

Consultation Document

**Proposal to Regulate and Phase Down Hydrofluorocarbons for
Implementation of the Kigali Amendment to the Montreal Protocol**

Environment and Ecology Bureau

July 2023

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Purpose

1. This paper sets out our proposals to regulate and phase down the production and consumption of hydrofluorocarbons (HFCs) in Hong Kong for fulfilling Hong Kong's obligations under the Kigali Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer.

Key Elements of the Kigali Amendment

2. HFCs are synthetic gases, primarily used as refrigerants in air-conditioning and refrigeration equipment, and also used as fire suppressants in fire protection and other minor uses in aerosol, solvent and foam insulation applications¹. They are used as substitutes for chlorofluorocarbon (CFC) and hydrochlorofluorocarbon (HCFC) refrigerants as well as halon fire suppressants, which had been phased out under the Montreal Protocol due to their ozone-depleting properties. Although HFCs are not ozone-depleting substances (ODSs), some of them are powerful greenhouse gases with high global warming potential (GWP), up to 14,800 times that of carbon dioxide (CO₂), aggravating significantly the global warming problem.

3. The Kigali Amendment that entered into force in 2019 seeks, inter alia, to phase down the annual production and consumption² of 18 HFCs with high GWP listed in **Annex 1**. The global phase-down is expected to avoid up to 0.5 degree Celsius global warming by the end of the century.

4. As of mid-June 2023, 150 out of the 198 Parties to the Montreal Protocol had ratified / accepted the Kigali Amendment. Following the acceptance of the Kigali Amendment by the Central People's Government in June 2021, Hong Kong is obliged to phase down the local production and consumption of the 18 HFCs to fulfil its international obligations under the Montreal Protocol.

¹ https://ozone.unep.org/sites/ozone/files/Meeting_Documents/HFCs/FS_2_Overview_of_HFC_Markets_Oct_2015.pdf

² The annual production and consumption of HFCs are both measured in total CO₂ equivalent (i.e., net weight in metric tonnes of HFCs multiplied by their GWP). Under the Montreal Protocol, consumption is defined as the production and import of HFCs into a given place, less the amount of export.

5. The respective schedules to phasedown production and consumption of HFCs, as set out in the Kigali Amendment, for developing parties (i.e. Article 5 parties, including the Mainland of China) and developed parties (i.e. non-Article 5 parties, including Hong Kong) are shown in **Annex 2a**. Hong Kong is required to phase down the use of HFCs by 85% from the baseline by 2036. Details of the HFC baseline and the corresponding phase-down figures of Hong Kong are shown in **Annex 2b**.

6. Apart from the HFC phase-down, parties to the Kigali Amendment are required to: (i) implement a licensing system for the import and export of new, used, recycled and reclaimed controlled HFCs; and (ii) report the import, export and production statistics to the United Nations Environment Programme (UNEP)'s Ozone Secretariat annually. There is also a trade control provision where parties to the Kigali Amendment shall not trade the controlled substances with non-parties, effective from January 2033.

7. The text of the Kigali Amendment can be downloaded from the website of the Kigali Amendment to the Montreal Protocol at the following link:

<https://ozone.unep.org/treaties/montreal-protocol/amendments/kigali-amendment-2016-amendment-montreal-protocol-agreed?q=treaties/montreal-protocol/amendments/kigali-amendment-2016-amendment-montreal-protocol-agreed>

Use of HFCs in Hong Kong and their Alternatives

8. In Hong Kong, HFCs are required for charging up air-conditioning and refrigeration equipment, and fire suppressant system during installation, servicing and maintenance. As Hong Kong has no manufacture of HFCs, the HFCs consumed by local industries are imported mainly from the Mainland and overseas countries such as Japan, Singapore and the United States. According to the best available information from the import and export statistics, the annual HFCs consumption, derived as retained import (i.e., total import minus total export), is over 1,400 kilotonnes CO₂-equivalent in 2022, as shown in **Annex 3a**.

9. As shown in the graph in **Annex 3b**, the major HFCs consumed were HFC-134a (around 43%, mainly used in chillers and motor vehicle air-conditioners), HFC-404A (around 24%, used in a variety of refrigeration equipment), HFC-410A (around 14%, mainly used in multi-split variable refrigerant flow air-conditioning system, single and split-type air-conditioners), HFC-407C (around 9%, mainly used in chillers), HFC-227ea (around 7%, used as fire suppressant), and HFC-32 (around 3%, used in domestic air-conditioners).

10. With the global implementation of the HFC phase-down, a large variety of lower GWP alternatives and more energy efficient technologies have emerged, many of which are now commercially available in the global market and have increasingly been used in overseas countries.

11. There are two main types of low-GWP alternatives. The first type is natural refrigerants. They include hydrocarbons (such as propane, isobutane), carbon dioxide and ammonia. These substances have very low GWP (close to zero) and are generally more affordable. However, they usually have the properties that make them more difficult to handle. For example, hydrocarbons are more flammable, carbon dioxide operates in high-pressure system, and ammonia is toxic. Safety precautionary measures to mitigate the risks are necessary to allow wider uses of these gases. Another type of low-GWP alternative is hydrofluoroolefins (HFOs). Like HFCs, HFOs are synthetic gases, but typically have lower GWP (less than 10) than HFCs, which makes them an attractive choice to substitute HFCs. Refrigerant blends HFOs can also be blended with HFCs to make them as substitutes.

