



Consultation document

# He huarahi marohi ki te whakaheke i te pānga o te haurehu kōwhai ki te taiao

Proposed measures to reduce the  
environmental impact of fluorinated gases



Ministry for the  
**Environment**  
*Manatū Mō Te Taiao*



**Te Kāwanatanga o Aotearoa**  
New Zealand Government

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# Introduction

## About this consultation

### Fluorinated gases and refrigerants

Fluorinated gases (F-gases) are potent greenhouse gases that make up about 2 per cent of Aotearoa New Zealand's annual greenhouse gas emissions. Most F-gases used in Aotearoa New Zealand are hydrofluorocarbons (HFCs) used as refrigerant gases.

Refrigerants are an important component of air-conditioning and refrigeration technology. They can be found in almost all heat pumps, dehumidifiers, refrigerators and freezers. They also play vital roles in essential services, by keeping temperature-sensitive goods (such as food products and medicines) cool for transport and storage.

The proposed policies outlined in this consultation document aim to reduce the contribution of F-gases to Aotearoa New Zealand's greenhouse gas emissions, in recognition of the negative effect these substances have on the climate. This document contains details of several previously announced policies that aim to reduce the unnecessary use of these gases and promote appropriate handling and disposal.

### Product stewardship

In July 2020, refrigerants and other synthetic greenhouse gases were made a priority product under the [Waste Minimisation Act 2008 \(WMA\)](#). This requires a product stewardship scheme to be developed and enables regulations to mandate acting in accordance with the scheme. In May 2020, an industry co-design working party proposed the framework for a regulated scheme targeting refrigerants. Important elements include improved requirements for workplace competence and widened coverage to other sectors using F-gases (eg, automotive air conditioning and heat pumps). In May 2022, a mandated product stewardship scheme was included as an action under the first emissions reduction plan.<sup>1</sup> We now wish to seek input from a wider audience on the content of these regulations and the requirements of a mandatory product stewardship scheme for refrigerants.

### Prohibitions

Based on recommendations from the Climate Change Commission, we have developed proposals for prohibitions to target the import and sale of equipment pre-charged with HFCs, when and where alternatives are available. This aims to stop the continued use of these gases in areas where a viable pathway exists to shift to alternatives with lower environmental impact. We are seeking input from the public and, in particular, industries that use or distribute F-gases, to best inform aspects of these prohibitions and ensure we are mitigating any adverse effects of our proposals.

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<sup>1</sup> Ministry for the Environment. 2022. *Te hau mārohi ki anamata – Towards a productive, sustainable and inclusive economy: Aotearoa New Zealand's first emissions reduction plan*. Wellington: Ministry for the Environment.

## Have your say

The purpose of this consultation is to:

- seek your views on the proposed regulated refrigerant stewardship scheme under the [Waste Minimisation Act 2008](#) and [Ozone Layer Protection Act 1996](#) to reduce the impacts of F-gases
- understand potential impacts of, and barriers to, achieving the proposed timelines for import prohibitions on equipment containing F-gases
- understand business and consumer perspectives on the possible effect of these proposals.

We welcome your feedback on the options set out in this document.

## Sending feedback

To submit your comments, you can complete the online feedback form at:

<https://consult.environment.govt.nz/waste/f-gases-and-refrigerants>

For full details, see [section 4: Have your say](#).

## Consultation questions

The questions throughout this document are a guide only. You do not have to answer them all, and we encourage any additional comments.

**Submissions close at 11.59 pm on 18 December 2022.**

# Section 1: Progressing towards a fluorinated-gas-free future

## Fluorinated gases and their environmental impact

Fluorinated gases (F-gases) are a class of fluorine-containing compounds that are gases at ambient temperatures. Four classes of F-gases exist: hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF<sub>6</sub>) and nitrogen trifluoride (NF<sub>3</sub>). The chemical properties of these gases make them useful in several applications but also mean they can have a significant impact on the climate.

F-gases have high global warming potentials (GWPs). GWP is a measure of a substance's ability to absorb heat in the atmosphere and is indicative of a substance's ability to affect the climate through the greenhouse gas cycle. GWP is measured by mass equivalents of carbon dioxide (CO<sub>2</sub>eq). Generally, we consider a low GWP to be below 150 and a high GWP to be above 750. Substances with GWPs between 150 and 750 we consider intermediate GWPs.

F-gases typically have GWPs in the hundreds or thousands, which means they have a considerable impact on the climate despite being emitted in low quantities. They are estimated to make up around 2 per cent of Aotearoa New Zealand's greenhouse gas emissions in terms of CO<sub>2</sub> equivalents. As a result of their environmental impact, F-gases are the target of several government initiatives that seek to reduce their contribution to Aotearoa New Zealand's greenhouse gas emissions.

## Fluorinated gases as refrigerants

In Aotearoa New Zealand, F-gases are mostly HFCs, which are primarily used as refrigerants.

Refrigerants are gases whose physical properties are used to manipulate the temperature of the surrounding environment, and are an essential component of refrigerators, freezers and air-conditioning units. Refrigerants are not consumed as they are used, so emissions are mostly the result of leaking equipment and improper disposal. To be disposed of properly, HFC refrigerants (and other F-gases) need to be recaptured and incinerated at high temperatures.

Refrigerants are everywhere. They can be found in household appliances, such as heat pumps, refrigerators and dehumidifiers, as well as in commercial refrigeration. Refrigerants also play an essential role in several important industries. They are involved in food production and allow for the operation of the 'cold chain', which allows temperature-sensitive goods (eg, perishable food and medicine) to be transported and stored throughout global supply chains.

Despite their environmental impact, HFC refrigerant gases provide a lot of benefits. Domestic heat pumps allow homes to be heated in a safe and energy-efficient manner – compared with methods that use combustion – and refrigerants have been employed in food production to allow it to be more cost-effective.

## Alternatives to hydrofluorocarbon refrigerants

Transitioning to low-GWP refrigerants will be essential to lowering F-gas emissions without significantly affecting industries that rely on refrigerants.

## Hydrochlorofluorocarbons and chlorofluorocarbons

The previous generation of refrigerants were primarily hydrochlorofluorocarbons (HCFCs) and chlorofluorocarbons (CFCs), but were replaced due to their ability to deplete the ozone layer. These gases and other ozone-depleting substances began to be phased out globally in the 1990s. This phase-out was facilitated by the Montreal Protocol.<sup>2</sup> HFCs, having similar chemical and physical properties, became common replacements.

## Natural refrigerants

A common low-GWP alternative to F-gases is a group of substances referred to as 'natural refrigerants'. These include hydrocarbons (such as propane or isobutane), carbon dioxide and ammonia. These substances have a lower environmental impact than F-gases and are typically more affordable. However, they also have several properties that can make them difficult or dangerous to handle. For instance, hydrocarbons are highly flammable, carbon dioxide requires high-pressure systems, and ammonia is toxic. Mitigating these risks is necessary to allow wider use of these gases.

## Hydrofluoroolefins

Another alternative to HFC refrigerants is hydrofluoroolefins (HFOs). HFOs have considerably lower GWP than HFCs (some less than 1 GWP), which makes them an attractive option for an alternative refrigerant. HFOs can also be mixed with HFCs to make refrigerant blends with an intermediate GWP, potentially providing a stopgap replacement until lower-GWP refrigerants are developed. Many still consider HFOs to be an emerging technology in the refrigerant field, and their full impact on the environment is not yet known.

# Current regulatory environment

Several active government policies are currently facilitating a phase-down of F-gases.

## Emissions Trading Scheme

Under the New Zealand Emissions Trading Scheme (NZ ETS), importers and manufacturers of HFCs are required to offset their emissions by obtaining New Zealand emission units (NZUs).<sup>3</sup>

The costs incurred by obtaining NZUs are passed down the supply chain. They have a significant effect on consumer prices, especially on HFCs with particularly high GWPs, because levies on bulk HFCs are applied based on GWP. This also means the cost of these gases will increase with the price of carbon.

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<sup>2</sup> Ministry for the Environment. May 2019. *Vienna Convention and the Montreal Protocol*. Retrieved from <https://environment.govt.nz/what-government-is-doing/international-action/vienna-convention-and-montreal-protocol/> (21 October 2022).

<sup>3</sup> Environmental Protection Authority. *Synthetic greenhouse gases*. Retrieved from <https://www.epa.govt.nz/industry-areas/emissions-trading-scheme/industries-in-the-emissions-trading-scheme/synthetic-greenhouse-gases/> (21 October 2022); Ministry for the Environment. June 2022. *How synthetic greenhouse gases are affected by the NZ ETS*. Retrieved from <https://environment.govt.nz/what-government-is-doing/areas-of-work/climate-change/ets/how-synthetic-greenhouse-gases-are-affected-by-the-nz-ets/> (21 October 2022).



The [Climate Change \(Other Removal Activities\) Regulations 2009](#) provide the ability for participants in the NZ ETS to obtain NZUs for the export or destruction of HFCs. The eligibility criteria for this scheme were recently consulted on.<sup>4</sup>

The [Climate Change Response Act 2002](#) makes it an offence to knowingly release a synthetic greenhouse gas while working with equipment containing refrigerants.

## **Synthetic greenhouse gas levy**

The [Climate Change Response Act 2002](#) imposes a levy on imported goods that contain synthetic greenhouse gases including refrigerants. The levy fees are set out in the [Climate Change \(Synthetic Greenhouse Gas Levies\) Regulations 2013](#). This is designed to target imports not covered by the standard NZ ETS requirements.<sup>5</sup>

## **Permitting scheme for bulk imports of hydrofluorocarbons**

In 2016, Aotearoa New Zealand became a party to the Kigali Amendment to the Montreal Protocol.<sup>6</sup> The Kigali Amendment requires parties to limit their consumption (defined as production and import minus export) of HFCs by specified amounts between 2019 and 2036.

To fulfil these obligations, the [Ozone Layer Protection Regulations 1996](#) were amended to introduce a scheme that limits the import of bulk HFCs. Bulk HFCs are gases in cylinders that are used to charge products, either for charging new products or recharging existing products. This scheme, which came into force from 1 January 2020, requires importers of bulk HFCs to obtain a permit for the substances they import.<sup>7</sup> Permits are issued in decreasing amounts over time and are based on the CO<sub>2</sub>eq tonnes of the HFC (considering weight and GWP of the gas).

