BEAM Plus certification is connected to gross floor area (GFA) concessions under the Buildings Department's Practice Note for Authorized Persons (PNAP APP-151).[27] Strengthening the alignment between Kigali requirements and BEAM Plus would allow planning incentives, particularly GFA concessions for new developments and major retrofits, to reinforce the transition toward low-GWP cooling technologies. Such alignment would help ensure that refrigerant phase-down, building performance objectives, and land-use incentives function as a coherent policy package.

4. Data, Transparency, and Market Confidence

The OLPAO's licensing, quota, and reporting requirements create an opportunity to institutionalise data-driven refrigerant governance. Aggregated data on refrigerant imports, consumption, recovery, and recycling could feed into a public or semi-public database, improving transparency for policymakers, financiers, and market participants.

Enhanced data availability would support:

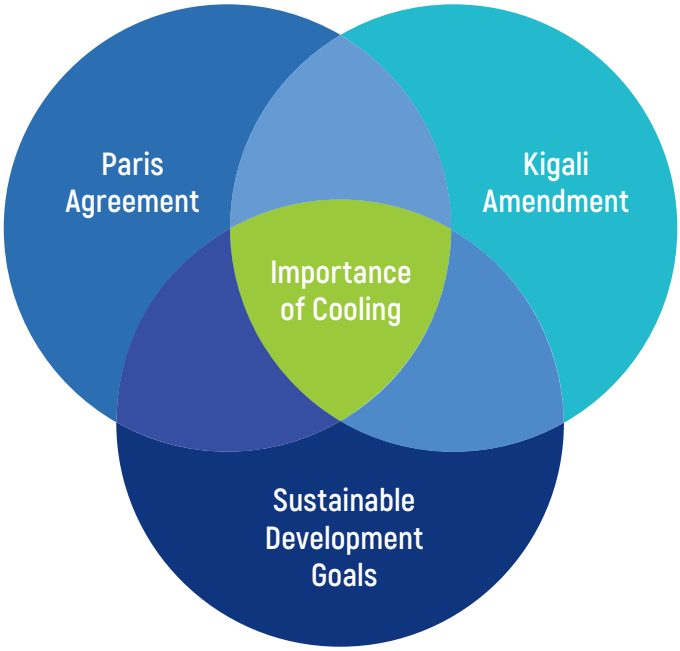
- Evidence-based updates to building codes and standards,
- Development of refrigerant-related performance indicators for green finance,
- Better risk assessment by lenders and insurers, and
- Monitoring of compliance and market integrity.

5. Governance Significance

Taken together, these institutional linkages position the Kigali framework as more than a compliance obligation. When integrated with building codes, planning incentives, tax policy, and finance, Kigali implementation can serve as a structural governance mechanism, embedding refrigerant transition into Hong Kong's broader climate, energy, and urban policy systems. In this way, the Kigali Amendment supports the institutionalisation of long-term, data-driven climate governance, linking international obligations with local regulation, market behaviour, and investment decision-making.

VIII: ALIGNING WITH THE PARIS AGREEMENT AND THE RATCHET MECHANISM

Under the Paris Agreement, Parties are required to progressively strengthen their Nationally Determined Contributions (NDCs) through a five-year "ratchet mechanism". Although Hong Kong is not a Party in its own right, its climate commitments are articulated through China's NDC and translated locally through *Hong Kong's Climate Action Plan 2050*, published in 2021. An updated Climate Action Plan is expected in 2026. This update will need to reflect tighter global expectations, evolving climate science, and stronger implementation pathways. It therefore provides a critical opportunity to embed building retrofitting and cooling efficiency as core pillars of Hong Kong's decarbonisation strategy.



Importance of cooling at the intersection of Paris Agreement, Kigali Amendment and SDGs

1. Kigali as an Enabler of Paris Alignment

Kigali compliance strengthens Hong Kong's ability to deliver on both the Paris Agreement and the Montreal Protocol frameworks simultaneously. By accelerating the phase-down of high-GWP refrigerants while improving cooling efficiency, Kigali-aligned retrofits address direct emissions from refrigerant leakage, and indirect emissions from electricity consumption in buildings. This dual mitigation pathway is particularly important for Hong Kong, where cooling dominates building energy demand and where existing buildings account for a large share of total emissions.

2. Relevance of the UAE Consensus (COP28)

The UAE Consensus adopted at COP28 in December 2023 marked the most significant political advance in global climate governance since the Paris Agreement.[28] In addition to reaffirming the 1.5°C limit, it called on Parties to:

- Transition away from fossil fuels in energy systems,
- Double the global rate of energy efficiency improvement by 2030, and
- Accelerate reductions in non-CO_2 greenhouse gases.

