

Supplementary Analysis Report: Regulations to support synthetic refrigerant product stewardship

Coversheet

Purpose of Document

Decision sought/taken:	Analysis produced for Cabinet report-back on decision to introduce a regulated product stewardship scheme for synthetic refrigerants
Advising agencies:	The Ministry for the Environment
Proposing Ministers:	Hon Penny Simmonds
Date finalised:	20 May 2024

Problem Definition

Synthetic refrigerants pose a risk to the environment if the equipment containing them is not used correctly, or the refrigerant is not disposed of correctly. Operational errors, such as leaks and improper maintenance, can result in the release of gases into the environment that are either ozone depleting or greenhouse gases. To be disposed of properly, synthetic refrigerants need to be recaptured and then destroyed at high temperatures.

The existing regime has information and skill gaps and does not provide sufficient incentive or impetus for such emissions to be appropriately prevented, resulting in comparatively low recovery rates and costs to society and the environment. In addition, current government initiatives mainly target refrigerants early in their use cycle. The stock of refrigerants currently in use and in equipment at their end-of-life is given less consideration.

Insufficient action around leakage and end-of-life management of refrigerants would result in continued harm to the environment from release of gases into the environment, leading to economic costs of up to \$437 million in the period to 2050.

Executive Summary

A regulated product stewardship scheme is proposed to ensure that synthetic refrigerants that are harmful to the environment when released are better managed, leading to lower emissions. The regulated scheme would replace an existing voluntary scheme, which has had limited success in raising the amount of refrigerant that is being recovered (estimated at 10 per cent annually), does not include all industry sectors, and has not been able to move beyond encouragement of adequate and enforceable industry training.

At present, there are an estimated 16,775 technicians who work on equipment containing synthetic refrigerants, with varying levels of training and experience. Apart from 'Approved Filler' certification, training is optional and there are no requirements for training on

environmental risks or potential risks to health and safety for alternative 'natural' refrigerants. Industry has highlighted that skill gaps increase the risk of harm.

Parties who cause costs to society and the environment typically do not face those costs themselves (i.e. there are costs to society from private actions). Parties are able to avoid costs because it is difficult to detect gas emissions (odourless and colourless), monitoring across the synthetic refrigerant supply chain is fragmented, and information on gas loss is not required to be collected or reported.

In 2020, the Associate Minister for the Environment declared synthetic refrigerants as a priority product. This declaration requires a product stewardship scheme to be developed and accredited as soon as practicable and opens the option of using a regulation to prohibit sale of refrigerant except in accordance with an accredited scheme. The Ministry assess whether the scheme is consistent with the Waste Minimisation Act¹ and provides advice to the Minister for decision on scheme accreditation.

Government intervention is needed to:

- Increase the volume of decommissioned synthetic refrigerant that is recovered annually for destruction.
- Lift the skills of those in the industry to reduce the potential for environmental harm when working with synthetic refrigerants.
- Shift costs from society and the environment to those whose decisions give rise to the costs, across the entire synthetic refrigerant supply chain.
- Set quality standards and improve data collection, monitoring and enforcement activities across the refrigerant industry.

Preferred option and consultation feedback

In 2023 Cabinet agreed to introduce a regulated product stewardship scheme for refrigerants. This option involves:

1. Prohibiting sale of synthetic refrigerant, except in accordance with an accredited scheme. This regulation requires importers and producers to participate in an accredited scheme and comply with its requirements.
2. Setting a quality standard for end-of-life synthetic refrigerant management, which would restrict the activity of recovering synthetic refrigerant to a qualified technician.
3. Restricting the purchase of synthetic refrigerant to a qualified technician. The accredited scheme run by a non-profit product stewardship organisation (PSO) would manage a national refrigerant technician certification database. The training and qualification requirements would be set by industry and certification would be done by training establishments for technicians that have met them.

¹ For priority products, this includes consistence with accreditation guidelines published by the Minister (<https://gazette.govt.nz/notice/id/2020-go3342/>).

4. Restricting the disposal of synthetic refrigerant to high temperature incineration or another method that ensures full destruction. The method has a minimum destruction and removal efficiency of 95 per cent for dilute sources and 99.99 per cent for concentrated sources.
5. Require the accredited scheme to provide a take-back and destruction service for synthetic refrigerants.

Proposals for regulations to support a product stewardship scheme for synthetic refrigerants were publicly consulted on from 8 November to 18 December 2022. Consultation feedback indicated wide support (87 per cent) to implement a regulated framework for priority product stewardship for synthetic refrigerants. Most submitters supported the proposed regulations including requiring industry to participate in an accredited scheme, and a requirement for the accredited scheme to provide a take-back for destruction service. Some stakeholders raised the following:

- The length of the commencement period for the quality standards, and whether the qualifications should be handled by an entity separate to the accredited scheme.
- Synthetic refrigerants should not be reused due to the risk of environmental harm from leakage.
- Proposed additional targets, such as the number of domestic cooling units sold and collected by the scheme; use a chain-of-custody approach to monitoring the onshore and offshore reduction of harm; and increased reporting from industry.

Following consultation, the Ministry changed the proposal relating to targets. Though supported by stakeholders, there is limited data at present to base targets on, and necessary improvements in both the take-back service and certification of the workforce would take up to five years. It is recommended target regulations are not set now but considered during a regulation review (if regulations are adopted).

Costs, benefits and impacts

Impacts were modelled with a five per cent discount rate out to 2050. Based on the preferred option, key impacts are:

- Technician training costs of \$25 to \$45 million
- PSO costs of \$145 million to \$181 million
- Regulator costs of \$9 million
- Training provider costs of \$11 to \$20 million
- Emissions reduction benefits of \$60 to \$437 million

The relatively broad range of estimated benefits reflects the modelled calculation of synthetic refrigerant stocks and uncertainty in the estimated impact of the regulated scheme in terms of impact on refrigerant recovery. In a low policy impact scenario, incremental refrigerant recovery reaches a maximum of four percentage points above the status quo recovery. A high policy impact scenario sees incremental refrigerant recovery reach 23 percentage points above status quo levels.

Several impacts were not able to be monetised due to lack of data. These impacts include refrigerant companies' economic costs to comply with the scheme, cost savings from

better access to drop off locations, and the industry's productivity increases that may result from training. These non-monetised impacts may not be large. Published values for the cost of carbon and expression of refrigerant gases in CO₂ equivalents were used to calculate the main emissions-related benefits.

Implementation

Subject to Cabinet approval, the proposed regulations would be developed under sections 22 and 23 of the WMA. The Ministry would work with the Parliamentary Counsel Office to draft regulations and report back to Cabinet in 2024.

The proposed regulations would be introduced in two tranches:

- Tranche one regulations would establish the measure to enable mandatory participation in the scheme, keeping records of synthetic refrigerant-related activities, and disposal of refrigerant gas. Depending on Cabinet decisions and availability of the Parliamentary Counsel Office, these regulations could come into force as early as late 2024.
- Tranche two would come into effect three years after Tranche one. Tranche two would establish the regulations required to enforce the training and certification provisions. The three-year gap will enable industry and refrigerant technicians time to upskill, become certified, and manage any pressures on training providers that may occur.

Implementation Risks

Regulations have not previously been established for a synthetic refrigerant stewardship scheme. To mitigate this risk, the Ministry would monitor the efficacy of the accredited scheme and require the scheme to record, monitor and report its performance to the Ministry on a regular basis. Monitoring would include both financial and environmental performance.

There are risks associated with scheme administration under regulations. Risks include the PSO being ineffective, the unwillingness of industry to participate, scheme compliance and Ministry enforcement measures being insufficient, costs being greater than budgeted, and the compliance system not being ready for implementation. Determination of final scheme design, information and awareness campaigns, transparent processes and communications, and phased implementation are mitigation options.

Limitations and Constraints on Analysis

This analysis was severely constrained by the lack of data across the range of industries involved with synthetic refrigerants. The number of technicians working with refrigerants, technicians requiring training, existing synthetic refrigerants stock, how synthetic refrigerants are used across the supply chain, and the extent of synthetic refrigerants recovery are only able to be estimated by expert opinion or one-off commissioned reports. Furthermore, there are differences across overseas jurisdictions that make comparison with existing regulated frameworks difficult.

The most relevant data is not routinely collected, as there is no requirement or incentive to do so at present. In addition, some data is commercially sensitive. This limits the ability to firmly establish the magnitude of identified problems, and some of the root causes are

unable to be directly observed.

Data and evidence collected by an industry-led co-design group and insights from regulated schemes overseas were utilised, along with interviews with key industry players. This process provided some useful evidence to assess likely impacts and the overall nature of the problem, but validation of the information provided was challenging.

The impact estimates in the analysis are based on the best available information, rather than the best possible information, meaning there is unavoidable uncertainty. Industry stakeholders acknowledge the data-poor environment and expect the regulated scheme would provide the core of a solution.

Responsible Manager(s) (completed by relevant manager)

Shaun Lewis

General Manager

Waste Systems

Ministry for the Environment

[Signature]

[Date signed out]

Quality Assurance (completed by QA panel)

Reviewing Agency: Ministry for the Environment

Panel Assessment & Comment: A quality assurance panel with members from Ministry for the Environment's delegated Regulatory Impact Statement Review Panel has reviewed the Supplementary Analysis Report. The panel assessed this using assessment criteria (complete, convincing, clear & concise and consulted), for all relevant sections of the report.

The panel considers that all its feedback was addressed and therefore it meets the Quality Assurance criteria.

Section 1: Diagnosing the policy problem

1. The following subsection summarises -the background to the synthetic refrigerants policy problem under the status quo.

Context of the policy problem

2. In 2020, the Associate Minister for the Environment declared refrigerants as a priority product. Refrigerants declared a priority product are all refrigerant gases (including SF6) used for heating, cooling and air conditioning that are:
 - Ozone depleting substances for the purposes of the Ozone Layer Protection Act 1996 (OLPA), for example, chlorofluorocarbons (CFCs).

- Synthetic greenhouse gases under the Climate Change Response Act 2002 (these are hydrofluorocarbons (HFC) and hydrochlorofluorocarbons (HCFCs)).²
3. Products are declared a priority because of:
 - The risk they pose to the environment when they become waste.
 - The benefits from reduction, reuse, recycling, or treatment are significant.
 - The product can be effectively managed under a product stewardship scheme.
 4. The declaration also captures products containing these gases. However, the priority product declaration and refrigerant regulations do not capture natural refrigerants.
 5. Emissions of synthetic refrigerants and other greenhouse gases contribute to climate change. Currently, HFCs contribute to approximately two per cent of New Zealand's annual greenhouse gas emissions.³ Synthetic refrigerants can have high global warming potential (GWP), hundreds or thousands of times stronger than carbon dioxide (CO₂). For example, HFC-134a has a GWP 1,300 times that of carbon dioxide. These high GWPs are why reduction of synthetic refrigerant emissions can significantly impact the climate despite being emitted in low quantities.
 6. Legacy gases such as HCFCs and CFC contained in equipment older than 20 years pose a risk to the ozone layer.
 7. Refrigerants are not consumed through use. Emissions are largely a result of equipment leaking refrigerants and improper disposal of refrigerants or the equipment that contains them. To be disposed of properly, synthetic refrigerants need to be recaptured and then denatured at high temperatures.

The current policy setting

8. Mitigating environmental harm from synthetic refrigerants, including F-gases, is a target of several government initiatives that aim to reduce the contribution of synthetic refrigerants to New Zealand's greenhouse gas emissions. These initiatives include New Zealand's first Emissions Reduction Plan (ERP), the New Zealand Emissions Trading Scheme (ETS), the Synthetic Greenhouse Gas (SGG) Levy, the Waste Minimisation Act 2008 (WMA), and the Kigali Amendment to the Montreal Protocol. In addition, there is currently a voluntary product stewardship scheme in place.
9. Further details on the initiatives and the existing voluntary product stewardship scheme are contained in Appendix A. The key points are as follows:
 - The ERP includes an action to introduce a mandatory product stewardship scheme for refrigerants. This action includes contributing to training and qualification development for all refrigerant handlers.
 - The ERP notes that initiatives in the F-gas sector— the Kigali Amendment phasedowns, the ETS, the SGG levy, and mandatory product stewardship—are projected to reduce emissions by 0.1 to 0.5 Mt CO₂-e by 2025 and 0.1 to 3.2 CO₂-e

² New Zealand Government (2020), *Declaration of Priority Products Notice 2020*, accessed at: <https://gazette.govt.nz/notice/id/2020-go3343>

³ Ministry for the Environment. (2022). *Aotearoa New Zealand's First Emissions Reduction Plan*.

by 2035.⁴ These numbers are significantly below the ERP sub-target for F-gases of 5.8 Mt CO₂-e by 2025.