This phase down is more ambitious than the obligations required by the Kigali Amendment. The quantities of HFCs allowed by the permitting scheme are smaller than the amounts prescribed in the Kigali Amendment. The Kigali Amendment requires parties to phase down consumption of HFCs to levels specified in the phase-down schedule in the Amendment. The phase down in the Aotearoa New Zealand regulations prescribes lower levels of consumption than the Amendment requires. However, this scheme does not account for HFCs imported in pre-charged equipment.

[Section 27 of the Ozone Layer Protection Act 1996 \(OLPA\)](#) requires that phase-down schedules be reviewed every two years.

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<sup>4</sup> Ministry for the Environment. 2022. *Proposed changes to regulations for the New Zealand Emissions Trading Scheme 2022: Consultation document*. Wellington: Ministry for the Environment.

<sup>5</sup> Environmental Protection Authority. *Synthetic Greenhouse Gas Levy*. Retrieved from <https://www.epa.govt.nz/industry-areas/emissions-trading-scheme/ets-reports/synthetic-greenhouse-gas-levy/> (21 October 2022).

<sup>6</sup> Ministry for the Environment. May 2019. *Kigali Amendment to the Montreal Protocol*. Retrieved from <https://environment.govt.nz/what-government-is-doing/international-action/vienna-convention-and-montreal-protocol/kigali-amendment-to-the-montreal-protocol/> (21 October 2022).

<sup>7</sup> Environmental Protection Authority. *Importing and exporting hydrofluorocarbon gases (HFCs)*. Retrieved from <https://www.epa.govt.nz/industry-areas/hazardous-substances/hfcs/> (21 October 2022).

## Planned interventions

The Government's first emissions reduction plan outlined several planned interventions that aim to reduce F-gas emissions and facilitate a transition to low-GWP alternatives.<sup>8</sup>

### Training and licensing for work with alternative refrigerants

The Ministry of Business, Innovation and Employment (MBIE) is developing regulations that will establish a licensing regime for workers doing various kinds of high-risk work. Refrigerant technicians will be some of the first workers who will need to be licensed under the new Health and Safety at Work (High-Risk Work Licences) Regulations (HRWL Regulations). The new regulations will require a licence to be held by all technicians who work on refrigeration, heating or air-conditioning systems in industrial and commercial settings involving hazardous refrigerants.

The regulations will take effect around March 2023, and technicians will need to be licensed by early 2027.

### Mandated product stewardship for refrigerants

In July 2020, refrigerants and other synthetic greenhouse gases were made a priority product under the [WMA](#), which requires a product stewardship scheme to be developed and enables regulations to mandate acting in accordance with the scheme. The new scheme will build on the current voluntary product stewardship scheme and aim to improve the handling and disposal of refrigerant gases, and the requirements for workplace competence.

## Prohibitions

### Import prohibitions on pre-charged equipment

The Ministry for the Environment (MfE) is developing prohibitions to target the import and sale of equipment pre-charged with HFCs, when and where alternatives are available. This work aims to stop the continued use of F-gases in areas where the market is capable of shifting to alternatives with a lower environmental impact.

### Investigating prohibitions on specific fluorinated gases

We are also investigating prohibiting the sale and use of specific F-gases. This would provide the legislative tools needed to eventually ban the use of F-gases all together. We are currently considering the framework for this.

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<sup>8</sup> Above n 1.

# Section 2: Regulated product stewardship

Aotearoa New Zealand’s first emissions reduction plan, announced in May 2022, includes actions to reduce F-gas emissions through enhanced training and authorisation, and a mandatory product stewardship scheme (table 1).

**Table 1: Emissions reduction plan – fluorinated gas actions relating to product stewardship and training<sup>9</sup>**

Actions for delivery	Proposed outputs	Timeline	Lead (support)	Key stakeholders and/or partnerships
<b>16.1</b> Develop training and licensing for workers handling alternative gases (installing, commissioning, decommissioning, dismantling, repairing, or maintaining plant that uses flammable, toxic or very high operating pressure refrigerants)	Licensing and authorisation schemes for workers installing, servicing, and disposing of equipment that uses natural or other alternative refrigerant gases	First emissions budget (2022–25)  Proposed regulations to take effect around March 2023 and technicians to be licensed by early 2027	MBIE (WorkSafe)	MBIE, WorkSafe, other regulatory organisations, users, industry, training bodies, and refrigerant technicians
<b>16.4</b> Introduce a mandatory product stewardship scheme for refrigerants	Implement regulated product stewardship via an accredited scheme for refrigerants	First emissions budget (2022–25)	MfE	MBIE, WorkSafe, other regulatory organisations, installers of heating, refrigerating and air-conditioning equipment

Note: MBIE = Ministry of Business, Innovation and Employment; MfE = Ministry for the Environment; WorkSafe = WorkSafe New Zealand.

This chapter proposes regulations to give effect to action 16.4. This would support the Emissions Reduction Plan through increasing removals of high-GWP gases and reducing F-gas emissions from leakage, as scheme participation and improved workplace competence becomes universal.

Consultation on framework regulations to give effect to action 16.1 will be undertaken separately by MBIE.

The proposed regulations are set out in table 2. An explanation of their rationale and indicative questions for consultation are set out in the following subsections.

<sup>9</sup> Above n 1, ch 16. Updated to reflect developments in implementing action 16.1 of the emissions reduction plan. Ministry for the Environment. 2022. [Aotearoa New Zealand's first emissions reduction plan: Table of actions](#). Wellington: Ministry for the Environment.

**Table 2: Proposed refrigerant product stewardship regulations**

<b>Proposed regulations</b>	Sale in accordance with accredited scheme	Workforce competence evidence required to work with equipment containing or designed to use refrigerants, or to purchase bulk or pre-charged refrigerants		Quality standard for end-of-life management of refrigerants plus reporting
	WMA s22(1)(a)	OLPA s11 and s16	WMA s23(1)(b)	WMA s23(1)(g) and (h)
<b>Problem being addressed</b>	Limited effect of voluntary schemes	Leakage of F-gases (risk of harm to environment) Leakage of F-gas alternatives in areas not covered by proposed HRWL Regulations (risk of harm to people or property)		
<b>Persons or entities covered</b>	People whose business sells or distributes F-gases or products containing them	People whose business installs, services, modifies or dismantles equipment containing or designed to use a controlled substance that is a refrigerant	People whose business sells bulk or pre-charged F-gases	People whose business disposes, degases, decommissions, recycles or wrecks equipment that contains or is designed to use F-gases
<b>Obligations</b>	The priority product may only be sold in accordance with the accredited scheme	These businesses will need to register with, and ensure their staff have qualifications recognised by, the accredited refrigerant stewardship scheme	These businesses will need to register with the accredited refrigerant stewardship scheme and ensure buyers of their goods are either companies registered with or individuals with qualifications recognised by the accredited scheme	<ul style="list-style-type: none"> <li>Disposal of F-gases or other synthetic greenhouse gases only permitted through complete denaturing (eg, plasma arc plant)</li> <li>These businesses will need to register with, and ensure their staff have qualifications recognised by, the accredited product stewardship scheme</li> </ul>
<b>Rationale</b>	This creates an enforceable obligation to require sale in accordance with an accredited scheme. This will establish a level playing field for industry and ensure producers take responsibility for mitigating the environmental impacts of the products	This would set an enforceable requirement to have suitable evidence of competence to work with refrigerants (most of which are defined as 'controlled products' under <a href="#">OLPA</a> )	Most refrigerant emissions are from leaks from poor equipment installation and/or management. Replacement gases will not be obtainable for people who cannot demonstrate they have suitable skills to prevent further leakage	<ul style="list-style-type: none"> <li>This would set a standard for safe disposal of gases that would otherwise impact climate change and the ozone layer. Recycling the gases risks them being leaked later</li> <li>It would also complement the proposed <a href="#">OLPA</a> enforcement powers to require those disposing, degassing or recycling equipment to also have evidence of competence to do so.</li> </ul>

Note: F-gases = fluorinated gases; OLPA = Ozone Layer Protection Act 1996; WMA = Waste Minimisation Act 2008.

## Voluntary product stewardship

Voluntary refrigerant stewardship services have been delivered in Aotearoa New Zealand for many years by two trusts established by industry leaders. The Trust for the Destruction of Synthetic Refrigerants (Recovery Trust) operates an accredited voluntary scheme to collect and destroy synthetic refrigerants, including F-gases.<sup>10</sup> The Refrigerant License Trust Board fosters training and licensing to reduce risk of harm in the workplace and to the environment.<sup>11</sup>

Both trusts have made significant improvements in industry best practice. However, as is typical of voluntary schemes, both have also experienced free-rider issues in funding, and low participation rates have prevented them from achieving their aspirations.

## Priority product declaration

Public consultation in 2019 informed the Government's decision to declare refrigerants and other synthetic greenhouse gases as priority products in July 2020. The priority product scope is:

All refrigerant gases (including SF<sub>6</sub> [sulphur hexafluoride]) used for heating, cooling and air conditioning that are ozone depleting substances for the purposes of the Ozone Layer Protection Act 1996 or synthetic greenhouse gases under the Climate Change Response Act 2002; or products containing these gases.<sup>12</sup>

The declaration of a priority product enables the making of regulations to prohibit the sale of that product except in accordance with an accredited scheme.

## Obligation to take part

The Government proposes regulating to prohibit the sale of synthetic refrigerants, except in accordance with an accredited scheme, under [section 22\(1\)\(a\) of the WMA](#). This would mean that producers, sellers and distributors<sup>13</sup> of the priority products would be required to sell only in accordance with an accredited scheme covering that product.

What it means to be “in accordance with an accredited scheme” will be clarified at the time of scheme accreditation. Once a decision to regulate under [section 22\(1\)\(a\)](#) is announced, and before such regulations take effect, MfE would ensure detailed information is available on its website, on the website for the product stewardship scheme, and directly to industry organisations.

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<sup>10</sup> Accreditation of the scheme under the [Waste Minimisation Act 2008](#) was obtained in 2010 and renewed in 2017. Trust for the Destruction of Synthetic Refrigerants. *Protecting our environment from synthetic refrigerants*. Retrieved from <https://www.refrigerantrecovery.co.nz/> (21 October 2022).

<sup>11</sup> The Refrigerant License Trust Board was established in 2011 and operates under the name Refrigerant License New Zealand. <https://www.rlnz.org.nz/w/rl>

<sup>12</sup> *New Zealand Gazette*. 29 September 2020. [Corrigendum – Declaration of Priority Products Notice 2020](#).