12. Hong Kong needs to catch up with the global trend to transit to these low-GWP alternatives. The transition to these next-generation technologies will not only contribute to the global efforts in combating climate change but also bring upon energy saving benefits to equipment users and thus enhance the competitiveness of our business.

Overseas Practices in Implementation of Kigali Amendment

13. Many overseas countries have introduced, in the past few years, various regulatory controls to enable implementation of the HFC phase-down required by

the Kigali Amendment. These include, among others, imposing licensing and quota control on the manufacture, import and export of HFCs, banning the manufacture, import and supply of a variety of equipment operating on HFCs with high GWPs, prohibiting the intentional venting and mandating recovery of HFC refrigerants during equipment maintenance, servicing, and at time of decommissioning and disposal, and requiring for refrigerant recycling and reuse. Please refer to **Annex 4** for a summary of the regulatory controls in the European Union (EU), Japan, Singapore and the United States (US).

Our Proposals

14. As per phase-down schedules set out by the Kigali Amendment and to give time for local stakeholders to adjust their operations to the phase-down, our proposal comprises three control strategies aiming at phasing down the production and consumption of HFCs in Hong Kong which facilitates an orderly and smooth transition to use of low GWP alternatives. The three control strategies and the details are outlined in the ensuing paragraphs.

Control Strategy 1: Control the overall production and consumption of HFCs in Hong Kong through prohibiting the manufacture and through licensing and quota control on import and export

15. To fulfil the international obligations under the Kigali Amendment, Hong Kong shall implement licensing control on the importation and exportation of HFCs and to restrict their annual import quantities in accordance with the phase-down schedules set out by the Kigali Amendment.

16. We will extend the control provisions of the Ozone Layer Protection Ordinance (Cap. 403) (OLPO)³ to cover HFCs to implement the requirements of the Kigali Amendment. We propose to:

³ The OLPO was enacted in 1989 to prohibit the manufacture of ODSs and control their import and export, so as to fulfil our international obligations under the Montreal Protocol. Under the OLPO, all the import and export of

- (i) add the 18 types of HFCs (“**Scheduled HFCs**”) under the control of the Kigali Amendment (as shown in Annex 1) as scheduled substances in the Schedule of the OLPO;
- (ii) prohibit the manufacture of Scheduled HFCs in Hong Kong; and
- (iii) control the import and export of Scheduled HFCs in bulk through a licensing and quota system.

17. For paragraph 16(iii) above, a licensing and quota system, similar to current one for HCFCs, is proposed to limit the maximum retained import (measured as CO₂ equivalent tonnes) of Scheduled HFCs according to the phase-down schedule as set out in Annex 2b. Importers and exporters of Scheduled HFCs in bulk⁴, whether existing alone or in a mixture, such as R-410A (a blend of HFC-32 and HFC-125) and R-407C (a blend of HFC-32, HFC-125 and HFC-134a), etc., are required to register with the Environmental Protection Department (EPD)⁵ and submitting an application for an import or export licence prior to the importation or exportation. Any import of Scheduled HFCs, except that with a declaration for re-export, must be covered by a sufficient amount of quota and a valid import licence.

18. We propose to split the import quota available in each year into two parts, namely the normal quota (say 70%) and the free quota (say 30%) as follows:

- (i) Normal quota will be allocated on a pro rata basis to registered importers based on their performance of total retained import of Scheduled HFCs (i.e. import for local consumption) in the past year(s); and
- (ii) Free quota will be allocated to new registered importers or existing registered importers who have exhausted their normal quota in that year.

ODSs are required to be covered by valid import and export licence, and the import quantity of ODSs is controlled by an import quota system.

⁴ Scheduled HFCs pre-charged inside any imported equipment designed to operate on the Scheduled HFCs are not subject to licensing and quota control.

⁵ Similar to the registration of ODS importers and exporters, the registration of HFC importers and exporters will be valid for 2 years and re-registration is required every two years.

19. In determining the initial allocation of import quota, we propose to use applicant's retained imports of Scheduled HFCs during the immediate previous two years as the benchmark. All quota units are calculated in terms of CO₂ equivalent tonnes.

20. Due to the extremely high GWP of HFC-23, we propose to ban any import of HFC-23 outright instead of going through a phase-down, except that for re-export purpose. According to our recent survey conducted, there is only a small number of ultra-low temperature freezers running on HFC-23 as refrigerants, mainly in local universities. To cater for the servicing need of these freezers and any need for research purposes, we propose to provide local research institutes with an exempted quantity from the import ban. The exempted quantity for any person or laboratory is proposed to be no more than 10 kg in a calendar year, subject to a total limit of 200 kg (equivalent to 2.96 kilotonnes CO₂-eq) in a calendar year.

Offence and penalty

21. The offence and penalty for the control of manufacture, import and export of scheduled substances under section 3(1), 3(2) and (4) of the OLPO will be extended to cover Schedule HFCs.

Consultation question

Question 1: Do you agree with the proposed approach on how the import quota shall be allocated?

Question 2: Do you agree with implementation of the proposed import ban on HFC-23 by 2025 earliest?