- Under the ETS, importers and manufacturers of HFCs are required to offset their emissions by obtaining New Zealand Units (NZUs). The Climate Change (Other Removal Activities) Regulations 2009 provides the ability to obtain NZUs for the export or destruction on HFCs. By doing so, these regulations provide monetary incentive to remove or destroy HFCs.
- The WMA provides a framework to accredit mandatory product stewardship schemes for products that have been listed as “priority products”. Regulations can be made to control or prohibit the sale and disposal of priority products, require take-back services, set fees, require labelling of products, set quality standards, and impose information requirements.
- ‘Waste’ and ‘disposal’ are defined under the WMA such that the product stewardship regulatory options for gases are limited. The WMA has limited regulation making powers for imposing controls during the lifecycle of “use” of a product.
- In 2020, an industry-led co-design working party proposed a regulated scheme design, and recommended supporting regulations, targeting synthetic refrigerants including F-gases. The group recommended requirements for skills, widened coverage to other sectors using F-gases (e.g. automotive air conditioning and heat pumps), and the significant expansion of F-gas collection for destruction.
- In 2022, the Ministry consulted on proposed regulations to support a priority product stewardship scheme for refrigerants and other synthetic greenhouse gases based on the co-designed proposal.⁵
- An industry-led voluntary product stewardship scheme, now named CoolSafe, established a national system to collect and destroy synthetic refrigerants. This scheme was accredited by the Minister for the Environment under the WMA in 2010 and reaccredited in 2017. The volume of refrigerant collected for destruction (or reuse) to date under a voluntary scheme has been low compared to other jurisdictions such as Australia and the United Kingdom. CoolSafe actively promotes an industry code of good practice to reduce risks of harm from refrigerants.
- Industry participants consider that the current state of training is lagging. While technicians are able to complete a National Certificate, the only mandatory qualification is an approved filler training course to fill containers with gases under pressure. The approved filler course is a generic one-day training course not specific to the needs of refrigeration technicians.
- A total of 16,775 persons are estimated to work on equipment containing F-gases in both stationary and mobile applications in New Zealand. This group consists of

⁴ Ibid

⁵ Further details of the scheme design can be found in Appendix 2 of the public consultation document on proposed product stewardship regulations for F-gases [Proposed measures to reduce the environmental impact of fluorinated gases: Consultation document | Ministry for the Environment](#)

approved fillers, licensed electricians, automotive technicians, and those without formal training.

- Some technicians working on synthetic refrigerants have received informal training, equipment manufacturer approved workplace training, or overseas certification, though the exact number is unknown. The extent to which these forms of training have been updated for recent industry developments in equipment and available gases is also unknown.
- Appendix B lists other legislation that relates to refrigerant management, and Appendix C sets out the range of stakeholders.

How is the status quo expected to develop?

10. Under the status quo, a voluntary product stewardship scheme would continue to operate, and would continue initiatives to improve industry training, the introduction of a bounty to improve recovery rates, and the expansion of the number of collection sites. However, the scheme is unlikely to substantially increase coverage of the above initiatives under a voluntary scheme.
11. We are unclear whether the above actions were put in place in anticipation of regulations being made to support a product stewardship scheme, or if the scheme would have undertaken these actions irrespective of regulations.⁶ Therefore, the expected development of the status quo is difficult to assess.
12. Cool-Safe has applied for accreditation as the priority product stewardship scheme for “refrigerants and other synthetic greenhouse gases”. The proposed scheme follows the model co-designed by the Synthetic Refrigerant Stewardship Working Group (Working Group) in 2020. The application is under consideration by the Ministry for the Environment. The process involves independent review and the next step is advice to the Minister for the Environment for decision.
13. The existing voluntary accredited scheme has an estimated recovery rate of F-gases for destruction of 10 per cent of available gas for removal in 2024.⁷ In October 2022, Cool-Safe started offering a “bounty” to partially offset the costs to the sector in collecting and delivering the gases to their collection sites.⁸ Since the implementation of the bounty, there has been a reasonable increase in volumes collected by Cool-Safe, though the precise increase is commercially sensitive.
14. The Trust has started working to offer a workplace competence register for the sector that will cover both environmental and safety components.
15. The Trust’s funding model changed in 2022. The original voluntary levy on bulk refrigerant importers has been replaced with the sale of NZU credits. Cool-Safe receives NZUs for HFCs and PFCs it collects and then exports. To date, these NZUs have largely been reserved. In recent years, these NZUs have significantly increased in market value and can be used to fund scheme activities. What happens in the

⁶ In addition to commercial sensitivity, uncertainty around the precise design of the regulated scheme and what PSO initiatives are additional to or build on those currently in place restricts the ability to estimate how the status quo would develop in the absence of a regulated scheme.

⁷ Verum Group (2023), MfE Projections Final, unpublished

⁸ The bounty currently pays \$25 per kilogram of refrigerant sent to Cool-Safe.

longer term is difficult to know, and alternative funding sources might be needed. The Ministry may consider setting a product stewardship fee to fund the scheme in future.

What is the policy problem or opportunity?

Refrigerants pose a risk to the environment, arising from a misalignment of private and social costs

16. Refrigerants can cause environmental harm if not used or disposed of correctly. For instance, HFCs are potent greenhouse gases that impact climate change, which threatens society with costly health and environmental impacts such as floods, wildfires, drought, and increasingly severe weather events.⁹ Intentional venting of gases to the atmosphere is prohibited under the CCRA and OLPA, but industry sources indicate that such venting does occur. The lack of record-keeping requirements, monitoring and enforcement difficulties mean the current regime does not provide a strong deterrent.
17. Detection of wilful discharge is also difficult because of the odourless and colourless nature of the gases and the typically private spaces in which refrigerant work occurs. There has only been a single prosecution for intentional venting under the CCRA.
18. Refrigerants that are securely contained in an operating system do not harm the environment, however, operational errors such as leaks and improper maintenance can result in the release of harmful gases into the environment.¹⁰ Refrigerant control through better management of equipment and recycling, recovery and safe end of life destruction is considered more effective at addressing global warming than any other initiative.¹¹
19. At present, parties involved in refrigerant supply and use chains do not face all 'lifecycle costs.' Social costs (i.e. those costs that are not borne by any particular party or group) arise from leaks, inadequate or neglected equipment servicing, and intentional venting of gases into the environment. These social costs, commonly referred to as externalities, result in degradation of the ozone and increased GWP.
20. The existing product stewardship scheme provides a free disposal service for refrigerant. However, the cost of hiring a refrigerant technician to recover the refrigerant and transport it to a scheme drop-off location is a disincentive. Anecdotal evidence is that some may have let gases vent to atmosphere, rather than incur the costs of appropriate disposal, giving rise to social costs. The scheme has recently implemented a free courier service and bounty to reduce transport and other costs.
21. When an individual intentionally vents gases into the atmosphere they avoid the private costs of disposal (i.e. the cost to responsibly collect, transport and dispose of refrigerant gases). Venting in this way has a low probability of detection, and no particular body or company is directly harmed who would complain or insist on responsible disposal. As a result, society and the environment bear the costs of the private decision. Similarly, the private costs of adequate equipment servicing can be

⁹ US Environmental Protection Agency, accessed at <https://www.epa.gov/climate-hfcs-reduction/hfc-allocation-nprm-frequently-asked-questions>

¹⁰ Maina and Huan, (2015)

¹¹ Project Drawdown, cited in Synthetic Refrigerant Stewardship Working Group (2019), Milestone 2: Report 1 – Critique existing system(s) including product regulations

ignored as the effects of such neglect accrue to society/the environment, rather than the supplier or user of such equipment.

22. In economic terms, there is a divergence between private and social costs. This divergence leads to increased risk of environmental harm compared to a situation where private and social costs are aligned (i.e. “internalising the externality”).
23. Data on leakage is not routinely collected. Key industry players highlighted the role that leaks play in the risk of environmental harm, however definitive estimates on the extent of leaks is not available.¹² One report provides some evidence of leakages of 10 per cent per annum from some systems and up to 30 per cent per annum for transport refrigeration or AC systems.¹³ Another report indicated that around 8 per cent of relevant gases is released into the atmosphere annually, and of that total, around 72 per cent relates to leaks and equipment servicing.¹⁴
24. In addition, once products containing refrigerants have reached the end of their useful life, the decommissioning process can lead to emissions. Commissioned modelling estimated that for 2024, around 10 per cent of all HFCs retired were collected for destruction, with an additional 12 per cent recycled. The remaining 78 per cent is unaccounted for.

Current stewardship arrangements do not provide sufficient incentive or impetus to bring about desired change

25. Despite being in place (in some form) since 1993, the current voluntary product stewardship scheme has not resulted in noticeable changes in key metrics such as the rate of synthetic refrigerant recovery, or the proportion of the relevant workforce who are qualified to work with synthetic refrigerants.
26. New Zealand’s recapture of refrigerant is comparatively low. As noted, New Zealand has an estimated refrigerant recovery rate of 10 per cent in 2022.¹⁵ To put this figure in context, Australia and the United Kingdom have estimated refrigerant recovery rates of between 52 to 65 per cent and 62 to 92 per cent respectively.¹⁶¹⁷
27. Some caution is required when comparing figures as there is no universal definition for recovery rate. Some jurisdictions calculate recovery rate using a base measure of total recoverable gases. That is, the recovery rate excludes gases that have leaked or been released during their life, as opposed to the total volume of imported gases. This ‘gas recoverable’ approach raises the reported recovery rate relative to alternative measures (as these may account for around 10%-30% of supply). Nevertheless,

¹² Synthetic Refrigerant Stewardship Working Group (2019), Milestone 2: Report 1 – Critique existing system(s) including product regulations

¹³ Verum Group (2020), Projections of HFC stocks and emissions to 2050 in relation to key factors influencing HFC consumption

¹⁴ Expert Group (2016) Hydrofluorocarbon Consumption in New Zealand, Report prepared for the Ministry for the Environment

¹⁵ Verum Group (2023), MfE Projections Final, unpublished

¹⁶ Refrigerant Reclaim Australia. (2021). *Potential Recovery | Refrigerant Reclaim Australia*.
<https://refrigerantreclaim.com.au/program-performance/potential-recovery/>

¹⁷ AHRI. (2016). *Review of Refrigerant Management Programs*.
https://www.arctic.org/media/1176/ahri_8018_final_report.pdf

available evidence supports the view that rates of recovery in New Zealand lag the rest of the world.

28. The existing scheme's historic slow-moving and ineffectual performance is related to the lack of responsibility for social costs. Upgrades under the re-branded Cool-Safe scheme have started to address barriers to more effective product stewardship performance are in Table 1 below. Evidence of causes and effects is scarce, but we set out the logic with evidence of the collective effects provided above.

Table 1 Limitations of current (voluntary) scheme

Barrier	Effect
Players can easily 'opt out' and can gain financially from doing so.	Scheme participation and recovery rates are, and will likely, remain lower than optimal. Refrigerant gas collection is optional. No cost off-sets are available to technicians to collect and drop-off gases, though the introduction of a 'bounty' has reduced costs. The nature and volume of training undertaken is less than that required for appropriate handling and disposal of synthetic refrigerants.
Parties can avoid social costs and there is no incentive for parties to take account of the environmental costs of products at the end of their life.	Councils and end-users are left to cover the costs of disposal, meaning society collectively pays for the individual decisions of other parties.¹⁸ De-gassing and responsible disposal of equipment attracts charges, which can readily be avoided.
No direct incentive exists to provide convenient methods of collection or to develop cost-minimising disposal services, and to achieve specified collection or recovery rates.	Lower recovery rates than international benchmarks, even after accounting for measurement differences. Inconvenient site locations hamper recovery and collection rates (under improvement in Cool-Safe scheme upgrades). Inconvenient and costly recovery systems encourage dumping of equipment, or illegal and environmentally harmful practices (e.g. releasing gases directly into the environment). Industry is not held accountable for environmental damage from refrigerant gases, making voluntary change unlikely.¹⁹

¹⁸ No data is publicly available on the proportion of landfill volumes that are refrigerant-containing equipment.

¹⁹ Confidential estimates of mass balance suggest that 'unaccounted for' gases (i.e. the volume of refrigerants not added to the estimated bank or known to be recovered or reused) could be substantial, potentially as much as half of the total gases imported annually. Validating this estimate is not possible. The sources are strongly of the view that mandated participation will greatly improve the ability to make more accurate estimates of relevant quantities.

Barrier	Effect
	Refrigerant replacement is cheaper than maintenance or repair in poorly service or faulty equipment, increasing the likelihood of continued leakage.
Ease of import for products that are hard to recycle or pose risk at end of life.	Any person can purchase and sell refrigerant gases with little concern for their treatment post-sale, though some suppliers have voluntarily placed restrictions on purchasers out of concern for the potential harm on industry reputation and the environment. Landfill can used as a disposal option for equipment containing refrigerants, resulting in higher landfill use than desired.
Poor information on product composition/potential risk to the environment.	Consumers are not well informed about the properties of the refrigerants used in household equipment, nor the need for reuse, recovery or reclaim possibilities for the refrigerant. Technicians also have knowledge gaps around the GWP of refrigerant gases.²⁰
Available training is limited (i.e. does not necessarily involve environmental harm component) and largely optional (the only mandatory requirement is a one-day approved fillers course).	Skill gaps exist, leading to poor practice and insufficient focus given to potential environmental harm.
Training and competence is not prioritised.	

Unlike other contexts, refrigerant gases are not ‘front-of-mind’ for consumers or society in general, resulting in a lack of awareness of the GWP properties of refrigerants

29. The public does not understand the environmental risks associated with refrigerants used in cooling systems, or the alternative options or risks from improper management or disposal of systems they are in. Further, refrigerants are colourless and odourless, reducing visibility to consumers. As a result there is little pressure, be it public accountability or consumer demands, to ensure the proper management of refrigerant-containing equipment at the end of its life.
30. There is little human health risk from synthetic refrigerants and no visual component. While consumers might be aware of littering associated with equipment such as

²⁰ New Zealand evidence from the Working Group is supported by a survey undertaken overseas that finds technicians do not always have a complete understanding of how refrigerant gases contribute to climate change, and the role their individual behaviour and training plays; Martinho et al (2023) A Social Study of the Technicians Dealing With Refrigerant Gases: Diagnosis of the Behaviours, Knowledge, and Importance Attributed to the F-Gases. International Journal of Refrigeration, 146, pp. 341-348.

refrigerators being abandoned, there is extremely little awareness of the risk of environmental harm from refrigerant gas leakage. As a result, consumers have a reduced understanding or influence on end-of-life treatment of refrigerants.