<sup>13</sup> Under [section 5 of the Waste Minimisation Act 2008](#), “sale” is defined as “an offer for sale” and “distribution or delivery, whether or not for valuable consideration (including delivery to an agent for sale on consignment)”.

A regulated refrigerant scheme was co-designed by an industry working party that reported to the Government in 2020. Main elements include improved workplace competence assurance and widened coverage of other sectors using synthetic refrigerants (eg, automotive air conditioning and heat pumps). Proposed roles and responsibilities of key players is summarised in [appendix 2 \(table 6 and table 7\)](#).

Application for accreditation of a scheme based on the 2020 co-design and ability to meet the priority product accreditation criteria<sup>14</sup> is anticipated before the expiry of the current refrigerant scheme accreditation in August 2024.

If [section 22\(1\)\(a\) of the WMA](#) is not implemented:

- there would not be a 'level playing field' within the refrigerant supply chains because no party will be required to participate, and free-rider issues experienced by voluntary schemes would continue
- reduction in current rates of F-gas emissions would be unlikely.

#### Question 1

Do you agree in principle that a regulated framework should be introduced to ensure effective product stewardship for synthetic refrigerants?

If not, why not?

#### Question 2

Do you agree with the proposal to make it mandatory to sell a product only in accordance with an accredited scheme for synthetic refrigerants?

If not, why not?

#### Question 3

What would be the impacts on your business if your participation in the proposed schemes is required? Please provide details of anticipated costs, benefits and other impacts.

## Workforce competence

Most of Aotearoa New Zealand's F-gas emissions arise from leaks in improperly installed or maintained equipment or disposal of end-of-life equipment. This can occur because technicians and those who dismantle refrigerant equipment are legally able to work on refrigeration, heat pump or air-conditioning systems outside of their competence, and [OLPA](#) prohibition against discharge is difficult to monitor and enforce.<sup>15</sup> Further intervention is needed to prevent release of F-gases caused by people working outside of their level of competence.

Two areas of competence are essential for reducing risk of harm to the community and the environment from F-gases and their alternatives:

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<sup>14</sup> *New Zealand Gazette*. 29 July 2020. [General Guidelines for Product Stewardship Schemes for Priority Products Notice 2020](#).

<sup>15</sup> [Ozone Layer Protection Act 1996](#), section 13(f), section 14 and section 15(3). Leakage also occurs over time from appliances.

- best practice management of F-gases to reduce high risk of harm to people, property and the environment from climate change and damage to the ozone layer
- best practice management of flammable and toxic F-gas alternatives to reduce significant risk of harm to people and property.

Most refrigerant technicians over their career will encounter both types of gases and need to understand and follow best practice for each. Currently, the only certification required is the Approved Filler compliance certificate, which addresses just a small part of this.<sup>16</sup>

Work health and safety falls under different legislation and agency management than ozone layer protection and climate change mitigation.

MBIE's development of regulations covering licensing for handling F-gas alternatives in the areas of highest risk to people and property in commercial and industrial settings is well underway, following consultations in 2018 and 2020. The new regulations will require a licence to be held by all technicians doing work on industrial and commercial refrigeration, heating or air-conditioning systems that use hazardous refrigerants. However, the new HRWL Regulations will not cover many parts of the industry where risk of refrigerant leakage is currently high. The high-risk work licensing regime has certain exclusions, for example:

- commercial and industrial plant using F-gas, including farm milk vats and transport
- automotive air conditioning
- domestic heat pumps or appliances
- dismantling, wrecking or disposal of heating, ventilation, air-conditioning and refrigeration (HVAC&R) equipment, extraction of refrigerants for recycling, disposal or export.

It is estimated around 25,000 to 30,000 technicians work on equipment containing F-gases and other synthetic refrigerants in both stationary and mobile applications in Aotearoa New Zealand.

Of this group, around 7,000 are registered as Approved Fillers under the WorkSafe framework and so have basic entry-level skills. Another subgroup of technicians has received a mix of informal or equipment manufacturer-approved workplace training, New Zealand Qualifications Authority (NZQA) qualifications or certifications from overseas, which may or may not have been updated with recent industry developments in equipment and available gases.

This leaves most of the workforce – particularly those in the automotive air conditioning and heat pump sectors – considered by industry sources to have insufficient competence to reduce the risk of harm from working with equipment containing refrigerants.

## **Stewardship scheme competence recognition framework**

The industry co-design working party in 2020 recommended a framework to:

- create a licence regime run by the accredited refrigerant stewardship scheme for persons working with synthetic refrigerants and products that contain them
- create an 'umbrella licence' administered by industry to:

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<sup>16</sup> WorkSafe New Zealand. January 2018. *Certification of people: Approved fillers*. Retrieved from <https://www.worksafe.govt.nz/topic-and-industry/hazardous-substances/certification-authorisation-approvals-and-licensing/certification-of-people/approved-fillers/> (21 October 2022).

- capture both licensing of workers using hazardous refrigerants and stewardship scheme licences in all classes
- ensure transparency and engagement by all participants
- ensure no confusion for participants
- ensure no loopholes (all refrigerants covered)<sup>17</sup>
- require companies to join the scheme and ensure that only properly trained people work on HVAC&R equipment (see [appendix 2, table 6](#)).

It is anticipated the regulated stewardship scheme will phase in requirements for recognition of competence over time, in collaboration with industry sector leaders. It is anticipated the regulated stewardship scheme will, based on sector advice, recognise a mix of competence indicators, including NZQA qualifications, WorkSafe licences, OEM (original equipment manufacturer) certified training, overseas certifications, and other ‘records of prior learning’.

The voluntary scheme has recently commenced this process, with the launch of a Cool-Safe branding framework to identify stewardship scheme–recognised competence for individual technicians and scheme accreditation of refrigerant collection systems. Next steps are anticipated to include development of sector workforce competence frameworks in consultation with industry leaders, as outlined below.



- Establish a framework for recognition of prior learning, including the NZQA standards specified in the co-design report,<sup>18</sup> in collaboration with industry groups such as the Refrigerant License Trust Board, Institute of Refrigeration, Heating and Air Conditioning Engineers, and the Climate Control Companies Association.
- Phase in new competence frameworks for the automotive air-conditioning and heat pump sectors, in collaboration with industry groups such as the Motor Trade Association and Heat Pump Suppliers Association.
- Explore a competence framework for the HVAC&R equipment disposal and recycling sector, in collaboration with industry groups such as the Waste Management Institute of New Zealand, New Zealand Association of Metal Recyclers and the Motor Trade Association.
- Explore the inclusion of SF<sub>6</sub> in scheme frameworks, in consultation with the electricity generation and distribution sectors.<sup>19</sup>

## Complementary measures

To support this concept of using enforceable measures available under existing legislation, the Government proposes the following package.

- Require under the [WMA, section 23\(1\)\(g\) and \(h\)](#) that any person whose business disposes, degasses, decommissions, or recycles equipment that contains or is designed to use synthetic refrigerants must register with the accredited refrigerant stewardship

<sup>17</sup> Synthetic Refrigerant Stewardship Working Group. 2020. *Synthetic Refrigerant Stewardship Milestone 4: Report 2 – Training Overview Document*, p 9.

<sup>18</sup> This has been summarised in [table 8 in appendix 2](#).

<sup>19</sup> Sulphur hexafluoride has an extremely high global warming potential of 23,500, is part of the priority product declaration, and was recognised by the co-design working group as able to be included in the regulated scheme framework (see [Management of SF<sub>6</sub> in appendix 2](#)).



scheme and demonstrate that they and their employees have the appropriate level of qualifications recognised by that scheme for their work.

- Require under the [WMA, section 23\(1\)\(b\)](#) that any person whose business is or includes the sale of bulk or pre-charged synthetic refrigerants must register with the accredited refrigerant stewardship scheme and ensure their buyers of such goods are either companies registered with the accredited scheme or individuals with qualifications recognised by the accredited scheme.
- Set a new regulation under [OLPA, section 11](#) and [section 16](#) to require any person whose business is or includes the installation, servicing, modification, or dismantling of any equipment containing or designed to use any controlled substance that is a refrigerant, or the direct handling of these substances involving a possible risk of their release into the atmosphere, to register with the accredited refrigerant stewardship scheme and demonstrate that they and their employees have the appropriate level of qualifications recognised by that scheme for their work.

If these provisions are not implemented:

- no enforceable competence requirement will be in place for people who handle most F-gases and F-gas alternatives that are not in high-risk installations covered by the WorkSafe framework
- risks of environmental and human health harm from release of refrigerants will not be substantially reduced.

#### **Question 4**

Do you agree with the proposal to restrict sales of F-gases, in bulk, pre-charged units or products, to companies that are registered with an accredited scheme or an individual who can demonstrate appropriate competence recognised by an accredited scheme under section 23(1)(b) of the Waste Minimisation Act 2008?

If not, why not?

#### **Question 5**

Do you agree with the proposal to require businesses decommissioning, dismantling, disposing of or recycling equipment containing refrigerants or other synthetic greenhouse gases to register with an accredited refrigerant stewardship scheme and demonstrate appropriate competence recognised by the scheme under section 23(1)(g) and (h) of the Waste Minimisation Act 2008?

If not, why not?

### Question 6

Do you agree with the proposal to require businesses that install, service, modify or dismantle any equipment containing or designed to use any controlled substance that is a refrigerant, or the direct handling of these substances involving a possible risk of their release into the atmosphere, to:

- (a) register with the accredited refrigerant stewardship scheme and
  - (b) demonstrate that employees have the appropriate competence recognised by that scheme for their work,
- under a new regulation using section 11 and section 16 of the Ozone Layer Protection Act 1996?

If not, why not?

### Question 7

What would be the impacts on your business if registration with an accredited refrigerant stewardship scheme and appropriate competence assurance for technicians were required for the sale and management of F-gases?

Please provide details of anticipated costs, benefits and other impacts.

## Scheme funding

For a regulated product stewardship scheme to achieve greater benefits than a voluntary scheme, it must have sufficient resourcing to undertake improved programmes and services, as well as industry-wide participation.