Kigali-aligned cooling retrofits directly support all three objectives. Improving cooling efficiency reduces electricity demand and fossil fuel dependence in the power system, while low-GWP refrigerants contribute to the rapid reduction of fluorinated gases. In this sense, Kigali implementation operationalises key elements of the UAE Consensus at the city level.

3. Signals from COP30

COP30, held in Belém, Brazil in November 2025, reinforced cooling as a frontline climate issue, even though it did not introduce new binding commitments on HFCs or efficiency. Three developments are particularly relevant for Hong Kong:

- A significant scale-up in global climate finance, with Parties agreeing to mobilise up to US$1.3 trillion per year by 2035, including for energy efficiency and heat-related adaptation;
- Growing recognition of cooling as a core mitigation and adaptation priority, especially in dense, heat-exposed urban environments; and
- Evidence that faster HFC phase-down schedules may be economically advantageous, delivering greater long-term benefits at lower overall cost.

These signals strengthen the case for early, proactive refrigerant transition and retrofit investment, rather than minimum-compliance approaches.

4. Implications for Hong Kong's 2026 Climate Action Plan

Taken together, the Paris ratchet mechanism, the UAE Consensus, and COP30 outcomes point toward a clear direction of travel: stronger expectations on cooling efficiency, refrigerant management, and finance-ready implementation. Integrating Kigali-aligned cooling transitions into Hong Kong's next Climate Action Plan would allow the city to:

- Demonstrate alignment with evolving global norms,
- Translate international commitments into concrete local action, and
- Mobilise green and sustainability-linked finance using measurable indicators such as verified energy savings and avoided GWP emissions.

In this context, Kigali compliance is not a peripheral obligation but a strategic instrument for strengthening Hong Kong's climate ambition, credibility, and implementation capacity under the Paris framework.

IX: POLICY RECOMMENDATIONS

1. Embed Kigali Compliance within Hong Kong's Next Climate Action Plan 2050

Hong Kong should explicitly integrate refrigerant transition and cooling efficiency into the 2026 update of the Climate Action Plan 2050. Building retrofitting should be positioned not only as an energy efficiency measure, but as a legally anchored Kigali-compliance pathway, with clear milestones for refrigerant phase-down, cooling system upgrades, and performance verification across the existing building stock.

2. Introduce Refrigerant GWP Limits within Building Codes

Future revisions to the Building Energy Efficiency Ordinance (BEEO) and related codes should specify maximum allowable refrigerant GWP thresholds, alongside minimum energy performance standards, at defined trigger points such as major retrofits or equipment replacement. Aligning these thresholds with BEAM Plus criteria would ensure consistency across regulatory, planning, and market instruments.

3. Expand Tax and Financial Incentives for Kigali-Aligned Retrofits

Hong Kong should extend tax incentives and risk-sharing mechanisms to explicitly cover Kigali-compliant cooling systems. This includes:

- Amending Schedule 17 of the HKIRO to include low-GWP refrigeration and air-conditioning equipment, and
- Establishing or expanding public guarantee and revolving fund mechanisms to de-risk SME-led Energy Service Company (ESCO) participation in PBC projects.

4. Strengthen Alignment between BEAM Plus and Kigali Compliance

BEAM Plus should more explicitly incorporate low-GWP refrigerant requirements and refrigerant-related KPIs into its scoring framework. Strengthened alignment would allow planning incentives, including GFA concessions, to reinforce Kigali-aligned retrofits and ensure coherence between refrigerant transition, building performance, and land-use policy. In this regard, specific BEAM Plus theme certificate on Kigali compliance may also be developed to assist in any future tax incentive.

5. Establish Training and Certification Pathways for Low-GWP Refrigerants

EMSD should partner with vocational and professional bodies to accredit technicians for the safe handling of low-GWP and natural refrigerants, such as CO_2 and ammonia. This is essential to support market confidence, safety, and scalability of the cooling transition.

6. Develop Dual Performance-Based Reporting Frameworks

Refrigerant-related KPIs, including annual refrigerant purchase volumes, leak rates, recovery quantities, and avoided GWP emissions, should be integrated into existing M&V frameworks used for energy savings. Verification of refrigerant-related indicators should be conducted by certified carbon auditors, complementing energy M&V protocols and strengthening finance-grade credibility.