Control Strategy 2: Accelerate the transition from the use of high-GWP product and equipment by restricting the supply of these product and equipment in the market

22. To reduce HFC demand, we need to accelerate the transition from the use of high-GWP product and equipment. Hence we propose to restrict the supply of

these product and equipment in the market. Overseas developed economies, like EU, Japan, Singapore, US, Canada, New Zealand, have already implemented / is proposing regulatory control on the supply of new product and equipment by prescribing a GWP limit on the HFCs the equipment is designed to use. Based on our survey conducted and information collected from various equipment suppliers, despite that low-GWP alternatives are commercially available in the global market, their adoption in Hong Kong is so far still very limited. To expedite the uptake of these low-GWP technologies, we propose to introduce a new regulation under the OLPO to prohibit the supply of product and equipment using HFCs with GWP greater than the prescribed limit. It is proposed to:

- (i) empower the Director of Environmental Protection (DEP) to declare, by gazette, the types of air-conditioning and refrigeration, and fire suppression system as “**Restricted Equipment**”;
- (ii) empower DEP to specify, by gazette, the GWP limit⁶ of the refrigerant or fire suppressant which the Restricted Equipment (see paragraph 23) is designed to operate on;
- (iii) prohibit the import, manufacture, supply and sale of Restricted Equipment containing or designed to operate on any refrigerant or fire suppressant with GWP value exceeding the specified GWP limit by a specified effective date; and
- (iv) impose labelling requirements on Restricted Equipment by their importers, manufacturers, suppliers and distributors.

⁶ If the refrigerant or fire suppressant used by Restricted Equipment is a blend or mixture, its GWP value is the mass-weighted average of GWPs of all the individual components in the blend. For example, the GWP value of a refrigerant comprising 3 components (A, B & C) is calculated as follows:

$$\text{GWP of Blend} = \text{Proportion by \% mass of component A} \times \text{GWP of A} + \text{Proportion by \% mass of component B} \times \text{GWP of B} + \text{Proportion by \% mass of component C} \times \text{GWP of C}$$

Restricted Equipment

23. With reference to the GWP limits imposed / being proposed in EU, US, Japan, Singapore, Canada and New Zealand⁷, we propose to initially list the ten types of equipment as Restricted Equipment (see details in **Annex 5**), including:

- (i) small room air-conditioner;
- (ii) household refrigerator and freezer;
- (iii) commercial refrigeration – standalone system;
- (iv) commercial refrigeration – condensing unit;
- (v) commercial refrigeration – supermarket system;
- (vi) cold storage warehouse system;
- (vii) air-cooled chiller;
- (viii) water-cooled chiller;
- (ix) motor vehicle air-conditioning - private car; and
- (x) fire suppression system

24. The detailed categories of Restricted Equipment, the respective GWP limits and effective dates for the prohibition of import and manufacture are proposed in Annex 5. The effective date for the prohibition of subsequent sale, supply, offer for sale or offer for supply are proposed to be one year after the effective date for the prohibition of import and manufacture, in order to provide one year time for selling out the existing inventory. We envisage that there will be more than two years between the date of this consultation and the commencement of prohibition. There should be sufficient time for selling current stock. The Government will closely monitor the global development of low-GWP technologies, and review and update the list of Restricted Equipment and the GWP limits from time to time in consultation with the trade.

⁷ Reference to the GWP limits imposed / being proposed in EU, US, Japan, Singapore, Canada and New Zealand are available in the following websites:
<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014R0517&from=EN>
<https://www.epa.gov/system/files/documents/2022-12/TT%20Rule%20NPRM%20Fact%20Sheet%20Final.pdf>
https://www.env.go.jp/earth/ozone/hiyasu-waza/eng/revised_f-gas_law_in_japan.html
<https://www.nea.gov.sg/our-services/climate-change-energy-efficiency/climate-change/reducing-ghg-emissions-from-the-use-of-refrigerants-in-rac-sector>
<https://laws-lois.justice.gc.ca/eng/Regulations/SOR-2016-137/index.html>
<https://environment.govt.nz/assets/Proposed-measures-to-reduce-the-environmental-impact-of-Fgases-consultation.pdf>

25. The proposed restriction is intended to target on product and equipment newly manufactured after the specified effective date but not on existing product and equipment. In this regard, we propose not to apply the new restriction on used product and equipment already in use in the local market, that is in the ownership of a local consumer, before the restriction takes effect. This includes, for instance, the air-conditioner as part of a second-hand car sold in the car sale agreement, the air-conditioning and refrigeration equipment installed and sold together with a premises. However, to prevent Hong Kong from becoming a dump site of outdated equipment, the proposed exclusion does not apply to import of used product and equipment.

26. We have already discussed with local importers to stop importing these outdated or soon to be banned product/equipment before the control takes effect and to alert consumers of the future limited supplies of refrigerant for maintenance or repair purpose which may drive up the cost of repair.

Labelling of Restricted Equipment

27. To facilitate enforcement and encourage compliance, we propose to impose the requirement of on-product labelling for all Restricted Equipment. The label shall contain information of the type of refrigerant or fire suppressant contained or intended for use in the product, the GWP value of the refrigerant or fire suppressant, the date of manufacture and the date for the ban of sale / supply. If the Restricted Equipment is contained in a box or other types of packing during shipment, we propose that the exterior packaging must also contain a label containing the same information. The labelling requirement would enhance the ease of inspection by the Authority, and would encourage compliance by allowing all parties, including distributors, retail sellers and consumers, to assess whether a product uses compliant refrigerant or fire suppressant. It would also increase the consumers' awareness on the regulatory requirement and affect their purchasing choices, thereby generating market pressures to speed up the transition away from products using high-GWP HFCs.

28. Our proposal is in line with overseas practice. EU and UK already require labels with similar information requirements for products containing HFCs. US is

also proposing to require the same in their rulemaking proposal under public consultation.