Currently, the Refrigerant License Trust Board is funded by a voluntary levy on industry. The Recovery Trust has also, until recently, been funded by a voluntary levy on bulk imports and some modest liquidation of its NZ ETS credits held in trust for these activities. The co-designed scheme proposed a combination of NZ ETS credits and establishment of a new 'advance stewardship fee' ([appendix 2](#)).

This section looks at funding options potentially available for a future regulated product stewardship scheme for F-gases.

The [WMA](#) allows the setting of a fee under [section 23\(1\)\(d\)](#) to fund stewardship scheme services. Last year, consultation was undertaken for this option for the proposed tyre and large battery schemes.<sup>20</sup>

A fee is not a levy and must be used for specified cost-recovery for services. To use this as an option, clarity is required on the amount of the fee, what it will be spent on, and what entity will collect it. Such details are not yet confirmed for a regulated product stewardship scheme for F-gases.

In 2020 the co-design working party proposed a fee of \$1 per kilogram of F-gases brought into the market to fund a new regulated scheme. Application for accreditation for a regulated scheme and further discussion with industry are required to firm up details of fee amount and phase-in dates of funded services before a new fee regulation can be proposed for consultation.

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<sup>20</sup> Ministry for the Environment. 2021. *Proposed product stewardship regulations: Tyres and large batteries – consultation document*. Wellington: Ministry for the Environment.

## Emissions Trading Scheme removal credits

Since 2013, the Recovery Trust has collected NZ ETS 'other removals' credits in NZUs for HFCs and PFCs, which it has collected and exported for documented destruction in an Australian plasma arc plant.

For nearly 10 years, regulation 22 of the [Climate Change \(Other Removal Activities\) Regulations 2009](#) has enabled the Recovery Trust to have a monopoly on these NZU removal credits. Recent decisions on these Regulations mean that, from January 2023, such credits will be open to any party registered under the NZ ETS that meets the other requirements for removal activity.<sup>21</sup>

This opens an opportunity for market forces to increase the recovery of F-gases for export or destruction, and possibly incentivise F-gas recycling. However, without controls, this will not ensure that high-GWP gases are prevented from leaking to the atmosphere and contributing to climate change. The [Workforce competence](#) and [Leak prevention](#) sections of this chapter discuss control options.

To date, the NZUs received by the Recovery Trust have largely been reserved for future use to fulfil the objectives of the Trust. This has been in anticipation of the time when volumes of high-GWP legacy F-gases emerging for collection and destruction would not be able to be funded by NZUs earned on removal of high-GWP gases, because only lower-GWP gases would be entering the market.

In recent years, the market value of these NZUs has increased significantly. This has created an option for the Recovery Trust to fund baseline regulated scheme activities for several years if they are accredited as a regulated scheme.

Some industry representatives in the regulated scheme co-design process suggested that Synthetic Greenhouse Gas Levy funds should be used to fund an effective refrigerant stewardship scheme. Their argument was that, because they are already paying a levy to incentivise the reduction of harmful F-gases in the market, being levied again would be double charging.

Currently, the Synthetic Greenhouse Gas Levy funds go into the Government's Consolidated Fund and would not be available for this purpose without a change in legislation and/or policy.

If the reserved credits held by the Recovery Trust were used to return value to the industry and wider community through a regulated scheme, such perceived double charging could be avoided for a time. However, this would not be a long-term remedy for scheme funding, because the Recovery Trust will no longer have a monopoly on removal credit NZUs.

## New legislation

The [WMA](#) is being considered for review, which may in due course widen the funding options available for regulated product stewardship schemes.

To give timely effect to the Government's priority product decisions, we propose use of existing [WMA](#) powers until additional options are available under revised legislation. If this occurs in time for subsequent consultations on priority product regulations, adjustments can be made accordingly.

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<sup>21</sup> The decision to remove that provision takes effect on 1 January 2023.

### Question 8

Do you agree in principle that a regulated refrigerant scheme should be funded in the first years through New Zealand Units earned under the New Zealand Emissions Trading Scheme by the Trust for the Destruction of Synthetic Refrigerants while longer-term funding options are developed and consulted on?

If not, why not?

## Leak prevention

F-gas emissions are a result of leaking equipment or improper disposal. It is estimated that most of Aotearoa New Zealand's F-gas bulk imports are used to service equipment where refrigerant has been lost to leakage.<sup>22</sup> While it is an offence under [OLPA, section 13](#) to knowingly release specified F-gases to the atmosphere,<sup>23</sup> this provision is difficult to monitor and enforce, and further intervention is needed to prevent intentional release of F-gases.

People working on leaking equipment will need to obtain replacement refrigerants. The regulation proposed under the [WMA, section 23\(1\)\(b\)](#) (see [Workforce competence](#) above) would require businesses selling bulk or pre-charged F-gases to ensure their buyers are either companies registered with the accredited scheme or individuals with competence documentation recognised by the accredited scheme.

In addition to improving assurance of workplace competence on risks and prevention of leaks, an opportunity exists under the [WMA](#) to ensure this also extends to degassing of decommissioned equipment and reducing the risk of recycling F-gases into leaking equipment here or overseas.

Reducing leakage would have other benefits. As HFCs are phased down, existing equipment will become more difficult and costly to service. Such equipment has high capital costs, which make businesses reluctant to convert to alternatives. Preventing leaks will reduce servicing needs, extend service life and delay the cost of converting to low-GWP alternatives. Reducing leakage would also improve energy efficiency, because systems require more power when they do not have the correct charge of refrigerant.

The currently accredited voluntary refrigerant stewardship scheme has indicated interest in piloting a leak detection and management programme for large users (eg, systems containing refrigerants having a GWP of over 100 tonnes of CO<sub>2</sub>eq) as an interim measure.

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<sup>22</sup> This advice has come verbally from bulk importers and industry representatives.

<sup>23</sup> It is an offence under [section 13\(f\) of the Ozone Layer Protection Act 1996](#) if a person “knowingly or without lawful justification or excuse releases a controlled substance into the atmosphere while installing, operating, servicing, modifying, or dismantling any refrigeration or air-conditioning equipment or other heat-transfer medium; or installing, servicing, modifying, or dismantling any fire extinguisher”.

## Quality standards

To incentivise regular leak testing and elimination of refrigerant leakage, we propose a quality standard under the [WMA, section 23\(1\)\(g\) and \(h\)](#) to require any person whose business is or includes the degassing, decommissioning or dismantling of any equipment containing or designed to use controlled substances, or any representative of such persons, to:

- register with, and ensure their staff have qualifications recognised by, the accredited product stewardship scheme
- dispose of F-gases or other synthetic greenhouse gases only through high temperature incineration (eg, plasma arc plant) or other full denaturing
- provide documentation of this destruction to the accredited scheme, and to the Environmental Protection Authority if NZU credits are applied for.

### Question 9

Do you agree that any person whose business is or includes the decommissioning, dismantling or degassing of any equipment containing or designed to use controlled substances, or any representative of such persons, be required to ensure that disposal of F-gases or other synthetic greenhouse gases is through full destruction (eg, plasma arc plant) or recycled into plant with documented leak-testing and repair protocols, never by release to the air?

If not, why not?

### Question 10

Do you think that recycling of F-gases into other heating, ventilation, air conditioning and refrigeration applications (domestic use or exported) should be allowed under such a quality standard?

If so, what measures could ensure such gases are not leaked to the atmosphere from the new heating, ventilation, air conditioning and refrigeration applications?

### Question 11

Are there other quality standards you would suggest relating to reusing, recycling or recovering F-gases?

## Take-back service and targets

The inclusion of a regulated stewardship scheme in the emissions reduction plan was based on modelling for improved collection and destruction of F-gases and phase-in of a comprehensive industry licensing scheme to reduce risk of F-gas emissions from technicians working on systems outside of their competence.

One of the regulatory option packages considered included setting and enforcing service levels and targets for the accredited scheme ([appendix 1](#)). This was not selected, because data to underpin such outcome expectations are limited. Further detail may also be available when an application is received for accreditation of a regulated scheme. In the meantime, we seek views on appropriate take-back service levels and other targets through this consultation.

## Recovery and destruction of fluorinated gases

An application for accreditation of a product stewardship scheme is required to have:

- measurable waste minimisation, treatment or disposal objectives
- timeframes for meeting those objectives.

[Section 23\(1\)\(c\) of the WMA](#) allows regulation requiring a take-back service that meets specified requirements for the collected products. The guidelines for accreditation of priority product stewardship schemes set an expectation that the schemes will provide a free and convenient collection service, but the guidelines do not define ‘convenience’.

The co-design working party proposed that targets for recovery and destruction of F-gas refrigerants should be 25,000 kilograms in the first year (baseline) to 50,000 kilograms in year five. For the year ended 31 March 2020, the accredited voluntary scheme reported 37,417 kilograms of refrigerants collected and destroyed, compared with an annual scheme target for that year of 24,000 kilograms.

The inclusion of a regulated product stewardship scheme in the emissions reduction plan was based on projections of recovery and destruction of retired HFCs. These are expressed as recovery percentages of estimated available gases, rather than by weight. The range of model assumptions were:

- baseline – 11 per cent of total retired HFCs (estimated recovery by voluntary scheme)
- 2023–2029 – increase to 13–20 per cent of total retired HFCs
- 2030–2039 – increase to 20–30 per cent of total retired HFCs
- 2040 onwards – increase to 20–35 per cent of total retired HFCs.

## **Phase-in of a comprehensive workforce competence recognition framework**

The co-design working party saw increased competence in the workforce as essential to reduce risk from refrigerants being released by technicians working outside their areas of competence. The working party’s training recommendations were set out in a separate final report, including a compilation of relevant unit standards by sector (summarised in [table 8, appendix 2](#)).

Targets for a phase-in approach to establish a framework and individual sector coverage are likely to be proposed in an application for accreditation of a regulated refrigerant stewardship scheme.

## **Reporting on targets and take-back services**

Monitoring and enforcement abilities of MfE will be extremely limited if information is not shared. [Section 23\(1\)\(i\) of the WMA](#) allows regulation to require collection and provision of information to MfE on provision of take-back services and meeting targets.

If the requirements of [WMA, section 23\(1\)\(c\)](#) together with related [section 23\(1\)\(i\)](#) information requirements are not implemented, full scheme revocation under [WMA, section 18](#) is the only current enforcement tool available to MfE.

### Question 12

Do you agree in principle that a regulated refrigerant stewardship scheme should be required to meet and report on specified targets for:

- (a) recovery and destruction of high global warming potential refrigerants?
- (b) phase-in of a comprehensive workforce competence recognition framework?