31. A 2013 report commissioned by the Ministry for the Environment found that there was no specific data on the willingness-to-pay of importers, manufacturers, or consumers for 'recycling' of refrigerant gases at end of life in New Zealand or overseas. Only a general willingness-to-pay to reduce emissions was found.
32. In addition, there is also widespread international evidence of avoiding payment (e.g. for technicians to remove gases and arrange for disposal), for reasons unknown but likely to relate to uncertainty and unwillingness to pay for external effects.²¹
33. The report concludes that there are potential benefits in the product cycle that are not being internalised (i.e. private costs not incorporating social costs) – in relation to environmental harm, there is/are:
 - Likely to be incomplete information, leading individuals to undervalue safe use and disposal
 - Social costs to current and future generations, including irreversible effects.

Root causes

34. The root causes are both societal and sector based.

Social norms favour behaviour focussed on convenience, particularly for consumers

35. No New Zealand specific data is available on consumer attitudes to refrigerants. However, a Portuguese study investigated the link between environmental behaviours and risk perceptions of consumers in relation to refrigeration equipment. The study found that—despite considering climate change to be of high importance and refrigerant gases to pose a high risk to the environment—most consumers did not consider these gases in their refrigeration equipment purchase decision.²²
36. Factors that are considered more important in the purchase decision include energy consumption, price, model features, brand, and noise. It follows that consumers who place a low priority on environmental concerns at the time of purchase would be very unlikely to prioritise the disposal of refrigerant gases at end-of-equipment-life. It is easier and less costly for consumers to receive information on the factors above than it is for safe disposal of refrigerants.
37. Furthermore, when consumers experienced refrigeration equipment malfunction, almost a third of those surveyed indicated that they bought new equipment, and the old one was taken by the seller.²³ Between two and seven per cent of consumers behaved in ways that would increase the risks to the environment: either attempting to repair the equipment at home, placing the item in storage at home, or leaving the equipment on the side of the road.
38. For pre-charged units (e.g. heat pumps, air conditioners), expert opinion in New Zealand is that when faced with the need to replace an old unit, homeowners either remove the old unit themselves or get an electrician to do so prior to connecting the new unit. De-gassing of the unit, required by the Health and Safety at Work

²¹ NZIER (2013) Willingness to pay for six end-of-life products. Report to the Ministry for the Environment, p.42.

²² Martinho et al (2022) Environmental behaviours and risk perception of domestic consumers: Refrigeration equipment case study. Cleaner Production Letters 3, 100024.

²³ Ibid.

(Hazardous Substances) Regulations 2017, would not generally occur in such instances, as not all electricians are specifically trained to de-gas units. There are no requirements for records to be kept on installations, charging, or degassing of these units, meaning it is almost impossible to prove that intentional venting occurs.²⁴

39. It is important to note that social norms alone do not govern people's behaviour – rather, it is the balance of personal values, norms, incentives, the removal of barriers (i.e., time, cost, provision of infrastructure) and, to a lesser extent, information provision. Industry experts highlight the role that perceptions of cost play in the interplay between sector participants. Consumers do not face the social costs of emissions from substandard installation, poor maintenance, and illegal discharges, and often do not consider the whole of life costs of refrigerant in relevant equipment, instead choosing the cheapest price they can get.²⁵

Difficulty monitoring and enforcing existing requirements, and current information and infrastructure provision is not sufficient to influence behaviour

40. The Ozone Layer Protection Act 1996 and Climate Change Response Act 2002 (CCRA) prohibit the intentional venting of refrigerant to the environment. However, the Government lacks oversight of compliance with this requirement. No monitoring or record-keeping requirements are in place currently. There has only been a single prosecution for intentional venting under the CCRA.
41. Data collected across domestic government agencies is scarce and inconsistent. The Working Group, in its examination of the existing regime, highlighted the difficulty in obtaining accurate and reliable data on refrigerant gases. As a result of data being collected by different agencies, for different purposes, and for different time periods, it is conflicting and confusing. This poor quality occurs despite some data reporting being required by law.²⁶ The Working Group state that improved data collection should be a feature of any mandated product stewardship scheme.
42. There are several practical controls in place for the management of refrigerants across relevant industries/parties. However, industry stakeholders have identified gaps and issues. Table 2 summarises these gaps and issues around refrigerant controls in the industrial/commercial, scrap metal, automotive, and heat pump sectors.

²⁴ Synthetic Refrigerant Stewardship Working Group (2019), Milestone 2: Report 1 – Critique existing system(s) including product regulations

²⁵ IRHACE, CCCANZ, and RLNZ (2022) Submission to the discussion document “Te hau mārohi ki anamata - Transitioning to a low emissions and climate-resilient future” F-gases

²⁶ Synthetic Refrigerant Stewardship Working Group (2019), Milestone 2: Report 1 – Critique existing system(s) including product regulations

Table 2 Identified gaps and issues with refrigerant controls and management

	Industrial/Commercial	Scrap Metal	Automotive	Heat pump sector
Gaps and issues.	Cool-Safe accepts refrigerants at their main hubs and collection points free of charge. The costs for getting a technician to de-gas equipment and take the gas for destruction can be prohibitive for some owners. Industry stakeholders indicate that this can be a significant disincentive to some and that they release the refrigerant rather than pay for it to go to the drop off. No hard data is available to verify those observations. Customs data on bulk imports differs from that reported by Cool-Safe. Participants often report more refrigerants than recorded as being imported. Different recording systems are identified as the main reason for the discrepancy. For pre-charged goods, differences between EECA and the EPA can sometimes be close to 100% in magnitude. Reporting bases (EECA records sales, the EPA imports) are thought by stakeholders to be the reason for the difference.²⁷	The degree of de-gassing taking place before scrapping is unknown. Available evidence suggests that some transfer stations have Approved Fillers on site which enables these units to be de-gassed and the refrigerant collected before being sent for destruction. Others will consolidate units so they can be degassed by an Approved Filler who is brought in to carry out this work.	The Working Group expert we interviewed considered the majority of mechanics and automobile wreckers do seek the services of refrigeration technicians when degassing is required and in some instances the technicians reuse the gas for charging AC units within other motor vehicles. There are also operators who release refrigerant gas to the atmosphere intentionally or unintentionally when a vehicle is crushed, but data on this is not collected. .	No regulations in place. Fixed pre-charged AC units that are not installed correctly or serviced regularly are known to lose significant amounts of SGG refrigerant to the atmosphere.

²⁷ Ibid

43. The gaps and issues identified mean there is little incentive for parties to ensure refrigerants are accounted for, recycled, reused, reclaimed, or disposed of correctly, unless they are motivated by their own intrinsic values.
44. Likely trends in gas use in future add to the problem. The existing stock of heating, ventilation, and air conditioning equipment contains approximately 7,000 metric tonnes of HFC, HCFC, and chlorofluorocarbons (CFCs).¹² The total amount of retired refrigerant is expected to increase over the next 10 years, as the stock of heating, ventilation, and air conditioning equipment reaches end-of-life and HFCs are replaced by lower GWP refrigerant.

Externalities and equity issues

45. The existing arrangements make it easy for people to ignore social costs (externalities) around GHG emissions from refrigerants. Those costs are passed on to society, the environment, and future generations.
46. The current accredited scheme accepts refrigerants at their main hubs and collection points free of charge. However, there are significant costs in getting a technician out to de-gas equipment and transport it to the destruction facility. The cost varies significantly (the reported range is \$6-8 per unit to \$58 per unit)²⁰, based on factors such as whether refrigerant-containing units are decommissioned individually or in bulk.²¹
47. The working group reports in 2020 and recent key stakeholder interviews highlighted that cost can be a disincentive, and many release the refrigerant direct to the environment rather than incur the recovery and transportation costs. As indicated above, these social costs are known as externalities.
48. Measuring the extent of the externalities associated with refrigerants is not possible under current settings. There is limited ability to allocate responsibility for the proper care and disposal of refrigerants.
49. Further, there is no industry-wide compulsion to invest in education and training to ensure environmentally friendly disposal of refrigerants. Industry participants who do invest in appropriate training do so in a bespoke manner, driven by personal values. The industry's lack of a uniform training requirement is a source of frustration (in respect of fairness and consistency) for key players.²⁸ Following the Working Group reports, Cool-Safe has invested in research to further develop training in the sector, but the initiative has not yet been fully implemented.

Stakeholder views

50. In 2022, the Government released the document "Proposed measures to reduce the environmental impact of fluorinated gases" for public consultation. The consultation was open from 8 November to 18 December 2022 and sought feedback on the preferred proposals to introduce a regulatory framework to support a refrigerant stewardship scheme.

Regulatory framework

51. In general, stakeholders agreed with the problems identified in the consultation paper. Almost three-quarters of total submitters supported a proposed regulatory framework for refrigerants. Strongest support came from individuals, local government agencies and anonymous other organisations. Reasons for this support included:
 - Product stewardship shifts costs to producers.

²⁸ Key person interviews and various Working Group reports.

- All interested parties should be responsible for environmental impacts (i.e. level-field concerns)
 - Regulated product stewardship will enable reduction of leaks and losses (with some submitters suggesting that the Ozone Layer Protection Act 1996 should be the basis for licensing, rather than the WMA).
52. A minority opposed the regulatory framework, mainly comprised of businesses in the industry and industry associations, principally citing difficulties in equitable design given such a wide array of interested parties.

Obligation to take part

53. A clear majority of submitters also supported the proposal to obligate sector players to take part in an accredited scheme, principally as regulation:
- Is effective in minimising environmental harm.
 - Ensures that all users/buyers are fully informed and able to meet their obligations.
 - Would replace the voluntary scheme that has only been able to recover 10% of available legacy synthetic refrigerants.
 - Would deter less scrupulous operators from entering the market.
54. The support was reasonably widespread among local government, individuals, and business/industry.
55. A small minority from industry opposed the proposal, based on views that nobody should be forced to join a body to make refrigerant purchases.

Take-back and targets

56. Most submitters agreed in principle with take-back and target proposals, citing ambition for future generations as well as consistency with international standards for recovery targets. Targets were also seen as assisting to ascertain how effective the scheme is. Individuals provided the strongest support, though business/industry submitters also provided strong support.
57. Cost and governance of training provision issues (i.e. the idea that an ITO should be the major party to determine training requirements) were cited by those who did not support the proposals.

Quality standards and workforce competencies

58. Similar patterns emerged in respect of proposals relating to quality standards for disposal, installation and reuse, recycling, or recovery, workforce competencies for sale and management of synthetic refrigerants. Most categories of respondents supported the proposal, but individuals were the strongest source of support, particularly in relation to quality standards. Support from businesses was mixed.
59. Reasons cited for supporting quality standards were relatively consistent across the various groups of stakeholders (across the supply chain). The major reasons were that regulation would provide:
- A level playing field.
 - Standards that are likely to reduce leakage.
 - A robust tracking tool.
 - Encourage recycling within the scheme and promote verified reuse at the required standard.

60. Submitters who opposed to the quality standards proposals questioned whether they would provide benefits over and above the current arrangements, were unable to support the proposals until they had detailed scheme design information and suggested that recycling and reuse would not reduce environmental harm.
61. Submitters who supported the workforce competency proposals cited the following reasons:
- Regulation would minimise leakage risk.
 - There would be consistency across other industries (e.g. plumbers and electricians).
 - Public awareness and knowledge would be lifted.
 - Responsible parties will not be able to avoid the cost of appropriate disposal.
62. Submitters opposed to quality standards and workforce competency proposals cited costs, and/or mixed views on how workforce competencies would reduce environmental harm as opposed to adding a delay in moving to lower GWP gases. The governance and objectives of scheme managers were also cited as reason why support was not forthcoming. Costs cited by opponents related to:
- The cost of storage and handling of relevant waste products at transfer stations.
 - Compliance costs.
 - Impacts on customers.
 - Re-training of staff if previous training is not recognised by upgraded industry standards.

What objectives are sought in relation to the policy problem?

63. The objective is to achieve the aims of section 8 of the Waste Minimisation Act 2008 Product Stewardship, which is to: encourage (and, in certain circumstances, require) the people and organisations involved in the life of a product to share responsibility for:
- Ensuring there is effective reduction, reuse, recycling, or recovery of refrigerant products.
 - Managing any environmental harm arising from the product when it becomes waste.
64. A regulated priority product stewardship scheme that better aligns social and private costs would contribute to the achievement of the objective.

Section 2: Deciding upon an option to address the policy problem

What scope will options be considered within?

65. This analysis considers how the proposed options will address the underlying causes identified above, notably how options:
- Increase the volume of synthetic refrigerant that is recovered annually, by mandating participation of importers, retailers and technicians in an accredited product stewardship scheme.
 - Lift the skills of those in the industry to reduce the potential for environmental harm when working with synthetic refrigerants.
 - Shift costs from society and the environment to those whose decisions give rise to the costs, across the entire synthetic refrigerant supply chain.
 - Set quality standards, collect data, and improve monitoring and enforcement activities across the refrigerant industry.
66. Options are limited to actions that can support priority product stewardship for synthetic refrigerants under the WMA, including non-regulatory and regulatory provisions. Options would also need to contribute to achieving action 16.4 of the ERP
67. The analysis has been informed by the research undertaken by the industry co-design Working Group, learnings from international jurisdictions operating product stewardship (or extended producer responsibility) schemes, and public consultation.