29. We also prepare to introduce a transitional product responsibility scheme (PRS) on the refrigerant before the commencement date of the regulation. Specifically any product/equipment with scheduled HFC imported to Hong Kong will be charged a levy so that there would not be a dumping of outdated equipment before the effective date and when pace of overseas regulation outspeed Hong Kong. Moreover, 43% HFC is from motor vehicles and chiller, this transitional PRS would greatly pre-empt the import of outdated air conditioners in vehicles before 2026. In this regard, we propose to introduce a transitional PRS on air conditioner of private car using scheduled HFC refrigerant.

Offence and penalty

30. Offences and penalties of this regulation are proposed as follows:

- i) any person who imports or manufactures Restricted Equipment containing or designed to operate on any refrigerant or fire suppressant with GWP value exceeding the specified GWP limit commits an offence. The penalty is set at the same level as for the import of controlled products under the Ozone Layer Protection (Products Containing Scheduled Substances) (Import Banning) Regulation, Cap.403C, that is a maximum fine of \$1,000,000 and imprisonment for two years;
- ii) any person who sells, supplies, offers for sale or offers for supply of Restricted Equipment containing or designed to operate on any refrigerant or fire suppressant with GWP value exceeding the specified GWP limit commits an offence. The penalty is set at the same level as item (i), that is a maximum fine of \$1,000,000 and imprisonment for two years; and
- iii) importer, manufacturer, supplier or distributor who contravenes the requirements of labelling commits an offence. The penalty is set at the same level as for the labelling requirements under the Energy

Efficiency (Labelling of Products) Ordinance, Cap.598, that is a maximum fine of \$100,000.

Consultation question

- Question 3: Do you agree with the proposed approach on how the newly imported or manufactured air-conditioning and refrigeration equipment and fire suppression system shall be managed?
- Question 4: Do you agree with the proposed GWP limit and the effective dates i.e. from 2026 for the ten types of equipment?
- Question 5: Do you agree with the proposed approach on how used product and equipment shall be managed?
- Question 6: Do you agree with the proposed on-product labelling requirement particularly the alert that the HFC product would be banned from sale / supply with effect from 2026?
- Question 7: Do you agree with introducing transitional PRS on air conditioner of private car using scheduled HFC refrigerant before the commencement date of the product restriction?

Control Strategy 3: Drive refrigerant recycling through development of refrigerant recycling and management programme

31. Refrigerant recovery and recycling during equipment maintenance and repairing can save the need to acquire new refrigerant for refilling the equipment after repairing. When refrigerant from retired equipment are recovered and subsequently recycled or reclaimed⁸, it can also become an additional source of supply of refrigerant in the market. These supplies of recycled or reclaimed

⁸ Refrigerant recycling refers to the reuse of recovered refrigerant following a basic cleaning process. It normally involves recharge back into equipment on-site. Refrigerant reclamation refers to reprocessing and upgrading of recovered refrigerant to restore it to a specified standard of performance. It often involves processing at an off-site facility.

refrigerant will help lessen the impact on owners of existing equipment due to decreasing supply of HFC refrigerant. Proper refrigerant recovery also means less refrigerant is venting out to the atmosphere, resulting in direct benefit to the climate. In this regard, we propose to implement a refrigerant recycling and management programme to drive the trade to step up refrigerant recovery and recycling practice. Our proposal is elaborated in paragraphs 32 to 34 below.

Mandate recovery of spent Scheduled Refrigerants and prohibit their intentional venting

32. We propose to introduce a new regulation under the OLPO to:

- (i) define any air-conditioning and refrigeration system that is installed in premises other than domestic premises and with refrigerant charge over 50 kg as “**Regulated Equipment**”; and
- (ii) mandate recovery of any refrigerant that is a scheduled substance (including ODSs and HFCs) or is a blend containing scheduled substance under the OLPO (“**Scheduled Refrigerant**”) from any Regulated Equipment during equipment maintenance, servicing, and at time of equipment decommissioning and prohibit intentional venting.

33. The threshold of 50-kg refrigerant charge is proposed to cover large size stationary air-conditioning and refrigeration systems. It basically includes chillers commonly used in medium to large size premises, and centralized refrigeration system in supermarkets and cold storage warehouses. For smaller equipment containing less than 50 kg refrigerant charge, we do not propose to extend the mandatory refrigerant recovery requirement to these equipment. Also we have covered those imported before the product restriction regulation commences under the PRS and should have discouraged its import. Furthermore, we would encourage the trade to adopt good practices in managing the refrigerants and preventing their releases through education and publicity.

34. To ensure that the legislative requirements are duly observed, we propose to set out clearly the responsibilities of equipment owner and service contractor (who is the person carrying out the refrigerant handling work) under the regulation as follows:

Requirement on refrigerant handling contractor

- (i) A person or company must register with EPD as “**Registered Refrigerant Handling Contractor**” if it carries out any Scheduled Refrigerant handling work, including installation and commissioning, inspection and leakage checking, maintenance or servicing, refrigerant refilling, refrigerant recovery or decanting, and decommissioning, on any Regulated Equipment that contains or is designed to contain Scheduled Refrigerants.
- (ii) Registered Refrigerant Handling Contractor has the obligations to provide adequate and properly maintained equipment, and establish and maintain policies and operating procedures to its technicians for the work conducted.
- (iii) Registered Refrigerant Handling Contractor shall arrange certified technician (who holds a certificate issued by training institutes as recognized by the Authority indicating successful completion of a refrigerant handling course) on-site for carrying out the refrigerant handling work. The Government would work with the trade and training institutes to provide the training. [this requirement will take effect at a date specified by the Authority and the number of certified technicians will be reviewed and determined in phases by the Authority in consultation with the trade.]
- (iv) Registered Refrigerant Handling Contractor shall cause or arrange the recovered refrigerant to be disposed of at a licensed waste disposal facility⁹ to get them reclaimed or destroyed, unless the refrigerant is charged back to the same equipment or transferred for use in other equipment owned by the same owner.