If so, what levels should these targets be set at, and over what period?

If not, why not?

### Question 13

Are there other targets that you think a regulated refrigerant stewardship scheme should be required to meet and report on? Please specify.

## Compliance, monitoring and enforcement of regulations

The Ministry for the Environment would be responsible for enforcing the proposed regulations under the [WMA](#). Enforcement officers, appointed by the Secretary for the Environment, would enforce requirements made under regulations. The [WMA](#) allows for enforcement proceedings to do this, and infringement offences are not provided for.

Where alleged breaches of, or instances of non-compliance with, the proposed regulations are identified, various enforcement tools may be used to bring about positive behavioural change and deter future offences. Enforcement outcomes would be proportionate to the seriousness of the non-compliance, following an investigation process.

The accredited scheme would have a role in monitoring compliance with agreements by scheme participants. If participants do not comply with requirements, the scheme manager may escalate enforcement efforts to the Ministry for the Environment.

# Section 3: Prohibitions on the import of pre-charged equipment

## History of proposals

In advising the Government on meeting Aotearoa New Zealand's emissions budgets, the Climate Change Commission made recommendations on how F-gas emissions should be reduced. The Commission recommended that "measures to reduce HFCs should include expanding import restrictions where feasible".<sup>24</sup>

Initial options to address the Climate Change Commission's recommendations, proposed as part of public consultation on the first Emissions Reduction Plan, included:<sup>25</sup>

- expanding the import limits on bulk HFCs, to equipment containing HFCs
- prohibiting finished products containing HFCs (pre-charged equipment), where alternatives are available
- restricting the sale of HFCs used for servicing, where alternatives are available.

As a result of this initial industry and public feedback, these options were refined into two sets of prohibitions that were included as actions in the Emissions Reduction Plan:

- prohibiting imports of pre-charged equipment containing HFC refrigerants
- investigating prohibiting the sale and use of HFCs used for servicing.

In response to feedback received during the Emissions Reduction Plan consultation, we also included the regulated product stewardship scheme for refrigerants, and the licensing scheme to be implemented under the HRWL Regulations, as actions in the Emissions Reduction Plan. These actions are designed to support the transition away from high-GWP refrigerants, in recognition of concerns raised about health and safety around natural refrigerants and the disposal of F-gases.

Since the release of the emissions reduction plan, we have engaged further with industry groups and interested parties, which have provided valuable insight into how these actions may affect the consumption of HFCs in Aotearoa New Zealand. These conversations have informed the current proposals in this document.

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<sup>24</sup> Climate Change Commission. 2021. *Ināia tonu nei: A low emissions future for Aotearoa*, p 301. Wellington: Climate Change Commission.

<sup>25</sup> Ministry for the Environment. 2021. *Te hau mārohi ki anamata | Transitioning to a low-emissions and climate-resilient future: Have your say and shape the emissions reduction plan*. Wellington: Ministry for the Environment.



## Why we need import prohibitions

An import prohibition on pre-charged equipment was initially proposed, because we observed that certain types of equipment containing HFCs continued to be imported even when low-GWP alternatives were available. This suggested that current government interventions (as outlined in [section 1](#)) and the global phase-down of HFCs are not enough to motivate a transition. If we allow continued imports of high-GWP alternatives out of pace with the global phase-down, the risk is that Aotearoa New Zealand could become a dumping ground for outdated equipment not accepted elsewhere due to the international phase-down of HFCs.

A prohibition on the import and sale of pre-charged equipment will ensure the use of high-GWP refrigerants does not continue once alternatives are available. It will also avoid the need for people to immediately transition to lower-GWP alternatives.

By imposing a prohibition on import and sale (as opposed to a prohibition on use), older systems will continue to be able to be serviced by bulk HFCs. For many consumers, air-conditioning and refrigeration equipment are a large investment, and being forced to transition to low-GWP systems before their current systems need replacing would be a considerable financial burden. A prohibition on import and sale allows for a transitional period, which means older systems can continue to be used, avoiding this financial burden.

Another important aspect of the prohibitions is that they need to be introduced when alternatives are available. Aotearoa New Zealand is a relatively small refrigerant market and is subject to Australasian and international supply and demand. The Aotearoa New Zealand market has a small influence over international supply, so prohibitions must be timed in such a way that enable and support a transition, rather than jeopardising any essential industries.

The timing of these prohibitions is also important to help to mitigate the risk of untrained or unlicensed operators carrying out work with hazardous refrigerants.

## How the prohibitions would work

After specified dates, limits will be imposed on the GWP of refrigerant that can be contained within specified classes of goods. If people try to import or sell prohibited items, those goods may be subject to confiscation, and importers may be fined.

## Prohibitions timeline

[Table 3](#) sets out our current proposed timelines. The first column shows the various classes of goods that will be covered. Subsequent columns show the GWP limit that will be imposed for each specified type of good from the date at the top of the column. Goods listed in the first column will not be able to be imported after the dates at the top of the second, third and fourth columns if they contain refrigerants with GWPs higher than the value specified in the body of the table.

**Table 3: Current proposed timeline for import and sale prohibitions**

Type of good	Date of prohibition and upper global warming potential limit		
	From 1 January 2025	From 1 January 2028	From 1 January 2032
Household refrigerators and dehumidifiers	150	–	–
Household and small commercial air conditioning, heat pumps and air conditioners	750	150	–
Household and small commercial water-heating heat pumps	150	–	–
Vehicle air conditioning (excluding trains and buses)	150 (for new vehicles)	150 (for used vehicles)	–
Passenger vehicle air conditioning (eg, trains and buses)	750 (for new vehicles)	–	150 (new and used vehicles)
Heavy commercial and industrial air conditioning (eg, office buildings and retail, including variable refrigerant flow systems)	750	–	150
Commercial refrigeration (eg, food retail, supermarkets and self-contained cabinets)	–	150	–
Commercial refrigeration (eg, less than 40 kilowatt rated capacity excluding food retail and applications below –50 degrees Celsius)	1,500	750	–
Transport refrigeration (eg, refrigerated trucks, shipping containers, fishing boats and reefer vessels)	–	1500	750
Industrial refrigeration (eg, stationary refrigerant systems with rated capacity of more than 40 kilowatts excluding applications below –50 degrees Celsius)	2,500	150	–

During consultation on the content of the emissions reduction plan, a similar schedule for prohibitions was provided, based on external expertise. To form the currently proposed timeline seen in [table 3](#), we have taken the previously released schedule and considered several factors, outlined below.

### Legislative processes

Before regulations can come into force, we need to develop a robust and effective mechanism for monitoring and enforcing compliance. This will mainly be informed by the needs of the relevant enforcement agencies, but will also be contingent on the feedback and outcomes from this consultation. Regardless of the final regulatory mechanisms used, the process of developing this takes time, which we have factored in when considering potential prohibition dates.

Several international trade requirements must also be considered. Many have time-sensitive obligations to notify the World Trade Organization. They also require justification and review, and the time associated with this also needs to be factored in.

## **Impacts of other government policies**

We are conscious that existing and planned policies (discussed in [section 1](#)) will affect the refrigerant market and need to be considered and aligned with our prohibitions. Those of most relevance are the new high-risk work licensing regime (under the HRWL Regulations) for refrigerant technicians and the refrigerant product stewardship scheme.

The high-risk work licensing regime for refrigerant technicians will target commercial and industrial applications of hazardous alternative refrigerants. We have made sure these areas will still be able to use non-flammable refrigerants before the Regulations take effect. This avoids creating demand for hazardous refrigerants before technicians have been trained and licensed.

Prohibitions are best placed to occur in line with the increasing capacity of a refrigerant product stewardship scheme. We must have appropriate tools to manage HFC refrigerants when they are no longer needed. Without having appropriate destruction options available, the sizable amount of HFC refrigerant currently in use would mostly be emitted to the atmosphere, increasing emissions, when the aim is the opposite.

## **Needs of industry and consumers**

We must consider that these prohibitions will have big implications for importers and distributors. These businesses will require time between regulations coming into force and prohibitions being active, to adjust their orders and processes.

## **Provide your input on the timeline**

Our goal is to implement these prohibitions on a timeline that allows us to address the environmental harm of F-gases, while also avoiding any unnecessary impacts on industry. We are now seeking your input into this timeline, to check it is viable.

### **Question 14**

Do you think the dates and global warming potential limits in the proposed timeline are feasible and what changes, if any, would you make to the proposed prohibition timeline?

### **Question 15**

Are any categories missing from the timeline that should be included?

## **Products containing ozone-depleting refrigerants**

The previous generation of ozone-depleting refrigerants was phased out by the Montreal Protocol in the 1990s. In Aotearoa New Zealand, specific products containing HCFCs and CFCs were banned under [OLPA](#), but products containing these substances were never prohibited.

If imported, these goods would be difficult to service, because the industry has already moved away from this technology. However, this is currently still an option for importers.

Introducing a prohibition on the import and sale of products containing HFC refrigerants also provides the opportunity to create regulations prohibiting the import and sale of goods containing ozone-depleting refrigerants as well.

#### Question 16

Do you think a ban on importing goods containing ozone-depleting refrigerants will have an impact on any current activities in Aotearoa New Zealand?

## Legislative considerations

### Ozone Layer Protection Act 1996

We have determined that [OLPA](#) is the appropriate legislative mechanism by which to establish the proposed import and sale prohibition. This Act allows for the creation of regulations that put controls on ozone-depleting and controlled substances.

Hydrofluorocarbons are currently regulated as controlled substances under [OLPA](#) through the permitting scheme for imports of bulk HFCs. A list of the HFCs currently regulated under this Act can be found in [appendix 3](#).

The [OLPA](#) allows for the creation of regulations that:

- prohibit the import, export, manufacture, sale or use of a controlled substance
- impose permitting schemes for the import or export of controlled substances
- require people handling controlled substances to be appropriately accredited
- establish offences related to the mishandling of controlled substances.

These provisions provide us with tools that can be used to implement the proposed prohibitions or related policies.

#### Question 17

What penalties should exist related to the import of pre-charged equipment (eg, fines, seizure of goods)?

### Other considerations

A prohibition on import and sale would affect international trade, and several obligations need to be considered, such as the Trans-Tasman Mutual Recognition Agreement and the Technical Barriers to Trade Agreement. The Ministry for the Environment is working with the Ministry of Foreign Affairs and Trade to navigate these issues.