Consultation on proposed regulations to support priority product stewardship scheme for refrigerants (2022)

68. In total, 38 submissions were received. Overall, submitters mostly supported the proposed regulatory framework, the components of which were highlighted in the opening section and are elaborated on below. Some submitters opposed the introduction of the regulatory framework, stating concerns such as the fact that only two per cent of New Zealand's greenhouse gas emissions were from refrigerants.

Consultation with population groups

69. The Ministry has not identified any population group disproportionately impacted by these problems. The Ministry consulted all groups as part of general consultation with the public in 2019 and 2022. There are no special factors (e.g., obligations in relation to Te Tiriti o Waitangi) involved in the policy problem.

What options were considered by Cabinet?

70. In 2023 Cabinet considered the following two options:

1. Status quo – voluntary accredited scheme

The management of synthetic refrigerants would rely on existing mechanisms such as the ETS and the SGG levy to phase out gases with high GWPs. The status quo also includes a voluntary accredited scheme that operates the collection and safe disposal of synthetic refrigerants.

2. Regulated priority product stewardship (preferred option)

This option would introduce regulations under section 22 and 23 under the Waste Minimisation Act 2008 (WMA). The regulations would place mandatory controls on the sale, reuse, and treatment of discarded synthetic refrigerants arising from faulty or end-

of-life equipment. In addition, the accredited scheme would need to provide a take-back and destruction service for synthetic refrigerants.

71. A possible third option, which Cabinet did not consider, is one that strikes a balance between the current voluntary state and a fully regulated product stewardship scheme. In effect, this option leaves it to industry to progress actions required to improve the management and disposal of refrigerants, in the knowledge that regulations were still a possibility, which would be signalled by the Minister.

Criteria that options are evaluated against

72. Criteria for options to ensure they best meet the objective stated above are that an option is:
- Effective – reduces the actual or potential environmental harm.
 - Efficient – results in increased present and future net societal well-being (i.e. makes society better off relative to the status quo, or other options).
 - Equitable – produces a cost allocation among parties that better aligns private and social costs (i.e. deals with externalities).
 - Implementable – is sufficiently practical that implementation is relatively straightforward.
73. There are likely to be trade-offs. Shifting cost burdens for equitable reasons may result in less effectiveness in terms of environmental outcomes, due to behaviour changes associated with respective responsiveness to cost changes.
74. Consumers most likely to alter behaviour in a negative way due to price changes might respond by using improper or illegal means of disposing equipment with these gases following intervention than would have been the case in the counterfactual. Monitoring and enforcement costs would rise to the extent that detection of such behaviour is a priority.
75. Hard evidence to substantiate the extent to which such potential trade-offs might arise does not exist.

Assessing the option against the status quo

76. Table 3 contains compares the preferred option to the status quo.

Table 3 Comparison to the status quo

Criteria	Status Quo	Regulated Priority Product Stewardship Scheme
Effective – reduces actual and potential environmental harm.	0	++ Through better training, improved data collection and better understanding of environmental impacts of refrigerants, rates of gas recovery are expected to increase, and release of harmful gases into the atmosphere would reduce.
Efficient –raises societal well-being.	0	+/- There are costs to all parts of the refrigerant industry, some of which are substantial. Society might be made better off, but it

Criteria	Status Quo	Regulated Priority Product Stewardship Scheme
		could also be made worse off. The uncertainty associated with the range of benefit values does not allow a definitive finding to be made, but the balance of the negative and positive values suggests a net benefit to society. The training component impacts industry significantly, but timing has been adjusted to allow for a phased transition.
Equitable – apportions costs in a way that better aligns private and social costs.	0	+ Shifts costs from society in general and the environment to those whose decisions give rise to the costs, across the entire refrigerant supply chain.
Implementable – able to be implemented	0	+ There are some risks to implementation, but their likelihood and their impact is not known at this stage. Mitigation options exist, and industry stakeholders are aware that further development in some areas is required as the scheme beds in.

Key: - worse than status quo; + - better than status quo; -- much worse than status quo; ++ much better than status quo

What was the Government's preferred option, and what impacts will it have?

77. Cabinet agreed to the Regulated Priority Product Stewardship option (Option 2 above). This option involves:

1. Prohibiting sale of refrigerant, except in accordance with an accredited scheme. This regulation requires importers and producers to participate in an accredited scheme and comply with its requirements.
2. Setting a quality standard for end-of-life refrigerant management, which would restrict the activity of recovering refrigerant to a qualified technician.
3. Restricting the purchase of refrigerant to a qualified technician. A new Product Stewardship Organisation (PSO), a non-profit organisation accredited to operate the scheme, would set the qualification requirements, and certify that technicians meet them.
4. Restricting the disposal of refrigerant to high temperature incineration or another method that ensures full destruction. The method has a minimum destruction and

removal efficiency of 95 per cent for dilute sources and 99.99 per cent for concentrated sources.

5. Require the accredited scheme to provide a take-back and destruction service for synthetic refrigerants.
78. Regulations 1, 4 and 5 will come into effect 28 days after the regulations are gazetted and regulations 2 and 3, will have a three-year commencement period.

Impacts of the chosen option

79. This option creates responsibilities that potentially affect all parties involved across the refrigerant supply chain. Not all of the responsibilities set out in Table 4 are new, but any existing responsibilities will grow (with associated costs which are discussed further below).

Table 4 Responsibilities created by a regulated scheme

Party	Responsibility
Regulator (Ministry for the Environment).	Responsible for developing regulations, compliance, monitoring and enforcement activities, and performance reporting.
Accredited Scheme, Product Stewardship Organisation.	Responsible for scheme set-up and implementation, ongoing governance and operations (e.g. offshore disposal and destruction services, corporate expenses such as overheads, training elements, communications, ongoing scheme management, and ongoing reporting requirements).
Industry (includes automotive technicians, electricians, importers, HVAC technicians, scrap metal dealers, producers, retailers).	Responsible for participation, ensuring competence through training and monitoring, raising awareness of others in the supply chain, meeting compliance requirements around quality, collecting and reporting relevant data.
Consumers.	Responsible for purchase, operational (e.g. maintenance), and disposal-related choices that better reflect the potential for environmental harm of refrigerants (e.g. insisting on making sure technicians are trained/certified and provide assurances that refrigerants will be disposed of in an environmentally friendly manner). This responsibility is indirect because consumers will not be regulated.
Society in general.	Individuals in society will be indirectly responsible for increasing awareness and understanding of the role that refrigerants play in climate change and the need for vigilance. This responsibility is indirect because these individuals will not be regulated.

80. Relative to the status quo, additional costs will be incurred, though not universally. For instance, parties that already provide training for their staff could only face modest additional costs and may derive some benefit from the potential recognition of training

through credentialisation or any efficiencies gained from wider provision. For other parties, costs rise from the obligation to participate in the scheme.

Regulator costs

81. The Ministry for the Environment will incur financial and resource costs in relation to monitoring scheme performance, general activities associated with the scheme (i.e. organisational and administrative costs associated with day-to-day oversight of the scheme), and potentially validating and storing collected data (though this is the responsibility of the PSO). Most of these costs are on-going, though activities around data validation and meetings with other stakeholders to discuss concerns or seek feedback on scheme performance are more 'one-off' in nature.
82. The estimated costs are for three full-time equivalent staff (two for compliance, monitoring and enforcement, and one for scheme monitoring). In addition, the Ministry will redeploy existing staff to assist with regulation development. The redeployed staff will incur opportunity costs for their time i.e. time taken away from other policy development.

Scheme (PSO) costs

83. The new PSO entity will incur additional costs. These costs will be associated with:
 - IT platforms for the increased data collection and reporting to the regulator and members. Some hardware costs would be one-off in nature, while IT equipment servicing, and maintenance would be on-going.
 - Labour for:
 - o Governance –recruitment, as well as ongoing salary, professional development, and board secretariat services.
 - o Data validation provided by members to the PSO, to ensure consistency with data held by other government agencies.
 - o Competency assessment framework and validation process development.
 - o Workload increases due to expected greater volumes of recovered refrigerant (including a take-back service and offshore disposal services), enhanced management and reporting of NZUs, scheme governance and management, delivery of new services to participants (e.g. mass data flows), technical support, incentive programmes, quality standard monitoring and enforcement.
 - Corporate (including overhead) costs of premises leasing, training, information awareness and education programmes, website maintenance, industry body activities (e.g. networking events, industry summits, awards nights).
 - Destruction facility costs including plant operation and salaries.

84. s 9(2)(b)(ii)

Industry costs

85. The nature and magnitude of costs incurred by respective industry players is not uniform.

Training dominates

86. Training requirements to achieve competence standards would be the largest cost to industry (present value cost of \$48 million for technicians to 2050). The size of the cost reflects the reported issues around the mixed levels of competence, and knowledge of

refrigerants and their potential for environmental harm.²⁹ Despite costs, the opportunity to standardise and recognise competency across the industry is valued by stakeholders.³⁰

87. The 'training gap' for the sector and for sub-parts of the industry cannot be calculated with any precision. We rely on existing high-level data that is unable to be validated by a 'building block' approach summing sub-sector-specific data to match the overall industry estimate. In part, this is due to data not being collected, but the situation also reflects the lack of visibility of refrigerants in many sub-sectors (e.g. automotive, electrical, some heat pump installers).

Estimated numbers requiring training

88. There are an estimated 16,775 technicians. This total comprises an estimated 7,000 refrigeration technicians, 3,200 licensed electricians and 1,775 workers in the automotive sub-sector who work on HVAC activities. In addition, an estimated 4,800 unqualified people with no designated occupation work on heat pumps.
89. There is currently no certainty on the recognition of existing qualifications (either international or domestic), or how work experience is applied. Available evidence supports the Working Group's position, and other stakeholders interviewed as part of this work state that some form of recognition is required. Therefore, not all of the estimated 16,775 technicians would require the same degree of training.
90. For this analysis, we use evidence from industry to identify a plausible distribution of worker qualifications, and apply the following 'recognition rules':
- Strong recognition (36%): those who have received training and therefore only require only modest additional training, if any.
 - Weak recognition (51%): those who are competent but have not received any formal (or current) training require a medium level of additional training.
 - No recognition (13%): those who are untrained or not competent and require substantial training.³¹
91. Differing levels of training cost are applied to the respective groups to monetise the estimated training cost burden associated with the regulated stewardship scheme.
- Strong recognition - \$375 per person, the cost for a technician to complete a refresher course, supplied by industry.
 - Weak recognition - \$1,270 per person, an average of the strong recognition and weak recognition figures.
 - No recognition - \$2,165 per person, using the upper bound of MBIE's costs for refrigerant technicians to complete training (adjusted to 2024 dollars). While MBIE's costs are for a licensing scheme, the costs to bring an untrained technician up to an industry standard will likely be similar, noting that the training required to deal with

²⁹ Synthetic Refrigerant Stewardship Working Group (2019), Milestone 2: Report 1 – Critique existing system(s) including product regulations.

³⁰ Synthetic Refrigerant Stewardship Working Group (2019), Milestone 3: Report 3 – Scope for industry credentials.

³¹ Some of the affected workers could either exit the industry or continue to work 'under market' without the necessary training, rather than face the costs. We are unable to estimate this proportion, so include the training costs in full.

natural and synthetic refrigerants will be different. In the absence of further training specifications, this upper bound is deemed an appropriate proxy.

Costs of participation and compliance

92. There will also be costs to industry associated with participation in, and compliance with the scheme, as well as some data collection costs. We are not able to monetise these costs but consider that they would be low.
93. As highlighted above, some businesses (including those who participate in the voluntary stewardship scheme and some who do not) already conduct training, collect data, and monitor staff and equipment performance.
94. Most stakeholders do not believe that the transition to a regulated scheme will result in substantial costs. Additional expenses from the training programme and delivery settings are expected to be limited because of the presence of formal and informal training programmes.
95. However, there are some parties who do not agree with mandated participation, or who see some costs (“not substantial, but still adding to the costs of doing business”) but struggle to identify benefits that would accrue to their business. The latter accept that there may be sector-wide benefits over time and indirect/softer benefits in business operation (i.e. less need to send out staff to deal with faulty or poor technician workmanship on their equipment).

Industry concerns with potential for duplication of costs

96. Two concerns raised by industry are the possibility of duplicated costs and business disruption costs.
97. As MBIE were developing a licensing regime for refrigeration technicians³², many in the industry raised the prospect of essentially doubling up on costs to business from two distinct initiatives that largely affect the same people.³³ Industry is looking to avoid that possibility as in their experience, agencies are not always receptive to collaborating to ensure that costs are not duplicated. While this does not necessarily alter the cost burden strictly relating to the regulated scheme, the industry may incur additional compliance costs and it may limit the marginal benefit.
98. Industry stakeholders proposed an ‘umbrella’ framework in their 2020 co-design report to avoid this potential duplication. This concept underpins the training framework and register of qualifications that the Cool-Safe scheme is currently developing.
99. Relevant companies also highlighted that it is not the financial or out-of-pocket costs of training that has the most impact on them, but the possibility of disruption to business operations from staff having to attend day-long training sessions. Often staff like to go together to compare their learning and experience, and this can mean that smaller firms in particular are unable to effectively ‘back-fill.’ This impact is contingent on the structure and delivery of the training and cannot be avoided but according to

³² As of October 2024 this work has been paused pending the outcome of consultation on the work health and safety regulatory system.

³³ Refrigerant Sector Training - Independent Review (2023), stakeholder interviews.

stakeholders can be better managed with appropriate training plans. No quantified estimates of cost were available.³⁴

100. These concerns would be mitigated by appropriate mutual recognition, for example, if the MBIE qualification was to be accepted as proof of competency.