⁹ It refers to the waste disposal facility licensed under the Waste Disposal Ordinance, Cap.354.

- (v) Registered Refrigerant Handling Contractor, after completion of each of the works engaged, must submit records of the refrigerant handling work to EPD in a format specified by the EPD within 2 months from the completion of the works.

Requirement on equipment owner

- (i) All owners of existing Regulated Equipment (i.e. in existence at the time when this regulation comes into operation) must register their Regulated Equipment with EPD in a format specified by the EPD within 6 months from the effective date of this regulation. Owner of any newly installed Regulated Equipment (i.e. installed after the effective date of this regulation) must register its Regulated Equipment with the EPD within 2 months upon completion of installation.
- (ii) Owner of Regulated Equipment operating on Scheduled Refrigerant must engage Registered Refrigerant Handling Contractor for any type of work involving handling of Scheduled Refrigerant. If the equipment owner uses in-house staff to handle Scheduled Refrigerant, the staff or the company concerned must register with the EPD.

For avoidance of doubt, owner of Regulated Equipment is defined as the person who has the management or control of the Regulated Equipment.

Offence and penalty

35. Offences and penalties of this regulation are proposed as follows:

- i) any person who allows or causes any Scheduled Refrigerant to release into the atmosphere without valid due diligence defence commits an offence. The penalty is set at the same level as for the prohibition of venting provision under the Ozone Layer Protection (Controlled Refrigerant) Regulation, Cap.403B., that is a maximum fine of \$100,000;
- ii) owner of Regulated Equipment who fails to engage Registered Refrigerant Handling Contractor to carry out work involving handling of Scheduled

Refrigerant commits an offence. The penalty is set at the same level as for item (i), that is a maximum fine of \$100,000;

- iii) any person who carries out work involving handling of Scheduled Refrigerant without registration commits an offence. The penalty is set at the same level as for item (i), that is a maximum fine of \$100,000;
- iv) Registered Refrigerant Handling Contractor who fails to provide adequate and properly maintained equipment, and establish and maintain policies and operating procedures to its technician commits an offence. The penalty is set at the same level as for item (i), that is a maximum fine of \$100,000;
- v) Registered Refrigerant Handling Contractor who contravenes the reporting requirement commits an offence. The penalty is set at the same level as for item (i), that is a maximum fine of \$100,000; and
- vi) owner of Regulated Equipment who fails to register their Regulated Equipment within the specified period commits an offence. Considering this offence is straight-forward, clear-cut and that the offender is clearly defined, we will explore the possibility of introducing a fixed penalty notice system against this offence to enhance enforcement efficiency.

Consultation question

Question 8: Do you agree with the proposal to mandate recovery and prohibit intentional venting of refrigerant from air-conditioning and refrigeration equipment?

Question 9: Do you agree with the proposal that equipment over 50 kg should be registered while those containing less than 50 kg refrigerant shall not be subject to the new mandatory refrigerant recovery requirement?

Question 10: Do you agree with the proposed registration requirement on refrigerant handling contractor?

Question 11: Do you agree with the proposed training and certification requirement on refrigerant handling technician?

Further supporting measure – producer responsibility scheme

36. It is anticipated that on-site refrigerant recycling practice during equipment maintenance will increase with the introduction of the mandatory refrigerant recovery requirement as proposed in preceding section. Unwanted refrigerants can either be destroyed completely at waste destruction facility or be reclaimed at refrigerant reclamation facility for resale and reuse in any appropriate air-conditioning and refrigeration system.

37. Currently, there is one destruction facility locally, i.e. the Chemical Waste Treatment Centre at Tsing Yi, and no local refrigerant reclamation facility. Apart from local facility, the unwanted refrigerants can also be shipped to overseas waste destruction facility or refrigerant reclamation facility¹⁰ for proper handling.

38. We consider that the demand for reclaimed refrigerant in local market will increase due to the HFC phasedown. Besides, the new mandatory refrigerant recovery legislation will generate a steady supply of used refrigerants that could be reclaimed and resold to the market. These developments will attract private investment in establishment of local refrigeration reclamation business.

39. We therefore propose to introduce a mandatory producer responsibility scheme (PRS) on the import of Scheduled Refrigerants and/or equipment pre-charged with Scheduled Refrigerants to place primary responsibility for the cost of refrigerant recovery and reclamation to importers and users of equipment, and then use the revenues to finance service contractors, facilities that provide refrigerant recovery and reclamation services. Please find in **Annex 6** for the information about PRS.

¹⁰ Refrigerant reclamation facility is a plant, usually privately-owned, that operates by reprocessing used refrigerants to restore it to a specified standard of performance and re-selling the reclaimed refrigerants to the market.

Consultation question

Question 12: Do you agree introducing mandatory producer responsibility scheme to facilitate development of refrigerant recovery and reclamation practice for supporting the HFC phase-down?

Question 13: What other options should be considered for promoting refrigerant recovery and reclamation and why?