Other regulations in Aotearoa New Zealand also apply to equipment covered by this prohibition. Equipment will still need to meet minimum energy performance standards requirements and any requirements of the [Electrical \(Safety\) Regulations 2010](#). A phase-down of high-GWP refrigerants in vehicles will also complement the Ministry of Transport's work to reduce vehicle emissions.

# Section 4: Have your say

The Government welcomes your feedback on this discussion document. The questions posed throughout this document can also be found on our website. These questions should also be used as a guide, and all comments are welcome. You do not have to answer all the questions.

To ensure your point of view is clearly understood, please explain your rationale and provide supporting evidence where possible.

## Timeframes

This consultation starts on 8 November 2022 and ends on 18 December 2022.

When the consultation period has ended, officials will analyse submissions and provide advice to the Government on the proposed policies that are discussed in this document.

## How to provide feedback

You can make a submission in two ways:

- via Citizen Space, our consultation hub, available at <https://consult.environment.govt.nz/>
- write your own submission.

We request that you do not email or post submissions, because this makes analysis more difficult. However, if you need to, please send written submissions to Hazardous Substances Policy, Ministry for the Environment, PO Box 10362, Wellington 6143 and include:

- your name or organisation
- your postal address
- your telephone number
- your email address.

If you are emailing your feedback, please send it to [FGas@mfe.govt.nz](mailto:FGas@mfe.govt.nz) as a:

- PDF, or
- Microsoft Word document (2003 or later version).

Submissions close at 11.59 pm on 18 December 2022.

## Publishing and releasing submissions

All or part of any written submission (including names of submitters) may be published on the Ministry for the Environment's website, [environment.govt.nz](http://environment.govt.nz). Unless you clearly specify otherwise in your submission, the Ministry will consider that you have consented to website posting of both your submission and your name.

Contents of submissions may be released to the public under the [Official Information Act 1982](#) following requests to the Ministry for the Environment (including via email). Please advise if

you have any objection to the release of any information contained in a submission and, in particular, which part(s) you consider should be withheld, together with the reason(s) for withholding the information. We will take into account all such objections when responding to requests for copies of, and information on, submissions to this document under the Official Information Act 1982.

The [Privacy Act 2020](#) applies certain principles about the collection, use and disclosure of information about individuals by various agencies, including the Ministry for the Environment. It governs access by individuals to information about themselves held by agencies. Please clearly indicate in your submission if you do not wish your name to be included in any summary of submissions that the Ministry for the Environment may publish.

# Glossary

Term	Description
ASF	Advance stewardship fee
CFC	Chlorofluorocarbon
CO <sub>2</sub> eq	Carbon dioxide equivalent
EPA	Environmental Protection Authority
F-gas	Fluorinated gas
GWP	Global warming potential
HCFC	Hydrochlorofluorocarbon
HFC	Hydrofluorocarbon
HFO	Hydrofluoroolefin
HRWL Regulations	Health and Safety at Work (High Risk Work Licenses) Regulations
HVAC&R	Heating, ventilation, air conditioning and refrigeration
MBIE	Ministry of Business, Innovation and Employment
MfE	Ministry for the Environment
NF <sub>3</sub>	Nitrogen trifluoride
NZ ETS	New Zealand Emissions Trading Scheme
NZQA	New Zealand Qualifications Authority
NZU	New Zealand Units
OLPA	Ozone Layer Protection Act 1996
PFC	Perfluorocarbon
PSO	Product stewardship organisation
Recovery Trust	Trust for the Destruction of Synthetic Refrigerants
SF <sub>6</sub>	Sulphur hexafluoride
WMA	Waste Minimisation Act 2008

# Appendix 1: Assessment of regulatory options – mandatory product stewardship

Section 22 and section 23 of the [Waste Minimisation Act 2008](#) and section 11 and section 16 of the [Ozone Layer Protection Act 1996](#) contain powers to create regulations to support effective delivery of a mandated refrigerant product stewardship scheme. The two regulation package options considered in the regulatory impact assessment are summarised in [table 4](#).

**Table 4: Regulation options assessed**

<b>Option 1</b>	Basic foundation (participation, workforce competence and quality standards)
<b>Option 2</b>	Basic foundation plus outcome-setting by regulation

<b>Proposed regulations</b>	Sale in accordance with accredited scheme	Workforce competence evidence required to work with equipment containing or designed to use refrigerants, or to purchase bulk or pre-charged refrigerants		Quality standard for end-of-life management of refrigerants plus reporting	Take-back service and targets required for accredited scheme
	WMA s22(1)(a)	OLPA s11 and s16	WMA s23(1)(b)	WMA s23(1)(g) and (h)	WMA s23(1)(c) and (i)
<b>Problem being addressed</b>	Limited effect of voluntary schemes	Leakage of F-gases (risk of harm to environment) Leakage of F-gas alternatives in areas not covered by proposed Health and Safety at Work (High Risk Work Licenses) Regulations (risk of harm to people or property)			Low rates of gas recovery and destruction, and improved workplace competence
<b>Persons or entities covered</b>	People whose business sells or distributes F-gases or products containing them	People whose business installs, services, modifies or dismantles any equipment containing or designed to use any controlled substance that is a refrigerant	People whose business sells bulk or pre-charged F-gases	People whose business disposes, degasses, decommissions, recycles or wrecks equipment that contains or is designed to use F-gases	The owner of the accredited scheme
<b>Description</b>	The priority product may only be sold or distributed in accordance with the accredited scheme	These businesses will need to register with, and ensure their staff have qualifications recognised by, the accredited refrigerant stewardship scheme	These businesses will need to register with the accredited refrigerant stewardship scheme and ensure buyers of these goods are either companies	<ul style="list-style-type: none"> <li>Disposal of F-gases or other synthetic greenhouse gas only permitted through complete denaturing (eg, plasma arc plant)</li> <li>These businesses will need to register with, and</li> </ul>	Take-back service targets and standards would be set for collection and destruction of F-gases, and targets and standards set for establishment of a workforce competence recognition framework



Enforcement			registered with, or individuals with, qualifications recognised by the accredited scheme	ensure their staff have qualifications recognised by, the accredited product stewardship scheme	
	On business owners, by MfE	On business owners, by EPA or MfE	On business owners, by MfE	On business owners, by MfE	On PSO, by MfE

Note: EPA = Environmental Protection Authority; MfE = Ministry for the Environment; OLPA = Ozone Layer Protection Act 1996; PSO = product stewardship organisation; WMA = Waste Minimisation Act 2008.

# Appendix 2: Summary of proposed product stewardship scheme for refrigerants

## Overview

The Refrigerant Recovery scheme, operated by the Trust for the Recovery and Destruction of Synthetic Refrigerants, collects and destroys high-global warming potential (GWP) refrigerants using a voluntary levy on bulk importers of refrigerants. It has been an accredited scheme under the [Waste Management Act 2008](#) since 2010.

Like all voluntary accredited schemes in Aotearoa New Zealand, this scheme has experienced issues with free-riders on scheme funding and limited participation, which has constrained its ability to meet sponsoring industry aspirations.

To address this, a co-design process with industry stakeholders was commenced in 2019 to develop a regulated scheme design, which was co-funded by the Waste Minimisation Fund. Representatives from several synthetic refrigerant sectors were involved ([table 5](#)).<sup>26</sup>

**Table 5: Co-design working party membership – product stewardship scheme for regulated refrigerants**

Sector	Entities represented
Commercial/industrial heating, ventilation, air conditioning and refrigeration	Institute of Refrigeration, Heating and Air Conditioning Engineers
	Climate Control Companies Association New Zealand
Automotive air conditioning	Automotive Parts Industry Association
	Imported Motor Vehicle Industry Association Incorporated
Heat pump installers	Heat Pump Suppliers Association
Technician training	Refrigerant License Trust Board operating as Refrigerant License New Zealand
Bulk refrigerant importers	Chemiplas NZ

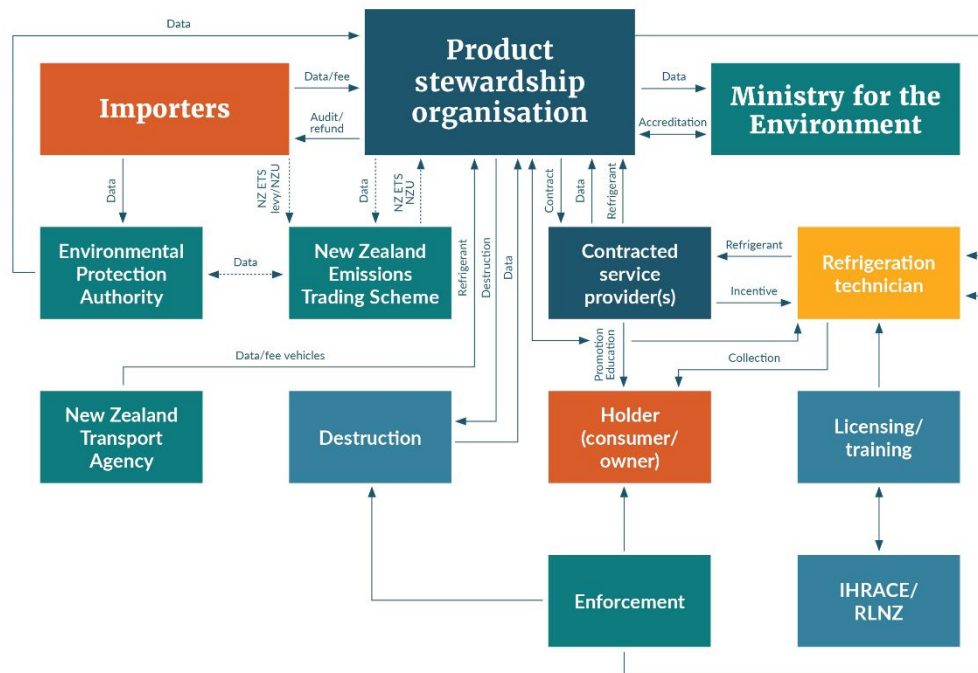
The working party's final report was provided to the Government in May 2020. The current voluntary scheme's accreditation runs until August 2024. To move to a regulated scheme for refrigerants, an application for a new scheme design will need to be received that meets the requirements for priority product scheme accreditation, be accredited by the Minister for the Environment, and have suitable regulations put in place to support the scheme operation.