Consumer costs

101. At a general level, the potential for refrigerant-related environmental damage through the consumer sector is less than the commercial and industrial sectors. While greater in number, domestic equipment, such as heat pumps, and car air-conditioning systems contain less refrigerant than commercial and industrial equipment, therefore reducing possible volumes release to the environment.
102. Any additional costs faced by consumers (households) relate to the degree of pass-through by industry of their cost increases. Available evidence around intentions is mixed. Some industry players, mainly refrigeration and air-conditioning business, suggest that because they provide bespoke training already the additional burden would be minimal, the costs of participation are modest, and the cost pass-through to consumers would be minimal.
103. On the other hand, some businesses in other parts of the industry indicate that any rise in costs, from training, participation and compliance monitoring would inevitably be passed on to consumers. Those businesses were not able to quantify the cost pass-through prior to the regulated scheme being implemented.
104. Some individuals who currently have the ability to purchase refrigerant gases in order to top-up air-conditioning units in their cars themselves would no longer be able to do so. They would face the costs of having the unit replaced or paying for a qualified technician. There is no available data on the extent of this practice, though industry players have expressed a view that such behaviours could be a major cause of refrigerant release under current settings.

Societal costs

105. There are no obvious costs to society arising from the regulated scheme.

Expected benefits

106. The expected benefits of the regulated scheme option are shown in Table 5.

Table 5 Benefit summary

Benefit	Comments
Environmental benefit.	Significant. Refrigerant recovered for destruction could rise from 10 per cent in 2024 to 20 per cent by 2034 in a low policy impact scenario or 35 per cent by 2034 in a high policy impact scenario. Without intervention, refrigerant recovery is expected to be 17 per cent in 2034. ³⁵ The magnitude of these recovery figures is disputed by some industry members.
Better knowledge through data collection improvements.	Direct benefit from industry understanding and acceptance of the state of refrigerant use, release, and recovery, to allow targeted actions.

³⁴ Stakeholder interviews.

³⁵ Verum Group (2023), MfE Projections Final, unpublished

Benefit	Comments
Alignment with overseas jurisdictions.	Better harmonisation of systems and New Zealand's reputation would be enhanced.
Greater skill levels of technicians.	Direct reduction in the risk of environmental harm from emissions during disposal and indirect reduction in risk during installation and maintenance. Potential for fewer callouts as less gas is lost. Cost savings will likely fall on consumers.
Clarity around responsibilities.	All of industry would be held accountable and take responsibility for recovering gases from end-of-life equipment and arranging for its environmentally safe treatment. Social costs would be better aligned with private costs.

What do stakeholders think?

107. In the 2022 consultation, there was strong support (87 per cent of those who answered the question) for a regulatory framework based on mandated participation in an accredited scheme, sales and purchase restrictions, take-back and destruction service provision, and quality standards. Reasons provided for such support included the shifting costs to producers, making every party responsible for their actions/costs, and regulations will enable reduction of leaks and losses.
108. Four submitters (around ten per cent) did not support the proposal. Their rationale was that only two per cent of New Zealand's emissions are attributed to F-gases, the proposed regulations could have adverse impacts on the environment and economy, and it is difficult to develop an equitable system for such a large sector. One submitter supported regulations, but recommended they be developed under the Climate Change Response Act rather than the WMA.
109. Table 6 summarises stakeholder feedback.

Table 6 Stakeholder feedback summary

Proposed regulation	Submitter Feedback
Participation requirement Those selling priority products must do so in accordance with the accredited scheme. Producers, importers, and retailers must participate in an accredited scheme and comply with its requirements.	89 per cent of submitters who answered the question supported the proposal. The reasons for support were largely to ensure the scheme is effective and minimise harm from refrigerants. Submitters who did not support the regulated framework had concerns there was minimal engagement from industry during the co-design process.
Qualification requirements Introducing qualification requirements for people who purchase refrigerant or decommission or dismantle refrigerant-containing equipment or recover refrigerant.	86 per cent of submitters who answered the question supported the proposals to restrict refrigerant purchase to a qualified person and 93 per cent for decommissioning or dismantling equipment for recovery refrigerant. 89 per cent of people who answered the question supported the proposed code of compliance requirements under the Ozone Layer Protection Act. The key reason for submitter support was that restricting these activities to qualified technicians would reduce leakage.

Proposed regulation	Submitter Feedback
	Submitters felt more time was needed to prepare for the proposal to take effect. Submitters also suggested that qualifications should be handled by an entity separate to the accredited scheme.
Disposal requirements Require business decommissioning, dismantling, or degassing of any equipment containing refrigerants to ensure gases are disposed of through full destruction (such as a plasma arc plant) or are recycled into plant with documented leak-testing and repair protocols.	Consultation feedback largely supported the proposal to ensure refrigerants are disposed via a method that ensures full denaturing of the substances (89 per cent of submitters who answered the question) or are recycled into equipment with documented leak-testing protocols (65 per cent of submitters who answered the question). The key reason for support was the standards would prevent leakage, but some submitters were concerned refrigerants should not be reused due to the risk of environmental harm from leakage.
Take-back and targets Require the accredited scheme to provide a take-back service to the public that is free at point of collection. The Government could set targets via regulation, for instance to require the scheme to collect a certain volume of refrigerant per annum.	Submitters were strongly supportive of the concept of introducing take-back and target requirements, with 100 per cent agreement from those who answered the question. While in agreement, a few submitters did note concerns regarding specific targets and five submitters recommended additional targets.
Scheme funding The consultation sought public input on whether the regulated refrigerant scheme should be funded in the first years through NZUs earned under the ETS by the Trust for the Destruction of Synthetic Refrigerants, while longer-term funding options are developed and consulted. ³⁶	Most submitters supported this funding proposal (85 per cent of total submitters who answered the question). Some submitters argued that funding the scheme through ETS credits could add administrative costs. Other submitters expressed the view that there needed to be greater consistency on how product stewardship schemes were funded, given other schemes, such as e-waste, will be funded through levies charged to importers/manufacturers.

110. In preparing this analysis, key industry stakeholders were contacted in order to strengthen the evidence base. The results were somewhat mixed. We were able to substantiate some figures in respect of training requirements and costs, and identify some potential implementation risks, but the lack of hard data meant we were not able to fully validate anecdotal evidence (e.g. the extent of leakage, and poor practice).

³⁶An explanation of this funding option is at paragraph 15.

What are the marginal costs and benefits of the option?

111. The results of the cost-benefit analysis (CBA) are outlined below. The CBA was prepared in line with guidance provided by the Treasury.³⁷ The CBA takes a societal perspective (rather than focusing on sectors or government) and reports economic costs and benefits. Economic costs (and benefits) relate to resource use as opposed to financial costs and benefits that focus on flows of money between parties. Factors such as transfers between parties, taxes, inflation, and depreciation do not feature in economic CBA.
112. The net impact of the regulated priority product stewardship option ranges from -\$194 million in a low policy impact scenario to \$247 million in a high policy impact scenario in present value terms. Ranges are preferred to point estimates wherever data allows. The range is driven by the emissions reduction benefit estimate, which are based on Verum's emissions reduction projections in low and high policy impact scenarios. Those estimates are acknowledged by Verum to be subject to considerable uncertainty.
113. Impacts are presented in present value terms to reflect the social impact to New Zealand over time. A discount rate of five per cent is used as per Treasury guidance for regulatory proposals.
114. Table 7 summarises the results of the monetised and non-monetised costs and benefits. Key assumptions that underpin the monetised cost estimates include:
- Status quo costs are estimated by estimating variable and fixed costs reported in existing information to hand. Annual fixed costs are assumed constant over the life of the regulation. Annual variable costs are projected forward using the growth rate in Verum's total refrigerant recovered under the status quo.
 - Costs associated with the construction of an onshore destruction facility are treated as sunk (i.e. they are not included in the costs of the preferred option) as construction, which is nearly completed, would have occurred regardless of any regulated option. Variable destruction costs scale with refrigerant recovered.
 - PSO costs are reported only to the extent that they are likely to be greater than the estimated status quo costs. PSO costs were provided directly by the Ministry. Given the difficulty establishing status quo costs. A range is used. The lower bound takes into account estimated PSO costs for activities that would have been undertaken regardless of the regulations, and hence fall within the status quo. The upper bound assumes that all of the incremental costs identified relate to the preferred option. That is, costs were incurred in anticipation of becoming the PSO under the preferred option.
 - Regulation development costs are based on the regulated product stewardship scheme for tyres.
 - Refrigerant technician costs are estimated for 16,775 and 8,775 technicians respectively. The range reflects alternative views of industry experts, specifically around the number of electricians who might work on heat pumps. The two

³⁷ Treasury (2015), Guide to Social Cost Benefit Analysis

estimates form upper and lower bounds for technician costs. Technician costs are then estimated by taking this range and splitting technicians into those with:

- i. Strong mutual recognition, equivalent to those stated by industry to have received training.
- ii. Weak mutual recognition, equivalent to those stated by industry to be competent but have not received any formal or current training.
- iii. No mutual recognition, equivalent to the remaining technicians who are assumed to be untrained and not competent.

Each categories' technicians were then costed using figures provided by the industry and MBIE's RIS for a licensing system for refrigeration, heating, and air conditioning technicians. The assumption is that new technicians' training would not have been provided without the regulated product stewardship scheme.

- Training provider costs draw from from MBIE's published regulatory impact assessment for work on a licensing system for refrigeration, heating, and air conditioning technicians.

115. The monetised benefits draw on Verum's projections of HFCs stocks. The incremental refrigerants recovered for low and high impact scenarios are estimated relative to status quo recovery. These two figures are then costed using the recovered refrigerants' respective GWPs reported in the ERP and Treasury's shadow price of carbon. While acknowledging that international comparisons of recovery rates is difficult, due to inconsistent definitions, we note that the projected recovery rates estimated by Verum appear low relative to figures overseas.
116. Lack of data meant some potential benefits were not able to be quantified, and hence monetised. Examples of such benefits include productivity gains due to enhanced training requirements for technicians (with associated rises in income), and pecuniary externalities associated with less cost to replace gas that would otherwise have leaked and owners not having to replace equipment as soon as they do now. There are also likely to be gains to consumers, in terms of avoided search and discovery costs associated with finding skilled and trusted technicians (i.e. over time there will be more standardisation of training and capability of technicians due to the regulations).

Table 7: Monetised and non-monetised costs and benefits for Option 3, (present value from 2050)³⁸

Affected groups	Comment	Impact (PV from 2050)	Evidence Certainty
Additional costs of the preferred option compared to taking no action			
Regulators			
Ministry for the Environment	Regulation development Cost to develop new regulations under the WMA, provided through existing FTE. Cost includes public discussion document and advisory group for regulation development.	\$0.3 million	Medium

³⁸ Training cost estimates were based on previous published regulatory impact statements from MBIE on the HRWL system for refrigerants. Costs may change in due course.

Affected groups	Comment	Impact (PV from 2050)	Evidence Certainty
	Compliance, monitoring, and enforcement Two full-time equivalent (FTE) persons needed for compliance, monitoring and enforcement of regulations. CME staff cost of \$110,000 p.a. and overheads of \$110,000 p.a.	\$5.1 million	Medium
	Scheme performance monitoring Up to one FTE person to monitor scheme performance against the accreditation requirements. Staff cost of \$110,000 p.a. and overheads of \$110,000 p.a.	\$3.4 million	Medium
Regulated groups			
Accredited Scheme, PSO	Scheme implementation	\$1.3 million (accrued largely over three years)	Medium
	Governance expenses including Board remuneration, Advisory Group expenses, and professional services	\$11.4 million	Medium
	Corporate expenses including salaries, training, leasing office space, branding and collateral, website maintenance, overheads	\$10.6 million to \$11.7 million	Medium
	Scheme management costs including salaries, IT systems, compliance, technical support (such as promotion and education), take-back service, incentive programmes	\$120.1 - \$151.4 million	Medium
	Destruction expenses associated with the additional refrigerant recovered under regulated scheme. The range is based on the additional refrigerant recovered under the low and high policy impact scenarios.	\$1.2 million to \$4.9 million	Low
Industry	Cost to refrigerant technicians to ensure qualifications standards. 8,775 to 16,775 technicians with some mutual recognition based on existing qualifications. Costs are based on MBIE's licensing system for refrigeration, heating, and air conditioning technicians.	\$25.1 million - \$45.3 million	Low
	Cost to refrigerant companies to comply with scheme. This marginal cost is expected to be low given the anecdotal evidence of data collection and extent of existing training regimes in industry.	Low	Low

Affected groups	Comment	Impact (PV from 2050)	Evidence Certainty
Consumers	Costs incurred by industry may be transferred to consumers	Low	Medium
Other			
Training providers	Providing additional training to technicians that do not meet the required standard of training.	\$11.3 million - \$19.6 million	Low
Total monetised costs		\$189.8 million - \$254.4 million	Medium
Non-monetised costs		Low	Low
Additional benefits of the preferred option compared to taking no action			
Regulated groups			
Industry	Positive PR – ‘doing the right thing’.	Low	Low
	Productivity increases – to the extent training leads to productivity increases due to enhanced technician skill levels and a smoother functioning industry as a result of clearer lines of responsibility and accountability	Low	Low
Society	Enhanced knowledge - greater understanding of refrigerants and their consequences due to better data collection and reporting; alignment with overseas jurisdictions reducing confusion	Low	Low
Consumers	Cost savings from better access to drop off locations for end-of life equipment, and potential for reduced expenditure replacing gas that has leaked	Low	Low
Environment	Emissions reduction increases. Ranges depend on low and high policy impacts provided in Verum’s projections.	\$60.1 million - \$437.2 million	Medium
Total monetised benefits		\$60.1 million - \$437.2 million	Medium
Non-monetised benefits		Low	Low
Net impact		-\$194 million to \$247 million	Medium

117. The net impact shown in the table highlights that, relative to the status quo, society could be made better off by \$247 million (in present value terms) but could also be made worse off by \$194 million (in present value terms). The available information on high and low emissions reductions benefits does not allow us to determine which of those possibilities is more likely. Monetised costs and benefits are subject to

uncertainty on both sides, meaning caution should be exercised in weighting the CBA results more highly than those of the multi-criteria analysis in Table 3.