Views Invited

40. The Government welcomes your views on the proposed measures. You may provide your comments by responding to the consultation questions which are reproduced below. In case you do not agree with the proposals, please give the reasons with supporting evidence where appropriate, and provide your alternative suggestions.

Consultation question

Question 1: Do you agree with the proposed approach on how the import quota shall be allocated?

Question 2: Do you agree with implementation of the proposed import ban on HFC-23 by 2025 earliest?

Question 3: Do you agree with the proposed approach on how the newly imported or manufactured air-conditioning and refrigeration equipment and fire suppression system shall be managed?

Question 4: Do you agree with the proposed GWP limit and the effective dates i.e. from 2026 for the ten types of equipment?

Question 5: Do you agree with the proposed approach on how used product and equipment shall be managed?

Question 6: Do you agree with the proposed on-product labelling requirement particularly the alert that the HFC product would be banned from sale / supply with effect from 2026?

- Question 7: Do you agree with introducing transitional PRS on air conditioner of private car using scheduled HFC refrigerant before the commencement date of the product restriction?
- Question 8: Do you agree with the proposal to mandate recovery and prohibit intentional venting of refrigerant from air-conditioning and refrigeration equipment?
- Question 9: Do you agree with the proposal that equipment over 50 kg should be registered while those containing less than 50 kg refrigerant shall not be subject to the new mandatory refrigerant recovery requirement?
- Question 10: Do you agree with the proposed registration requirement on refrigerant handling contractor?
- Question 11: Do you agree with the proposed training and certification requirement on refrigerant handling technician?
- Question 12: Do you agree with introducing mandatory producer responsibility scheme to facilitate development of refrigerant recovery and reclamation practice for supporting the HFC phase-down?
- Question 13: What other options should be considered for promoting refrigerant recovery and reclamation and why?

41. Please send us your views and comments on the proposal on or before **9 September 2023** by post, email, or facsimile to the following: -

Mailing Address: Air Policy Group
Environment and Ecology Bureau
(Environment Branch)
33/F, Revenue Tower
5 Gloucester Road, Wanchai,
Hong Kong
(Attn.: Consultation on the Proposed Phase-down of HFCs)

By Email: olposurvey@eeb.gov.hk

By Facsimile: 2827 8040

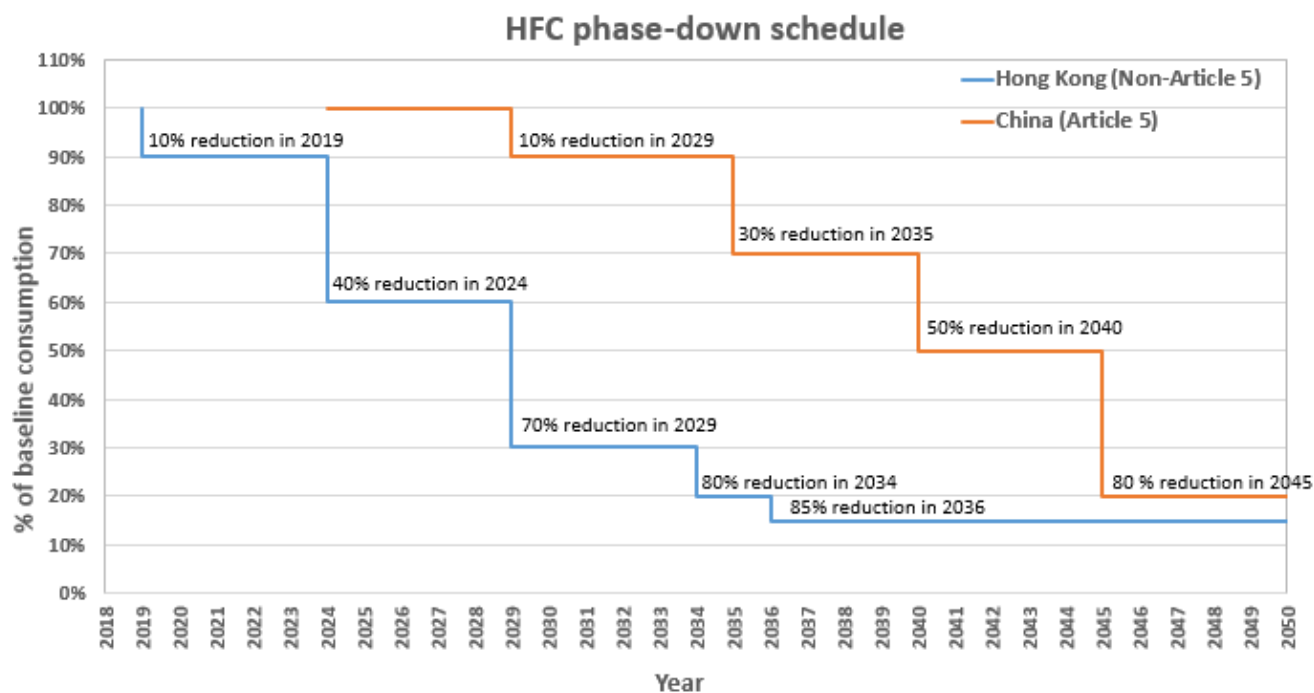
42. Where appropriate, please indicate the organisation / company which you are providing views on behalf of. The names and views of organisations, companies or individuals submitting their views in response to the consultation document may be published for public viewing after conclusion of the consultation exercise. Please note that the Government may wish, either in discussion with others or in any subsequent report, whether privately or publicly, to be able to refer to and attribute views submitted in response to this consultation document. Any request for treating all or part of a response in confidence will be respected, but if no such request is made, we shall assume that the response or views received are not intended to be confidential.