<sup>26</sup> Details of the individuals who held these roles on the working group and the independent facilitator of the process can be found in the working group's final report. Synthetic Refrigerant Stewardship Working Group. 2020. *Milestone 4: Report 1 – Guiding principles for preferred industry stewardship solution*.

## Indicative regulated scheme design

The working party considered various options and proposed a scheme design it felt would best deliver effective and efficient product stewardship for refrigerants in Aotearoa New Zealand. The working party proposed a single product stewardship organisation (PSO) contracting out service delivery functions (figure 1).

Figure 1: Structure proposed for co-design working group for refrigerant product stewardship



Note: NZ ETS = New Zealand Emissions Trading Scheme; IHRACE = Institute of Refrigeration, Heating and Air Conditioning Engineers; NZU = New Zealand Unit; RLNZ = Refrigerant License New Zealand.

This proposal reflects the situation in 2020. One aspect that has changed is that as of January 2023 ETS NZU will also be available to other parties registered with the EPA for export or destruction of gases, not just the accredited PSO. While the development of Refrigerant Recovery and its application for re-accreditation are expected to follow this design in many respects, details cannot be confirmed until regulations are in place, the application has been received, and re-accreditation granted.

## Governance

The co-design working group recommended that the governance structure of the PSO should comprise six to eight members, with one representative from each of the following stakeholders:

- Large-scale holders and/or customers
- refrigeration sector and/or suppliers
- pre-charged suppliers
- automotive air conditioning
- installation and service contractors
- refrigeration industry associations

- an independent professional chair with no conflicts and/or interests, with experience in business administration or environmental management.

The recommendations for board members included a maximum term of three years, ability to re-stand for selection, not serving more than three consecutive terms, staggered terms to ensure continuity and retention of institutional knowledge, and payment for services albeit not exorbitant.

The recommended range of skills among the members included experience in governance, operational and contract management, financial management, industry-specific technical skills, logistics, communications, and health, safety and environment management.

## Scheme funding

To fund the scheme, the working group recommended a mix of advance stewardship fees (ASFs) based on the costs of collection, destruction and management of the scheme, and New Zealand Emissions Trading Scheme (NZ ETS) credit units received from destruction of refrigerants.

The working group proposed an indicative ASF rate of \$1 per kilo through a variety of ASF-collection mechanisms.

- Bulk refrigerants and pre-charged equipment: importers declare amounts to PSO, which will invoice them later. Declaration to PSO of exports would enable a refund for those.
- On-road motor vehicles: collected by New Zealand Transport Agency at point of registration.
- Off-road motor vehicles: whether and how to cover these to be identified by PSO later.

## Targets

The proposed refrigerant collection target was 25,000 kilograms in the first year, rising progressively to 50,000 kilograms in year five.

## Roles and responsibilities

The co-design working group identified the following ‘classes of persons’ as participants of the proposed scheme (table 6).

**Table 6: Classes of persons likely to engage with the accredited scheme for refrigerants**

Producers and importers	
Bulk refrigerant importers	Importers of refrigerants that are in single containers and not contained within refrigeration equipment
Pre-charged equipment importers	Importers of new and used equipment that contains refrigerants
Vehicle importers	Importers of new and used motor vehicles as detailed in the <a href="#">Land Transport Act 1998</a> and that contain refrigerants
Equipment manufacturers	Those that produce refrigeration equipment within Aotearoa New Zealand and charge it with refrigerants for sale within the country and/or overseas
Others working with synthetic refrigerants	
Refrigeration technicians and engineers	Trained and qualified technician or engineer who installs, services and removes synthetic refrigerants and/or equipment containing them
Industry associations	Organisations that represent professionals working in the refrigeration sector and provide services such as training and education

Traders and suppliers	People who purchase or export bulk refrigerants or equipment containing these gases
Automotive technicians	A vehicle technician who services vehicle air-conditioning units
Automotive dismantlers	A business that breaks vehicles down into parts for resale, recycling or recovery
Scrap metal merchants	A business that processes vehicles and/or equipment containing refrigerants to sell the metal component parts
Collectors	Collects refrigerants from others
Collection sites	A place where refrigeration technicians and engineers can drop off unwanted refrigerants
Transfer stations and landfills	A site for the temporary deposition, processing or storage of waste materials or disposal

The working party also identified as essential to scheme success:

- the Ministry for the Environment in relation to accreditation, monitoring and enforcement
- other government agencies (eg, New Zealand Customs Service and New Zealand Transport Agency for potential collection of the ASF).

Roles and responsibilities were identified for key participants. These give an indication of what “sale in accordance with an accredited scheme” could mean under a regulated scheme (table 8).

**Table 7: Roles and responsibilities of main scheme participants**

Key participants	Roles and responsibilities
Wholesalers and retailers of bulk synthetic refrigerants	<ul style="list-style-type: none"> <li>• Be a member of the scheme and operate in accordance with its requirements</li> <li>• Maintain records and provide data to the product stewardship organisation (PSO) on the type and quantity of unused bulk refrigerants they have imported and exported</li> <li>• Pay the advance stewardship fee(s) (ASF(s)) set by the PSO</li> <li>• Only sell bulk synthetic refrigerants to a company that is a member of the scheme, or to an individual who can safely demonstrate appropriate training, qualifications and registration</li> <li>• Only dispose of unwanted synthetic refrigerants through the scheme</li> </ul>
Wholesalers and retailers of pre-charged synthetic refrigerant-containing equipment	<ul style="list-style-type: none"> <li>• Be a member of the scheme and operate in accordance with its requirements</li> <li>• Maintain records and provide data to the PSO on the type and quantity of unused bulk refrigerants they have imported and exported</li> <li>• Pay the ASF(s) set by the PSO</li> <li>• Only sell (within Aotearoa New Zealand) split systems that require wiring and pipework installation to: <ul style="list-style-type: none"> <li>– a company that is a member of the scheme</li> <li>– an individual who can safely demonstrate appropriate training, qualifications and registration</li> <li>– an individual who is not appropriately licensed where the wholesaler or retailer is undertaking the installation themselves using an individual who can safely demonstrate appropriate training, qualifications and registration</li> <li>– an individual or company where they have contracted a third party to undertake the installation, who can safely demonstrate appropriate training, qualifications and registration</li> </ul> </li> <li>• Only dispose of unwanted synthetic refrigerants through the scheme</li> </ul>

Key participants	Roles and responsibilities
Manufacturers of synthetic refrigerant-containing equipment	<ul style="list-style-type: none"> <li>• Be a member of the scheme and operate in accordance with its requirements</li> <li>• Maintain records and provide data to the PSO on the type and quantity of unused bulk refrigerants they have imported and exported</li> <li>• Pay the ASF(s) set by the PSO</li> <li>• Only sell (within Aotearoa New Zealand) synthetic refrigerant-containing systems that require on-site installation of wiring and interconnecting pipework to: <ul style="list-style-type: none"> <li>– a company that is a member of the scheme</li> <li>– an individual who can safely demonstrate appropriate training, qualifications and registration</li> <li>– an individual who is not appropriately licensed where the wholesaler or retailer is undertaking the installation themselves using an individual who can safely demonstrate appropriate training, qualifications and registration</li> <li>– an individual or company where they have contracted a third party to undertake the installation, who can safely demonstrate appropriate training, qualifications and registration</li> </ul> </li> <li>• Only dispose of unwanted synthetic refrigerants through the scheme</li> </ul>
Installers of synthetic refrigerant-containing equipment	<ul style="list-style-type: none"> <li>• Be a member of the scheme and operate in accordance with its requirements</li> <li>• Pay the appropriate registration fee(s) (if any) set by the PSO</li> <li>• Maintain records of synthetic refrigerant-containing equipment installed, including all the details requested by the PSO</li> <li>• Only sell (within Aotearoa New Zealand) synthetic refrigerant-containing systems that require on-site installation of wiring and interconnecting pipework, where they are undertaking the installation themselves using an individual who can safely demonstrate appropriate training, qualifications and registration</li> <li>• Only use appropriately licensed individuals to install, service and decommission split systems or other synthetic refrigerant-containing equipment that require wiring and pipework installation</li> <li>• Only dispose of unwanted synthetic refrigerants through the scheme</li> </ul>

Responsibilities of the product stewardship scheme would include:

- collecting data from producers about net imports of refrigerants
- setting and collecting an ASF from sellers of refrigerants or equipment containing them
- ensuring personnel collecting and managing refrigerants can safely demonstrate appropriate training, qualifications and registration
- accepting refrigerants only from third parties who are registered participants of the scheme or individuals who can safely demonstrate appropriate training, qualifications and registration
- incentivising participation to maximise the collection of refrigerants, including potential financial incentives
- reporting at least annually on the amount of refrigerants destroyed
- continuing to destroy all refrigerants collected until most consist of low-GWP refrigerants.

## Workplace competence

The primary focus of the accredited Refrigerant Recovery scheme is recovery and destruction of high-GWP refrigerants. The proposed regulated scheme design would add equal emphasis to training and competence certification of technicians.