Section 3: Delivering an option

How will the new arrangements be implemented?

119. This section outlines how the preferred option can be given effect. It outlines current preparation, impacts on the sector, implementation risks, and plans to manage these risks.
120. Initially, the Ministry for the Environment will have responsibility for development, finalisation and bringing into force the regulations, under sections 22 and 23 of the Waste Minimisation Act 2008 and under section 11 and 13 of OLPA. The Ministry would also be responsible for enforcement, conducting audits and investigating potential breaches of regulations.
121. The Ministry would require importers and the PSO to keep records of compliance and investigate where non-compliance is detected. The Ministry will develop guidance on requirements of the regulations and how to comply with them.
122. The PSO will be responsible for most of the practical implementation. It will have a role in monitoring compliance of scheme participants. To monitor compliance, the PSO will set record-keeping requirements. Non-compliance can be escalated to the Ministry.

Preparations are underway for an accredited scheme

123. The Trust will operate the accredited scheme under the brand name Cool-Safe. It is actively preparing for the transition from its voluntary scheme to the proposed regulated priority product scheme.
124. Cool-Safe has been progressively implementing new operational procedures and policies as part of its application for accreditation as the PSO. The Trust:
 - Rebranded from 'Recovery' to 'Cool-Safe' in October 2022. The Cool-Safe scheme allows for end users and contractors to hand over responsibility for safe disposal of refrigerants through a network of collection systems.
 - Established a national collection network for recovered refrigerants, utilising suitably skilled technicians to decant refrigerants (contracted through a supply agreement).
 - Employed (October 2022) a dedicated Collection Services Business Development Manager with the intention to expand the collection network.
 - Employed (October 2022) a dedicated Communications Manager to increase awareness and engagement across industry of the collection network for recovered refrigerants, and to extend this reach to include businesses, organisations and consumers who purchase and use equipment.
 - Launched the recovered mixed Refrigerant Bounty Buy-Back Programme (October 2022) that publicises a financial incentive for industry. The programme rewards those who are depositing end-of-life mixed refrigerants at its collection sites, with the aim of increasing the recovered volume of refrigerants.
125. The proposed priority product scheme design was completed in May 2020. In late 2022, Government consulted on proposed regulations to enable regulated product stewardship for Refrigerants (CAB-22-MIN-0564). In April 2023, the Trust applied for priority product stewardship accreditation of Cool-Safe—its rebranded refrigerant recovery scheme. A decision is expected in late 2024 following independent review.
126. Cool-Safe's accreditation will ensure the set-up for the sale of refrigeration in accordance with an accredited scheme and the provision of a take-back and destruction service (regulations 1 and 4). Further work will be required to establish

the quality standard requirements for qualified technicians by 2027 (regulations 2 and 3).

Onshore disposal of refrigerants will be possible from 2024

127. The Trust is building a plasma arc plant for the destruction of refrigerants (and other chemicals). The plant has been commissioned with an initial capacity to destroy 100 tonnes of refrigerant per annum and is expected to be operational in 2024.
128. The plasma arc will enable onshore destruction of refrigerants. Previously, refrigerants were exported to Australia. The facility will enable further capacity to dispose of refrigerants with high temperature incineration (regulation 5).
129. As an onshore destruction facility, the plasma arc will have the following benefits:
 - It will eliminate the need and risk from shipping refrigerants offshore for destruction.
 - The facility can be used for the destruction of other hazardous chemical waste.
 - It will support New Zealand as a party to the Basel Convention by reducing the need to ship hazardous waste offshore.

Regulations would be developed under sections 22 and 23 of the WMA and implemented in two tranches

130. The proposed regulations would be developed under sections 22 and 23 of the WMA, subject to Cabinet approval. The Ministry would work with the Parliamentary Counsel Office to draft the regulation and would report back to Cabinet in 2024.
131. The proposed regulations would be introduced in two tranches. Tranche one regulations would establish the measure to enable mandatory participation in the scheme, keeping records of synthetic refrigerant related activities, and recovery of gas from end-of-life equipment. Tranche two would establish the requirements to avoid intentional release of gases as well as training and certification provisions.
132. Tranche one is expected to be in force from mid-late 2024. Tranche two will come into force three years later. The three-year gap will enable industry and refrigerant technicians time to upskill, become certified, and manage any pressures on training providers that may occur.

Table 8: Impact on sector from the proposed refrigerant stewardship regulations

Timeframe	Proposed Regulations	Impact on sector
Tranche one (mid-late 2024)	The "in effect" date is subject to Cabinet approval. It is expected to be mid-late 2024: - Prohibit the sale of refrigerants except in accordance with the accredited scheme. - Require disposal of refrigerant to methods that ensure full destruction. - Require the accredited scheme to provide a take-back (collection) and destruction service for refrigerants.	Persons selling refrigerant, i.e. importers would need to do so in accordance with the accredited scheme. Persons capturing refrigerants from equipment containing refrigerants would need to ensure the refrigerants are either destroyed via high-temperature incineration or reused. The accredited scheme would need to provide collection and destruction services for refrigerants. Consumers and stakeholders such as facility managers will be educated through the accredited scheme's communication platform and via direct

Timeframe	Proposed Regulations	Impact on sector
		engagement.
Tranche two (3 years after Tranche one)	Subject to Cabinet approval, the earliest in effect date is May 2027: - Restrict the purchase of refrigerant to a qualified Refrigerant Technician - Set a quality standard to ensure refrigerant is only recovered by a qualified Refrigerant Technician.	Persons buying refrigerant or capturing and disposing of refrigerant, would need to demonstrate they hold appropriate certifications and/or qualifications for safe refrigerant management.

Implementation risks

133. The following subsection details implementation risks as they relate to a mandatory product stewardship scheme. These risks, their evidence, and consequent mitigation measures are outlined in Table 9 below.

Table 9: Implementation risks

Risk identified	Evidence or possible cause of risk	Mitigation of risk
The PSO is ineffective	The PSO may use its resources inefficiently. Inefficient resource use can lead to poor performance, greater costs than needed, friction with stakeholders, and reduced effectiveness.	The Ministry can revoke scheme accreditation if scheme is not meeting stated outcomes The PSO would be required to regularly report on the scheme's performance, including on meeting the scheme's objectives.
	The PSO has insufficient skills to run the scheme.	Draw on experience from existing voluntary scheme as well as the Ministry's experience implementing similar regimes e.g. the tyres product stewardship scheme.
	The Ministry may provide the PSO with poor targets. Poor targets can lead to over or understated performance.	Robust development of PSO targets, drawing from best practice. Targets and progress towards these targets published in annual reports.
Unwillingness of industry to participate in the scheme	Industry may be dissatisfied with the regulation. Duplication of costs due to MBIE licensing regime being developed for refrigeration technicians in respect of hazardous gases.	Co-design development process. Appropriate compliance, monitoring, and enforcement (CME) measures. Information and awareness campaigns to build trust. Potential to recognise MBIE requirements as proof of competence for the regulated stewardship scheme proposed here (i.e. no need to pay twice or receive joint certification).
Litigation from parties unsatisfied with the accreditation process and appointment of PSO	Submissions to the Ministry highlighted that some parties may be unsatisfied if Cool-Safe is appointed as the PSO. Any residual resentment can lead to reduced participation and engagement in the scheme.	The Ministry would ensure that the appointment and evaluation process is robust, transparent, objective, and rigorous. Any applications that are received in addition to Cool-Safe's will also be considered.

Risk identified	Evidence or possible cause of risk	Mitigation of risk
Voluntary non-compliance	Compliance and enforcement measures are insufficient to ensure the industry's compliance.	Broader CME strategy that tailors the tools for circumstances. This strategy will include appropriate enforcement measures, detection measures, and assistance (e.g. information and guidance) to ensure compliance. Two CME FTEs focusing on this matter. This is in line with similar legislation in New Zealand, for example, the Ministry's regulation to support product stewardship schemes for tyres. The Ministry will ensure the public accountability of the PSO. Public accountability involves clear information on the scheme's workings, transparent chain of custody for collected refrigerants, and published annual reports that include target reporting.
Involuntary non-compliance	Importers, manufacturers, and producers may struggle to comply with the scheme if a start date is too near.	The time taken to establish the accredited scheme, and for parties to become compliant with any requirements will need to be appropriately considered.
	The 16,775 technicians may struggle to become qualified by the start date.	The two-tranche implementation plan provides a three-year lead-in time to enable technicians to become compliant. Appropriate mutual recognition of current qualifications and training. Guidance for appropriate mutual recognition is stated in the Synthetic Refrigerant Stewardship Working Group' Milestone 4 Report 2 document.
Insufficient upfront investment in collection sites	Collection sites with sufficient capacity are required to ensure refrigerant can be recovered. This issue will be magnified for rural areas and other isolated locations where access to refrigerant facilities can be limited.	The Trust has recently implemented measures to improve access to refrigeration facilities, including establishing a national collection network, employing a Collection Services Business Development Manager to expand the collection network, and employing a Communications Manager to increase awareness and engagement with the collection network.

Risk identified	Evidence or possible cause of risk	Mitigation of risk
Inadvertent anti-competitive effects	The regulation will prohibit the sale of refrigerants except in accordance with the accredited scheme. Anti-competitive effects will arise to the extent that any importer or manufacturer is unfairly advantaged.	The PSO must disclose its proposed requirements for selling a product in accordance with the scheme. All governance activities will adhere to the Commerce Commission guidelines on collaborative activities between competitors, including but not limited to considering the option of applying for collaborative activity clearance from the Commission for the scheme.
Lack of strong and verifiable evidence of impact	There is limited data on the impact of introducing regulations to support the refrigerant scheme.	The scheme will be required to record, monitor, and report on its performance to the Ministry regularly. Australia implemented mandatory participation in a product stewardship scheme and mandatory training requirements despite the lack of concrete evidence for a problem.
Costs are greater than budgeted	The scheme's benefits rely on incurring a level of costs. However, any undue cost burden poses a risk to the scheme's efficacy.	The scheme's costs and benefits will be monitored, to the extent possible, through annual reporting requirements. The threat to revoke scheme accreditation will encourage effective cost management.
The CME system will not be ready for implementation	A functioning CME system is required to ensure compliance with the proposed regulation.	The Ministry can leverage its existing expertise in CME implementation, for example, drawing from the learnings from the current implementation of the product stewardship scheme for tyres. The Ministry plans to operate the CME function as part of its business-as-usual activity.

How will the new arrangements be monitored, evaluated, and reviewed?

134. The following section outlines how the regulation will be monitored, evaluated, and reviewed. It states the roles, responsibilities, and requirements of key parties to the regulation, as well as arrangements to review the scheme.

Roles, responsibilities, and requirements

135. The Ministry would be responsible for enforcing the proposed regulations. It would do so under the WMA.³⁹ The Ministry would appoint two CME personnel to enforce compliance with the scheme. After the first three years of operation, resourcing requirements and their application would be reassessed.
136. Where alleged breaches of,⁴⁰ or instances of non-compliance with, the proposed regulations are identified, enforcement tools would be used to bring positive behavioural change and deter future offences. Enforcement approaches would be proportionate to the seriousness of the noncompliance, following an investigative process.⁴¹
137. The accredited scheme would monitor scheme participants' compliance with any of its requirements. The scheme may escalate issues of non-compliance to the Ministry.
138. The accredited scheme would be required to submit an annual report to the Minister outlining its performance. The report would contain information on financial performance (including scheme cost effectiveness), environmental performance (including performance against objectives, targets, and best practice collection rates in other jurisdictions), and agreements with scheme service providers. The Ministry will use this information to review the effectiveness of the accredited scheme, and to inform future reviews.
139. Scheme participants—importers, wholesalers and retailers, refrigerant technicians, owners of HVAC14 equipment, and consumers—would have roles, responsibilities, and legislative obligations. These are listed in Table 10 along with the proposed monitoring tools.

Review of the scheme

140. The scheme will have a maximum review period of four years. The review would cover the overall efficacy of the scheme and associated regulations.
141. Outside this scheduled review, a review of the regulations may be triggered by lower-than-expected refrigerant recovery (collection) rates or if significant unintended consequences are reported which query the appropriateness of the scheme.
142. A review may also be triggered by legislative change at a national or international level. For instance, the Resource Management Act 1991, WMA and the Litter Act 1979 are currently being reviewed. Change has been indicated for the WMA.

³⁹ 1 Section 14 of the WMA requires an accredited scheme to monitor and report on its performance, and section 20 enables the Ministry to monitor accredited schemes performances (and recover the costs of doing so). Charges payable for monitoring priority product schemes can be set by regulation under section 22(1)(e).

⁴⁰ Breaches are likely to be raised directly to the Ministry by the accredited scheme provider, public reporting and auditing.