Environment and Ecology Bureau
July 2023

Annex 1: HFCs Controlled under the Kigali Amendment

Group	Substance	100-Year Global Warming Potential
<i>Group I</i>		
CHF ₂ CHF ₂	HFC-134	1,100
CH ₂ FCF ₃	HFC-134a	1,430
CH ₂ FCHF ₂	HFC-143	353
CHF ₂ CH ₂ CF ₃	HFC-245fa	1,030
CF ₃ CH ₂ CF ₂ CH ₃	HFC-365mfc	794
CF ₃ CHF ₂ CF ₃	HFC-227ea	3,220
CH ₂ FCF ₂ CF ₃	HFC-236cb	1,340
CHF ₂ CHF ₂ CF ₃	HFC-236ea	1,370
CF ₃ CH ₂ CF ₃	HFC-236fa	9,810
CH ₂ FCF ₂ CHF ₂	HFC-245ca	693
CF ₃ CHFCH ₂ CF ₂ CF ₃	HFC-43-10mee	1,640
CH ₂ F ₂	HFC-32	675
CHF ₂ CF ₃	HFC-125	3,500
CH ₃ CF ₃	HFC-143a	4,470
CH ₃ F	HFC-41	92
CH ₂ FCH ₂ F	HFC-152	53
CH ₃ CHF ₂	HFC-152a	124
<i>Group II</i>		
CHF ₃	HFC-23	14,800

Annex 2a: Phase-down Schedules of HFCs under the Kigali Amendment



Annex 2b: HFC Baseline and Phase-down Schedule for Hong Kong

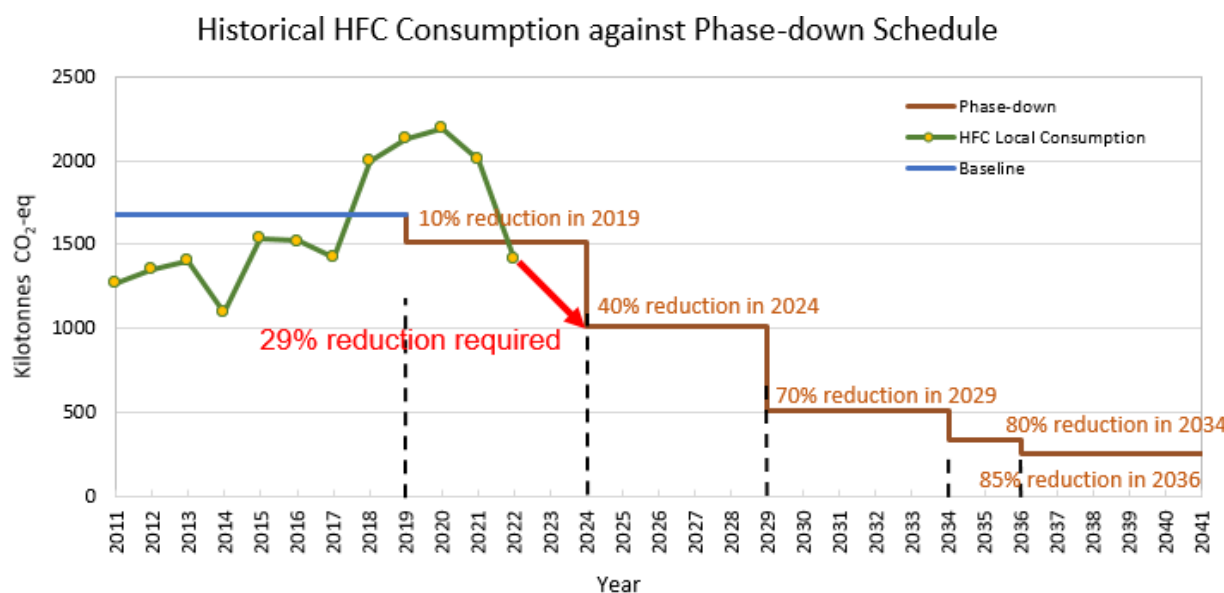
- (i) The HFC consumption baseline figures¹¹ and the proposed corresponding phase-down schedule for Hong Kong are as follows:

	Unit: kilotonnes CO ₂ -eq
HFC baseline	1682
90% of baseline (2019-2023)	1513
60% of baseline (2024-2028)	1009
30% of baseline (2029-2033)	504
20% of baseline (2034-2035)	336
15% of baseline (2036 and thereafter)	252