The co-design working party saw a required training regime as essential to addressing the problem that most imported bulk refrigerants are to replace gases lost to the atmosphere by technicians working outside their areas of competence. The working group's training recommendations were set out in a separate final report.<sup>27</sup>

They considered that the heating, ventilation, air-conditioning and refrigeration industry subject-matter experts would need to be closely involved (and preferably running) the licensing regime. Because licensing and accreditation and the stewardship scheme would require different skillsets to administer, the co-design working group proposed a separate licensing board under the PSO. The roles of this board would include:

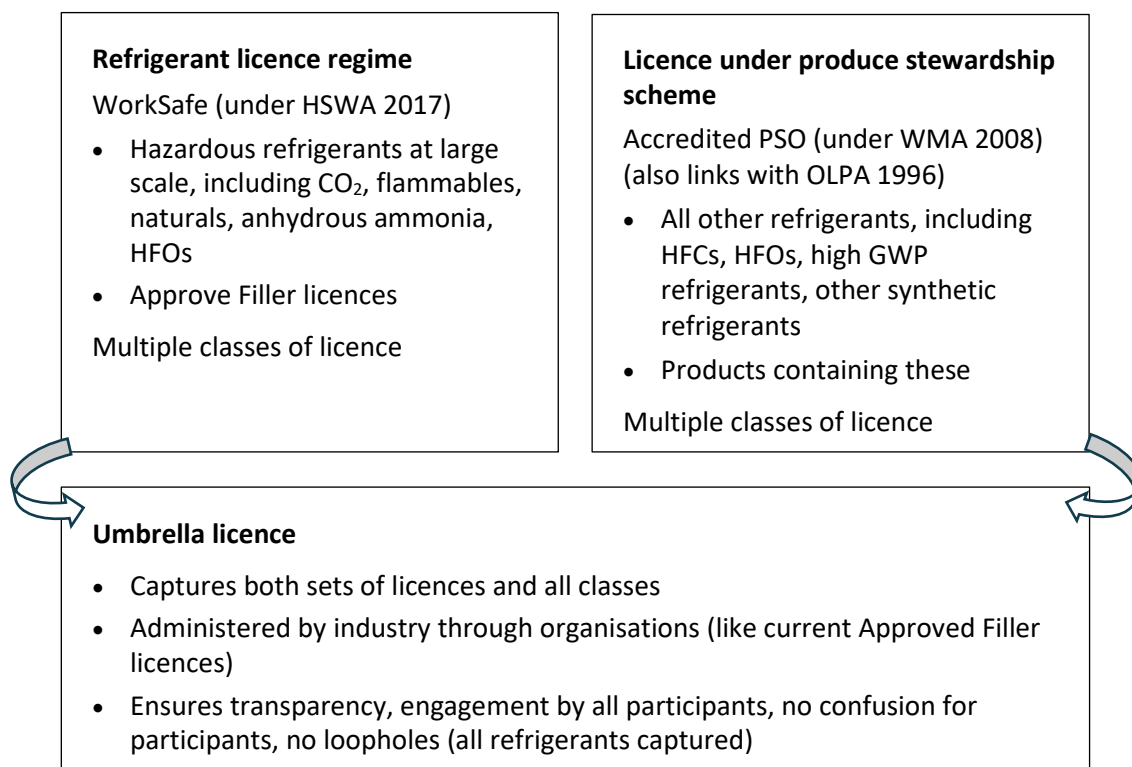
- managing accreditation activities for the PSO
- licensing technicians based on proof of competence and wider assessment criteria
- maintaining a register of licensed technicians
- investigating and adjudicating on complaints
- reviewing and managing licence renewals.

The co-design working group was concerned that training was not covered by the proposed Health and Safety at Work (High Risk Work Licenses) Regulations framework, and that the potential existed for creating loopholes, confusion and extra costs. To mitigate this, they proposed an 'umbrella' licence provided by industry to bring together hazardous refrigerant and PSO training and certification ([figure 2](#)).

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<sup>27</sup> Synthetic Refrigerant Stewardship Working Group. 2020. [Milestone 4: Report 2 – Training Overview Document](#).

Figure 2: Proposed 'umbrella licence' concept to link all refrigerant competence recognition<sup>28</sup>



Note: CO<sub>2</sub> = carbon dioxide; GWP = global warming potential; HFCs = hydrofluorocarbons; HFOs = hydrofluoroolefins; HSWA 2017 = Health and Safety at Work Act 2017 ; OLPA 1996 = Ozone Layer Protection Act 1996; PSO = product stewardship organisation; WMA 2008 = Waste Minimisation Act 2008.

This included a detailed matrix using existing unit standards to cover six categories of activity: automotive, appliance servicing, building services installation, air-conditioning installation, trade assistant, and commercial/industrial refrigeration and air conditioning. This is summarised in [table 8](#) on the next page.

The proposed licence period was for five years.

## Management of sulphur hexafluoride

Sulphur hexafluoride (SF<sub>6</sub>) has a high GWP and was declared a priority product in the category of refrigerants and other synthetic greenhouse gases in July 2020. The co-design working group did not include it in the scope of the proposed scheme. The working group instead proposed that SF<sub>6</sub> could be included in the scheme in future, subject to engagement with the electricity generation and distribution sectors, because the PSO may be the most appropriate body to handle collection and destruction of the gas.

<sup>28</sup> Adapted from *Possible structure to accommodate and administer two licensing organisations*. Above n 27, p 9. Note that 'licences' are not enabled under the [Waste Minimisation Act 2008](#) or the [Ozone Layer Protection Act 1996](#).



**Table 8: Recommended product stewardship scheme training matrix from co-design working party**

Industry sector	Automotive	Appliance servicing technician	Trade assistant	Building services installer	Air-conditioning installer	Commercial/industrial refrigeration and air conditioning	
<b>Licence classes</b>	Class 1, 2, 3	Class 1	Class 1	Class 3	Class 3	Class 4	
Synthetic refrigerants and hydrofluorolefins	<b>Title</b>	National Certificate in Motor Industry	New Zealand Certificate in Electrical Engineering	New Zealand Certificate in Refrigeration and Air Conditioning (Trade Assistant)	New Zealand Certificate in Mechanical Building Services (Trade)	New Zealand Certificate in Air-Conditioning Installation ( <i>Proposed course with New Zealand Qualifications Authority for approval</i> )	New Zealand Certificate in Refrigeration and Air-Conditioning (Trade)
	<b>Qualification</b>	<ul style="list-style-type: none"> <li>• Class 1 Automotive Licence</li> <li>• Class 2 Automotive Licence</li> <li>• Class 3 Automotive Dismantler and Collision Repair Licence</li> </ul>	<ul style="list-style-type: none"> <li>• Level 3 Pre-trade Appliance Servicing specific unit standards + Approved Filler</li> </ul>	<ul style="list-style-type: none"> <li>• Level 3 Pre-trade</li> </ul>	<ul style="list-style-type: none"> <li>• Four-year Apprenticeship in development + Approved Filler</li> </ul>	<ul style="list-style-type: none"> <li>• Two-year Apprenticeship</li> <li>No electrical</li> <li>Installation-focused apprenticeships (ie, more on job) + Approved Filler</li> </ul>	<ul style="list-style-type: none"> <li>• Level 4 Refrigeration and air-conditioning + including Approved Filler + Flammable Awareness</li> <li>Service-focused</li> <li>Technical</li> </ul>
	<b>Unit standards current</b>	981, 3397, 19666, 24443, 24444, 24445, 24446, 24447, 24448, 24449, 24451, 24452, 28950, 28952, 29563, 29577, 30565, 31124, 31127	19666, 28952, 28950, 29563	19666, 29563	19666, 26336, 28952, 29563, 28950, 23959, 29563, 22707, 31142	31142, 22441, 23959, 22707, 28950, 28959, 19666, 28952, 29563	3846, 3851, 3874, 19666, 28952, 28970, 28959, 28960, 28965, 28963, 23959, 28950, 28953, , 28956, 29563
	<b>For review</b>		Leak testing – 28953 Jointing – 2679, 23959				
General	<b>Permitted activity</b>	Able to install, service and repair or dismantle automotive air-conditioning systems.	Able to service appliances containing refrigerants. Only includes systems not permanently connected to the build power supply.	To handle a refrigerant while undertaking training and/or assessment in a classroom setting and at a workplace under	To handle a refrigerant while undertaking training and/or assessment in a classroom setting and at a workplace under	Able to purchase, install and decommission air-conditioning <i>plant and</i>	Able to purchase, service, install and de-commission air-conditioning and refrigeration equipment.

Industry sector	Automotive	Appliance servicing technician	Trade assistant	Building services installer	Air-conditioning installer	Commercial/industrial refrigeration and air conditioning
	<p>Able to purchase refrigerants.</p> <p>Able to recover refrigerants.</p>	<p>Able to purchase refrigerants.</p> <p>Able to recover refrigerants.</p>	<p>supervision. The supervisor must be the holder of a licence that entitles them to engage in work for which the licensee is being trained.</p>	<p>supervision. The supervisor must be the holder of a licence that entitles them to engage in work for which the licensee is being trained.</p>	<p><i>equipment up to 50 kilowatts.</i></p> <p>Able to purchase <i>non-hazardous</i> refrigerants.</p> <p>Able to recover refrigerants.</p>	<p>Able to purchase all refrigerants.</p> <p>Able to recover refrigerants.</p>
<b>Renewal</b>	5 years	5 years	5 years	5 years	5 years	5 years
<b>Notes</b>	<p>Unit standards listed, relevant to technicians working with refrigerants only</p> <p>Current unit standards to be added are those that cover flammable and refrigerant management.</p>					

# Appendix 3: List of hydrofluorocarbons currently regulated by the Ozone Layer Protection Regulations 1996

**Table 9: List of hydrofluorocarbons currently regulated by the Ozone Layer Protection Regulations 1996**

Substance	Molecular formula	100-year global warming potential
HFC-134	CHF <sub>2</sub> CHF <sub>2</sub>	1,100
HFC-134a	CH <sub>2</sub> FCF <sub>3</sub>	1,430
HFC-143	CH <sub>2</sub> FCHF <sub>2</sub>	353
HFC-245fa	CHF <sub>2</sub> CH <sub>2</sub> CF <sub>3</sub>	1,030
HFC-365mfc	CF <sub>3</sub> CH <sub>2</sub> CF <sub>2</sub> CH <sub>3</sub>	794
HFC-227ea	CF <sub>3</sub> CHFCF <sub>3</sub>	3,220
HFC-236cb	CH <sub>2</sub> FCF <sub>2</sub> CF <sub>3</sub>	1,340
HFC-236ea	CHF <sub>2</sub> CHFCF <sub>3</sub>	1,370
HFC-236fa	CF <sub>3</sub> CH <sub>2</sub> CF <sub>3</sub>	9,810
HFC-245ca	CH <sub>2</sub> FCF <sub>2</sub> CHF <sub>2</sub>	693
HFC-43-10mee	CF <sub>3</sub> CHFCCHFCF <sub>2</sub> CF <sub>3</sub>	1,640
HFC-32	CH <sub>2</sub> F <sub>2</sub>	675
HFC-125	CHF <sub>2</sub> CF <sub>3</sub>	3,500
HFC-143a	CH <sub>3</sub> CF <sub>3</sub>	4,470
HFC-41	CH <sub>3</sub> F	92
HFC-152	CH <sub>2</sub> FCH <sub>2</sub> F	53
HFC-152a	CH <sub>3</sub> CHF <sub>2</sub>	124
HFC-23	CHF <sub>3</sub>	14,800

Note: Gas mixtures containing any of the above are also covered.