⁴¹ [Waste Minimisation Act 2008: Compliance, Monitoring and Enforcement Strategy | Ministry for the Environment](#)

Table 10: Proposed legislative obligations for regulated refrigerant stewardship scheme participants

Regulation	Legislative authority	Obligation	Offence	Monitoring	Example of CME tool application (examples are indicative only)
Importers and retailers - <i>The producer or importer of bulk Refrigerant and of Refrigerant contained in pre-charged equipment</i> - <i>Retailers and wholesalers who sell Refrigerant and equipment containing Refrigerant</i>					
Sale in accordance with an accredited scheme	Regulation set under WMA 22(1)(a) and enforced by Ministry CME team	People who sell or distribute Refrigerants or equipment, first placed on the market, must participate in an accredited scheme and comply with its requirements. The requirements will be published on the Ministry website	An importer or retailer commits an offence if they do not register with an accredited scheme before selling refrigerants, or if they do not comply with its requirements	The Ministry will request data from NZ Customs Service under section 24 of the WMA to identify a list of refrigerant importers. Other sources, for example Consumer NZ, would be consulted if deemed necessary. The Ministry will cross-check this list with the list of scheme participants provided by the accredited scheme	Persons prosecuted and convicted of an offence are liable for a fine of up to \$100,000.
Restriction on sale of refrigerant	Regulation set under WMA 23(1)(b) and enforced by Ministry CME team	Refrigerant retailers must only sell refrigerant to a technician who provides evidence they participate in an accredited scheme and meet the qualification requirements set by the accredited scheme	A retailer who sells refrigerant to an unqualified technician commits an offence.	The Ministry will set record-keeping requirements (under s23(1)(i)) to monitor and enforce the requirement. Retailers must keep records of the people who purchase refrigerant and whether they provided verification that they meet the qualification requirements. The Ministry's CME team can access these records on request.	Persons prosecuted and convicted of an offence are liable for a fine of up to \$100,000.

Regulation	Legislative authority	Obligation	Offence	Monitoring	Example of CME tool application (examples are indicative only)
Refrigerant technicians					
<i>Technicians (including automotive refrigerant technicians) who install, service, maintain, and decommission refrigerant-containing equipment. Technicians who fill and recover refrigerant</i>					
Restriction on sale of bulk refrigerant	Regulation set under WMA 23(1)(b) and enforced by Ministry Compliance Monitoring and Enforcement (CME) team	Technicians who purchase bulk refrigerant-containing equipment must meet qualification requirements, as set by the accredited product stewardship organisation and published on the MfE website.	A person who purchases refrigerant who does not meet the PSO qualification requirements commits an offence.	The Ministry will set record-keeping requirements (under s23(1)(i)) to monitor and enforce the requirement. Retailers must keep records of the people who purchase refrigerant and whether they provided verification that they meet the PSO qualification requirements. The Ministry can request these records for inspection, in the cases where they detect non-compliance.	Persons prosecuted and convicted of an offence are liable for a fine of up to \$100,000.
Quality standard for end-of-life refrigerant product	Regulation set under WMA 23(1)(g) and (h). The Ministry CME team has responsibility for enforcement.	Technicians who decommission refrigerant-containing equipment and recover refrigerant and arrange for its disposal must meet the qualification requirements as determined by the accredited scheme.	A person who decommissions refrigerant-containing equipment or recovers refrigerant who does not meet the PSO qualification requirement commits an offence.	The Ministry will set record-keeping requirements (under s23(1)(j)) to monitor and enforce the requirement. Technicians must keep records of the quantity of refrigerant disposed, and method for disposal. The Ministry can request these records for inspection, in the cases where they detect non-compliance.	Persons prosecuted and convicted of an offence are liable for a fine of up to \$100,000.
Disposal of refrigerant only permitted through full denaturing	Regulation set under WMA 23(1)(a). Local authorities have	Technicians who recover refrigerant must ensure it is disposed of through a method that ensures full	A person who vents refrigerant to the environment or disposes of refrigerant through a	The Ministry will set record-keeping requirements (under s23(1)(j)) to monitor and enforce the requirement. Technicians must	Persons prosecuted and convicted of an offence are liable for a fine of up to \$100,000.

Regulation	Legislative authority	Obligation	Offence	Monitoring	Example of CME tool application (examples are indicative only)
	responsibility for enforcement.	denaturing (e.g., plasma arc facility).	method other than full denaturing, commits an offence.	keep records of the quantity of refrigerant disposed, and method for disposal. The Ministry can request these records for inspection, in the cases where they detect non-compliance.	
Owners of HVAC equipment					
Quality standard for end-of-life refrigerant product	Regulation set under WMA 23(1)(g) and (h). Ministry CME team has responsibility for enforcement.	Owners of refrigerant-containing equipment reaching end of life must ensure a qualified technician recovers refrigerant from the equipment before the equipment is disposed.	A person who disposes of refrigerant-containing equipment without recovering the refrigerant commits an offence.	The Ministry will set record-keeping requirements (under s23(1)(j)) to monitor and enforce the requirement. Technicians must keep records of the quantity of refrigerant disposed, and method for disposal. The Ministry can request these records for inspection, in the cases where they detect non-compliance.	<i>Infringement fee</i> - up to \$100,000 value for individuals or corporates if they dispose of refrigerant-containing equipment without arranging for a qualified technician to recover the refrigerant before disposal.
Disposal of refrigerant only permitted through a designed facility	Regulation set under WMA 23(1)(a). Local authorities have responsibility for enforcement.	Owners of refrigerant-containing equipment must arrange for the disposal of refrigerant through full denaturing (e.g., a plasma arc facility).	A person who vents refrigerant to the environment or disposes of refrigerant through a method other than full denaturing, commits an offence.	The Ministry will set record-keeping requirements (under 23(1)(i)) to monitor and enforce the requirement. HVAC equipment owners must keep records of the quantity of refrigerant disposed, and method for disposal. Local authorities can request these records, in cases where they suspect non-compliance with the	<i>Infringement fee</i> - up to \$100,000 value for individuals or corporates if they dispose of refrigerant-containing equipment without arranging for a qualified technician to recover the refrigerant before disposal.

Regulation	Legislative authority	Obligation	Offence	Monitoring	Example of CME tool application (examples are indicative only)
				requirements OR they must provide evidence to plasma arc facility/accredited scheme drop off facility that a qualified person has recovered the gases and arranged for its disposal.	
Consumers					
Purchase of refrigerant	Regulation set under WMA 23(1)(b) and enforced by Ministry (CME) team	Bulk refrigerant can only be purchased by qualified technicians. Consumers must provide evidence a qualified technician is installing equipment containing refrigerant (e.g. heat pumps).	A person who purchases bulk refrigerant without meeting qualification requirements set by the PSO commits an offence.	The Ministry will set record-keeping requirements (under s23(1)(i) to monitor and enforce the requirement. Retailers must keep records of the people who purchase refrigerant and whether they provided verification that they meet the PSO qualification requirements. The Ministry can request these records for inspection, in the cases where they detect non-compliance.	Persons prosecuted and convicted of an offence are liable for a fine of up to \$100,000

Appendix A: Further detail on the Status Quo

Background

143. Synthetic refrigerants are human-made refrigerants. They have physical properties that allow them to be used to change the temperature of the surrounding environment. Refrigerants are an essential component of refrigerators, freezers, heat pumps, and air-conditioning units.
144. Fluorinated gases (F-gases) are a class of fluorine-containing compounds that are gaseous at room temperature. There are four classes of F-gases, including hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF6) and nitrogen trifluoride (NF3). In New Zealand, F-gases are largely hydrofluorocarbons (HFCs), which are primarily used as refrigerants.
145. In 2020, the Associate Minister for the Environment declared refrigerants as a priority product. Refrigerants declared a priority product are all refrigerant gases (including SF6) used for heating, cooling and air conditioning that are:
- Ozone depleting substances for the purposes of the Ozone Layer Protection Act 1996 (OLPA), for example, chlorofluorocarbons (CFCs).
 - Synthetic greenhouse gases under the Climate Change Response Act 2002 (these are hydrofluorocarbons (HFC) and hydrochlorofluorocarbons (HCFCs)).⁴²
146. Products are declared a priority because of:
- The risk they pose to the environment when they become waste.
 - The benefits from reduction, reuse, recycling, or treatment are significant.
 - The product can be effectively managed under a product stewardship scheme.
147. Synthetic refrigerants have high global warming potential (GWP) and/or are ozone depleting properties. GWP is a measure of a substance's ability to absorb heat relative to carbon dioxide. A low GWP is considered to be below 150 and a high GWP to be above 750. Substances with GWPs between 150 and 750 are considered to have intermediate GWPs
148. The declaration also captures products containing these gases. However, the priority product declaration and refrigerant regulations do not capture natural refrigerants.
149. Natural refrigerants, in some situations, can be used as an alternative to synthetic refrigerants. Natural refrigerants are substances that occur directly in the environment. Examples of natural refrigerants include hydrocarbons (such as propane or isobutane), carbon dioxide, and ammonia. Natural refrigerants generally have a low GWP and are usually more affordable than synthetic refrigerants. They are not covered under the priority product declaration.
150. However, they often have 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 and corrosive. The range of risks associated with natural refrigerants is a barrier to wider use.
151. In New Zealand, phasing out of synthetic hydrochlorofluorocarbons (HCFCs) and chlorofluorocarbons (CFCs) began in the 1990s under the Montreal Protocol—a global

⁴² New Zealand Government (2020), *Declaration of Priority Products Notice 2020*, accessed at: <https://gazette.govt.nz/notice/id/2020-go3343>

agreement to phase out almost 100 synthetic ozone depleting substances. Ozone depleting substances are synthetic gases that destroy the ozone layer once they get to the ozone layer. They include HCFCs and CFCs. While HFCs have a high GWP, they are not ozone depleting substances.

Government and industry initiatives underway at present

New Zealand's first emissions reduction plan (ERP)

152. New Zealand's first ERP was released in May 2022. It contains strategies, policies, and actions to achieve New Zealand's first emissions budget as part of the global effort to limit temperature rises to 1.5 degrees Celsius above pre-industrial levels. The emissions budget requires New Zealand to reduce greenhouse emissions by an extra 11.5 Megatonnes of Carbon Dioxide equivalent (Mt CO₂-e) by 2025.
153. The ERP's Chapter 16 states that *"by 2050, Aotearoa New Zealand will have transitioned away from fluorinated gases (F-gases) with high global warming potentials (GWP), while safeguarding activities that currently rely on F-gases, such as refrigeration and heating"*.⁴³
154. In the ERP, the Government sets a target for the F-gas sector of limiting F-gas emissions to 5.8 Mt CO₂-e from 2022 to 2025 compared to an estimated 7.2 Mt CO₂-e without the initiatives in the ERP. To do this, three key actions have been set:
- Build the capability to shift to alternative low-emission refrigerants and develop training and accreditation for handling alternative gases.
 - Prohibit the import of pre-charged equipment.
 - Investigate prohibiting F-gases with high GWP
 - Introduce a mandatory product stewardship scheme for refrigerants.

Emissions Trading Scheme

155. The ETS is provided for under the Climate Change Response Act 2002 (CCRA). The CCRA puts in place a legal framework to enable New Zealand to meet its international obligations under the United Nations Framework Convention on Climate Change, the Kyoto Protocol, and the Paris Agreement.
156. Under the ETS, importers and manufacturers of HFCs are required to offset their emissions by obtaining New Zealand Units (NZUs). Importers and manufacturers pass ETS costs down the supply chain to retailers, who then pass their cost onto consumers in product purchase prices. Consumer prices are significantly impacted because levies on bulk HFCs are applied based on GWP i.e. HFCs with higher GWPs incur higher costs. The costs of these gases will track with the price of carbon.
157. The Climate Change (Other Removal Activities) Regulations 2009 provides the ability to obtain NZUs for the export or destruction on HFCs. By doing so, these regulations provide monetary incentive to remove or destroy HFCs.
158. NZUs earned— from the export of HFCs for destruction—by the current regulated product stewardship scheme have been held in reserve when the NZU price was low. Since 2022, some of these have been traded by the current scheme to:
- Incentivise gas collection.

⁴³ Ibid

- Commission an onshore plant to destroy F-gases.
- Expand the scheme support sector training certification.

The Synthetic Greenhouse Gas Levy

159. In 2013, the SGG Levy was introduced to set an emissions price for F-gases in imported pre-charged equipment and vehicles for which the ETS is not applicable. The SGG Levy price is set relative to NZU prices within the ETS.
160. Revenue from the SGG Levy goes directly to the Crown and is not available to fund collection and destruction of F-gases or to establish product stewardship schemes. However, NZU credits received by the accredited scheme for removal of gases from New Zealand through export or destruction has been liquidated to provide funding for the scheme. The number of NZU credits received is linked the GWP of the gases removed and the income received is based on the market price of carbon.