7. Improve Transparency of HFC Quotas and Market Data

To reduce uncertainty and prevent supply-side shocks, the HKSAR Government should publish:

- Annual HFC quota allocations,
- Baseline consumption data, and
- Forward-looking GWP phase-down trajectories at least two years in advance.

Enhanced transparency would support investment planning, financing decisions, and compliance monitoring.

8. Use Public Sector Demonstration Projects to Catalyse Market Uptake

The HKSAR Government should implement Kigali-aligned cooling retrofits in public buildings such as schools, hospitals, and government complexes, using outcome-based financing models. These projects can serve as proof-of-concept demonstrations, de-risk private investment, and accelerate market learning.

9. Expand New Eco-Building Fund/New Smart Power Fund through a Pay-for-Performance approach

The utilities' New Eco-Building Fund/New Smart Power Fund could be expanded and modernised by linking subsidies directly to verified energy savings, using a P4P model analogous to a FiT Tariff. Savings should be measured in kilowatt-hours using the IPMVP and validated by accredited professionals. This approach would enable deeper retrofits, including Kigali-aligned cooling upgrades, and unlock larger-scale participation by building owners and SMEs.

X: CONCLUSION: TOWARD AN INTEGRATED COOLING AND RETROFIT STRATEGY

The Kigali Amendment provides both a binding international obligation and a strategic opportunity for Hong Kong. By accelerating the phase-down of high-GWP refrigerants, it transforms refrigerant management from a peripheral environmental issue into a central driver of building system modernisation.

Integrating Kigali compliance into the 2026 update of Hong Kong's Climate Action Plan 2050 would allow the city to link international commitments with concrete local action. It would reinforce the case for accelerating retrofits of existing buildings, where much of Hong Kong's electricity use and carbon emissions are concentrated.

In practical terms, energy efficiency and cooling efficiency can no longer be treated as separate policy domains. Kigali-aligned retrofits can deliver three outcomes simultaneously:

- Reduced electricity demand and operating costs: through more efficient cooling systems;
- Lower direct climate impacts: by phasing out high-GWP refrigerants; and
- Future-proofed building assets: that remain compliant as global standards tighten.

When supported by coherent regulation, targeted incentives, performance-based finance, and transparent data, the cooling transition becomes investable, finance-ready, and scalable. This integration strengthens Hong Kong's climate governance capacity while enhancing market confidence and competitiveness.
By aligning refrigerant transition, building retrofitting, and green finance within a single policy framework, Hong Kong can demonstrate how dense, highly urbanised cities translate global climate obligations into effective local implementation. In doing so, it positions itself not only as compliant with the Montreal/Kigali and Paris regimes, but as an early mover in the emerging low-carbon urban economy.

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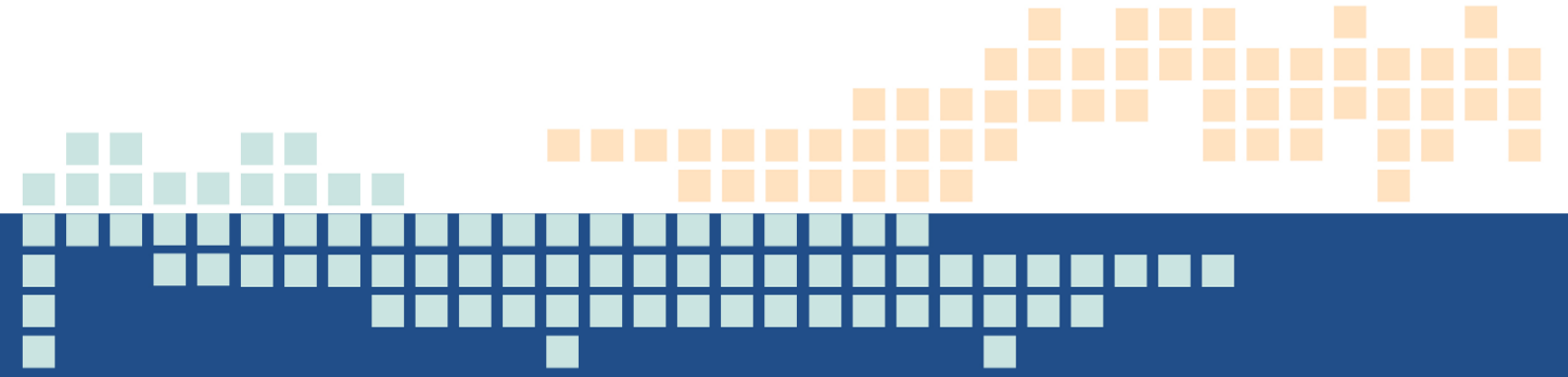

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