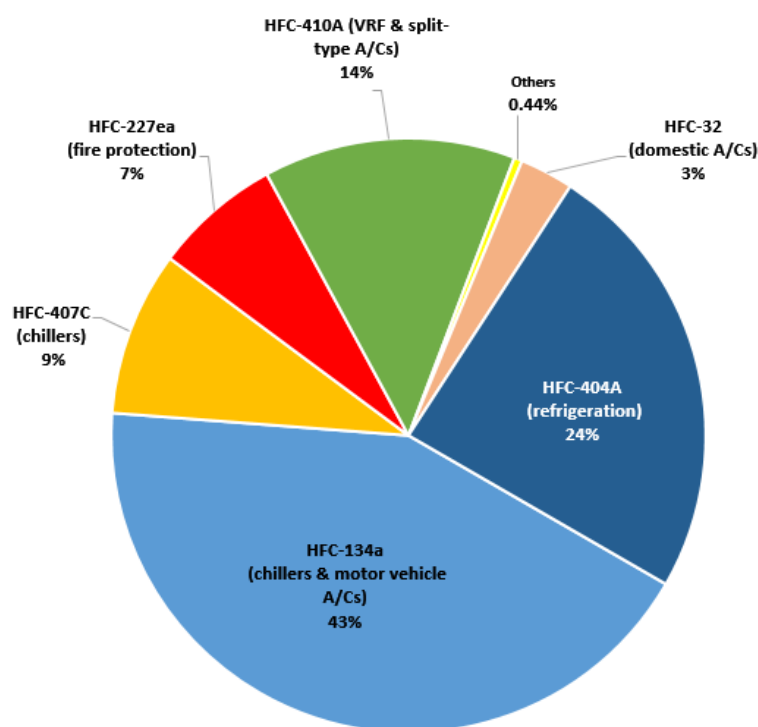
- (ii) The HFC production baseline for Hong Kong is zero.

¹¹ In accordance with the Kigali Amendment, the HFC consumption baseline level of Hong Kong is calculated as average of annual HFC consumption for 2011-2013 plus 15% of the HCFC consumption baseline (calculated based on 1989 HCFC consumption plus 2.8% of 1989 CFC consumption). The baseline and phase-down figures are derived from calculations using import and export statistics from the Census and Statistics Department.

Annex 3a: Historical HFC Consumption against Phase-down Schedule under the Kigali Amendment



Annex 3b: HFC Consumption by Sector in Hong Kong in 2022 (in kilotonnes CO₂-eq)¹²



¹² The HFC consumption data are derived from calculations using import and export statistics from the Census and Statistics Department.

Annex 4: Overseas Practice in Implementation of Kigali Amendment

1. The European Union updated their F-Gas Regulation in 2014 to control emissions of HFCs. The regulation establishes quantitative limits on HFCs that can be sold in the market; bans the use of specific products and equipment that contain or function with HFCs with high GWPs; and establishes rules on containment, use, recovery and destruction of HFCs from equipment.
2. Japan amended its Ozone Layer Protection Law in 2018 to control the manufacture and import of HFCs. The Act on Rational Use and Proper Management of Fluorocarbons revised in 2019 aims for restraining emission of fluorocarbons throughout their lifecycle, including periodical equipment inspection to reduce leakage in addition to recovery of fluorocarbons from the equipment during maintenance and disposal. The Act also establishes the GWP target value and implementation year for manufacturers and importers of a range of air-conditioning and refrigeration products.
3. In Singapore, the Environmental Protection and Management (Amendment) Act 2021 and its subsidiary regulations require the implementation of licensing controls on the import and export of HFCs, impose restriction on the supply of refrigeration and air-conditioning equipment using high-GWP refrigerants, and mandate the collection and proper treatment of spent refrigerants from decommissioned refrigeration and air-conditioning equipment.
4. In the United States, the American Innovation and Manufacturing Act was enacted in December 2020 which directs EPA to address HFCs by phasing down production and consumption, maximizing reclamation and minimizing releases from equipment, and facilitating the transition to next-generation technologies through sector-based restrictions. Restrictions on the GWP limit of refrigerants in various sectors of industrial, commercial and residential applications have been proposed and are now under public consultation.

Annex 5: Restricted Equipment

The GWP limit of the refrigerant or fire suppressant which the Restricted Equipment is designed to operate on is proposed as follows:

Category of Restricted Equipment	GWP Limit	Effective date	
		Prohibition of import or manufacture	Prohibition of sale, supply, offer for sale or offer for supply
Room air-conditioner (split type or window type, with rated cooling capacity < 7.5kW)	750	1 Jan 2025	1 Jan 2026
Household refrigerator, freezer and refrigerator combined with freezer	150	1 Jan 2025	1 Jan 2026
Commercial refrigeration - stand-alone system	150	1 Jan 2025	1 Jan 2026
Commercial refrigeration - condensing unit	1500	1 Jan 2025	1 Jan 2026
	150	1 Jan 2028	1 Jan 2028
Commercial refrigeration – supermarket system	1500	1 Jan 2025	1 Jan 2026
	150	1 Jan 2028	1 Jan 2028
Cold storage warehouse system	1500	1 Jan 2025	1 Jan 2026
	150	1 Jan 2028	1 Jan 2028
Air-cooled chiller	750	1 Jan 2025	1 Jan 2026
Water-cooled chiller	150	1 Jan 2025	1 Jan 2026
Motor vehicle air-conditioning - private car (as defined in the Road Traffic Ordinance, Cap.374)	150	Manufacture year 2027	Manufacture year 2027
Fire suppression system	15	1 Jan 2025	1 Jan 2026

Annex 6: Producer Responsibility Scheme

Producer Responsibility Scheme (PRS) is a key policy tool in the waste management strategy in Hong Kong. Enshrining the principle of “polluter pays” and the element of “eco-responsibility”, the PRS concept requires relevant stakeholders to share the responsibility for the collection, recycling, treatment and disposal of end-of-life products with a view to avoiding and reducing the environmental impacts caused by such products at the post-consumer stage. Various PRSs (e.g. Waste Electrical and Electronic Equipment, and Glass Beverage Containers) have been introduced since the enactment of the Product Eco-responsibility Ordinance (Cap. 603) in 2008 which provides the shared core elements of all PRSs and the fundamental regulatory requirements in respect of individual types of product, with operational details to be set out in the Ordinance and its subsidiary legislation.