The Waste Minimisation Act 2008

161. The WMA's purpose is to encourage waste minimisation to protect the environment from harm and provide environmental, social, economic and cultural benefits.
162. The WMA includes product stewardship provisions. These provisions aim to encourage, and in certain circumstances require, the people or organisations involved in the life of the product to share responsibility for:
 - Ensuring there is effective reduction, reuse, recycling, or recovery of the product.
 - Managing any environmental harm arising from the product when it becomes waste.⁴⁴
163. The WMA provides a framework to accredit mandatory product stewardship schemes for products that have been listed as "priority products". Regulations can be made to control or prohibit the sale and disposal of priority products, require take-back services, set fees, require labelling of products, set quality standards, and impose information requirements.
164. 'Waste' and 'disposal' are defined under the WMA such that the product stewardship regulatory options for gases are limited. The WMA has limited regulation making powers for imposing controls during the lifecycle of "use" of a product. In this instance, before gases (or products they are contained in) become waste.
165. Instead, the regulation making powers mostly relate to end-of-life disposal of gases. For example, it is not possible to regulate the refilling (or the management of refilling) while in ordinary use and before the point of disposal. However, the WMA does allow for restrictions on the purchase of the gases. The WMA allows regulations to be made restricting the purchase of gases, requiring industry to participate in an accredited scheme, and setting quality standards for end-of-life management. We expect the combination of these regulations would impact emissions in the wider cycle of use for the gases.
166. Government declared refrigerants and other synthetic greenhouse gases a priority product under the WMA in 2020. The declaration means a priority product stewardship scheme must be developed. It also enables regulations to be made to mandate acting in accordance with the scheme.
167. In 2020, an industry-led co-design working party proposed a regulated scheme design, and recommended supporting regulations, targeting synthetic refrigerants including F-gases. The group recommended requirements for skills, widened coverages to other sectors using F-gases (e.g. automotive air conditioning and heat pumps), and the

⁴⁴ Parliamentary Counsel Office. (2023). *Waste Minimisation Act 2008*.

significant expansion of F-gas collection for destruction. The proposal was informed by data on the voluntary scheme performance reporting, New Zealand-specific industry experience, and considerations informed from looking at the effectiveness of models used in regulated schemes overseas.

168. In 2022, the Ministry consulted on proposed regulations to support a priority product stewardship scheme for refrigerants and other synthetic greenhouse gases based on the co-designed proposal.⁴⁵

The Kigali Agreement to the Montreal Protocol

169. The Kigali Amendment to the Montreal Protocol requires parties to limit their consumption of certain HFCs by specified amounts between 2019 to 2036. It limits bulk net imports of HFCs but does not restrict the import of equipment pre-charged with HFC refrigerants.
170. As a party to the Kigali Amendment, New Zealand is currently in the process of reducing HFC imports. New Zealand will phase down the net supply of new bulk HFCs to 52 per cent below a baseline level in 2025 and 75 per cent below in 2031.⁴⁶

Industry-led voluntary product stewardship

171. In 1993, the Trust for the Destruction of Synthetic Refrigerants (the Trust) established a voluntary product stewardship scheme, Refrigerant Recovery, for synthetic refrigerants. Refrigerant Recovery was initially funded by a voluntary levy paid by most of the major importers of bulk refrigerants. Since 2022, the levy was discontinued and the scheme is now funded with NZU credits.
172. Refrigerant Recovery was accredited by the Minister for the Environment under the WMA in 2010 and reaccredited in 2017. The scheme established a national system to collect and destroy synthetic refrigerants and exported the gases to Australia for high-temperature destruction. Refrigerant Recovery has recently been rebranded as Cool-Safe. An application for reaccreditation of the upgraded scheme has been submitted.
173. In the 2022/2023 financial year, Cool-Safe collected approximately 38 tonnes and destroyed approximately 20 tonnes of refrigerant gases of all types. Refrigerant gases have historically been exported to Australia for destruction. The quantity of gases destroyed is limited by access to bulk gas storage containers and capacity in shipping and the destruction plant and varies across years. Around 70 per cent of gases recovered and destroyed are HFCs. This has reduced emissions of ozone depleting substances by 360 tonnes and avoided approximately 43,000 tonnes of CO₂ equivalent entering the environment.

⁴⁵ Further details of the scheme design can be found in Appendix 2 of the public consultation document on proposed product stewardship regulations for F-gases [Proposed measures to reduce the environmental impact of fluorinated gases: Consultation document | Ministry for the Environment](#)

⁴⁶ OLPA (2018). Ozone Layer Protection Act Regulations at 10/12/18 Schedules 6+1AA, relating to a High Court amendment

Table 11: Refrigerant collected and destroyed by Cool-Safe

Year	2017/18 ⁴⁷	2018/19 ⁴⁸	2019/20 ⁴⁹	2020/21 ⁵⁰	2021/22 ⁵¹	2022/23 ⁵²
Total amount collected.	38,624 kg	32,573 kg	37,417 kg	30,951 kg	33,168 kg	38,481 kg
Total amount destroyed.	39,086 kg	7,482 kg	45,820 kg	9,162 kg	53,403 kg	20,125 kg
Total ozone reductions.	11,400 tonnes	1,000 tonnes	3,000 tonnes	1,950 tonnes	3,852 tonnes	360 tonnes
Total CO ₂ equivalent avoided.	90,100 tonnes	16,000 tonnes	101,000 tonnes	20,500 tonnes	127,000 tonnes	43,000 tonnes

The current state of training and licensing

174. The Institute of Refrigeration, Heating and Air Conditioning Engineers (IRHACE) and Climate Control Companies Association of New Zealand (CCCANZ) with funding provided by the refrigerant levy collection established the Refrigerant License Trust Board in 2011, which operates under the name Refrigerant License New Zealand (RLNZ). RLNZ initially developed and provided refrigerant filler and handler training and certification. It has since expanded its activities to provide a wider range of training, technical education, and professional development for the industry.
175. Refrigeration technicians can complete a National Certificate, which includes training modules on the installation, repair, and maintenance of refrigerants, however this is not compulsory. The only mandatory qualification is an approved filler training course to fill

⁴⁷ Refrigerant Recovery, Product Stewardship Scheme Annual Report to the Minister for the Environment for the Year ended 31 March 2019, accessed at [Trust for the Destruction of Synthetic Refrigerants - 2019 Annual Performance Report.pdf \(irhace.org.nz\)](https://www.datocms-assets.com/1669781971-rr-annual-report-2019-final.pdf)

⁴⁸ *ibid*

⁴⁹ Refrigerant Recovery, Product Stewardship Scheme Annual Report to the Minister for the Environment for the Year ended 31 March 2021, accessed at [Recovery-Product-Stewardship-Scheme-Reporting-to-Minister-2021.pdf \(refrigerantrecovery.co.nz\)](https://www.datocms-assets.com/1669781971-rr-annual-report-2021-final.pdf)

⁵⁰ *ibid*

⁵¹ Refrigerant Recovery, Product Stewardship Scheme Annual Report to the Minister for the Environment for the Year ended 31 March 2022, accessed at [1669781971-rr-annual-report-2022-final.pdf \(datocms-assets.com\)](https://www.datocms-assets.com/1669781971-rr-annual-report-2022-final.pdf)

⁵² Cool-Safe, Product Stewardship Scheme Annual Report to the Minister for the Environment for the Year ended 31 March 2022, accessed at <https://www.datocms-assets.com/79297/1701641714-cool-safe-annual-report-2023.pdf>

containers with gases under pressure. The approved filler course is a generic one-day training course not specific to the needs of refrigeration technicians.

176. A total of 16,775 persons are estimated to work on equipment containing F-gases in both stationary and mobile applications in New Zealand. This group consists of:
- 4,214 technicians registered as Approved Fillers under the WorkSafe framework and have basic entry-level skills. Approximately 1,100 of these technicians also have New Zealand Qualifications Authority (NZQA) qualifications.⁵³
 - 3,200 licensed electricians.⁵⁴
 - 1,775 automotive HVAC technicians.⁵⁵
 - The remaining 7,586 are considered to have no formal training.⁵⁶
177. An unknown quantity of all technicians working on synthetic refrigerants have received informal training, equipment manufacturer approved workplace training, or overseas certification. It is unknown whether these forms of training have been updated for recent industry developments in equipment and available gases.
178. The remaining workforce is considered by industry sources to have insufficient competence to reduce the risk of harm from working with equipment containing refrigerant.
179. The proposed framework for High Risk Work Licences in the refrigeration sector included new regulations requiring a licence to be held by all technicians who work on refrigeration, heating, or air conditioning systems in specified high-risk industrial and commercial settings involving hazardous refrigerants.⁵⁷
180. MBIE's legislative regime is focused on improving workplace safety, rather than on environmental risk. The MBIE licensing scheme as previously proposed would only cover people working with F-gas alternative refrigerants with hazardous properties used in specified high-risk commercial and industrial settings.

Other legislation

181. The management of refrigerants is also covered in other legislation. Appendix B outlines this legislation and the regulatory agencies involved.

Stakeholder interests

182. Stakeholders involved with synthetic refrigerants (Appendix C) include companies and organisations representing refrigerants and equipment containing refrigerants. They also include synthetic refrigerant importers, wholesalers and suppliers, retailers, automotive industry, scrap metal recyclers, waste management companies, local

⁵³ Figures sourced from NZQA and WorkSafe

⁵⁴ Figure sourced from industry.

⁵⁵ Figure sourced from the Motor Trade Association.

⁵⁶ Estimate supplied from above figures and additional information provided in consultation with Cool-Safe, the Ministry of Business, Innovation, and Employment, and key industry players in the heat pump sector.

⁵⁷ As of October 2024 this work has been paused pending the outcome of consultation on the work health and safety regulatory system.

government and consumers (individuals, householders and commercial companies).

Appendix B: Legislation relevant to the management of synthetic refrigerants

Table 12 Legislation relevant to the management of synthetic refrigerants

Legislation	Relevance to synthetic refrigerants
Administered by the Ministry for the Environment	
Climate Change Response Act 2002 (CCRA)	The Climate Change Response Act 2002 puts in place a legal framework to enable New Zealand to meet its international obligations under the United Nations Framework Convention on Climate Change, the Kyoto Protocol and the Paris Agreement. The CCRA also provides for the frameworks for New Zealand's greenhouse gas Emission Trading Scheme (ETS) and Synthetic Greenhouse Gas (SGG) Levy.
Waste Minimisation Act 2008 (WMA)	The Waste Minimisation Act 2008 encourages a reduction in the amount of waste we generate and dispose of in New Zealand. The aim is to reduce the environmental harm of waste and provide economic, social and cultural benefits for New Zealand. The WMA provisions include the waste disposal levy, product stewardship, waste minimisation fund, role of territorial authorities and the Waste Advisory Board. The WMA is currently being reviewed, and change has been indicated.
Hazardous substances and New Organisms Act 1996 and Hazardous Substances (classification) Notice 2017	Regulates the use of hazardous substances (including dangerous goods) across their lifecycle (including during transport). Some refrigerants are classified as hazardous substances, especially those with flammable properties.
Ozone Layer Protection Act 1996 (and regulations)	Regulates activities which may modify the ozone layer, phases out ozone-depleting substances and gives effect to New Zealand's obligations under the Vienna Convention for the Protection of the Ozone Layer and the Montreal Protocol on Substances that Deplete the Ozone Layer.
Resource Management Act 1991	Regulates activities relating to the discharge of contaminants into the environment (section 15) and duty to avoid, remedy or mitigate adverse effects on the environment arising from the activity (section 17). The RMA is currently under review and change has been indicated.
The Litter Act 1979	Prohibits illegal disposal of equipment containing refrigerant (such as fridges or freezers) on any property without the owner's permission. Monetary fines can range from \$1,000 to \$20,000. The Litter Act is currently under review and change has been indicated.

Administered by the Environmental Protection Agency	
Basel Convention on the Control of Transboundary Movements of Hazardous Waste	An international agreement that aims to reduce the amount of waste produced by signatories and regulates international transport of hazardous waste. Refrigerants are classified as a hazardous waste.
Administered by the Ministry for Business Innovation and Employment	
Health and Safety at Work Act 2015 and Hazardous Substances Regulations 2017	Sets controls on the use of hazardous and high-pressure refrigerants in workplaces. The Ministry for Business, Innovation, and Employment (MBIE) have proposed regulations to require refrigerant technicians to be trained and accredited to handle refrigerants with hazardous properties in high-risk areas.
Imports and Exports (Restrictions) Act 1998	Controls the importation and exportation of refrigerants and equipment containing refrigerants.
Administered by the Ministry of Transport	
Land Transport Act 1998	An application for registration of a motor vehicle must include the amount of the Synthetic Greenhouse Gas levy (SGG Levy).

Appendix C: Stakeholder groups

Table 13 Stakeholder groups involved in the refrigerant

Producers, importers, exporters and distributors	
Bulk refrigerant importers	Importers of refrigerants that are in single containers and not contained within refrigeration equipment
Pre-charged equipment importers ⁵⁸	Importers of new and used equipment that contains refrigerants
Vehicle importers	Importers of new and used vehicles that contain refrigerants
Equipment manufacturers	Those that produce refrigeration equipment within New Zealand and charge it with refrigerants for sale within the country and/or overseas
Wholesalers and retailers, traders and suppliers	People who purchase or export bulk refrigerants or equipment
Others working with refrigerants	
Refrigeration technicians and engineers	Trained and qualified technicians or engineers who install, service and remove gases from equipment
Industry organisations	Organisations that represent professions working in the refrigeration sector and provide services such as training and education
Automotive technicians	A vehicle technician who services vehicle air-conditioning units
Waste management	
Consumers	Householders and commercial entities such as supermarkets, cool stores, dairy farms, owners of air-conditioned buildings, who purchase equipment and engage technicians to install, maintain and decommission the equipment
Waste management and resource recovery	
Automotive dismantlers and scrap metal merchants	A business that breaks vehicles and/or processes equipment into its component parts for resale, recycling or recovery
Collectors	Collects refrigerant from others, such as the accredited voluntary product stewardship scheme
Collection sites	A place where refrigerant technicians and engineers can return unwanted gases
Transfer Stations, Resource Recovery Centres, Landfills	Sites for the temporary deposition, processing or storage of waste materials or for permanent disposal

⁵⁸ Pre-charged equipment refers to equipment that is imported already containing refrigerants such as fridges and freezers.

Regulators	
Government agencies	Various government agencies support the management of refrigerants. Refer to Table 13 for a summary of their roles and responsibilities

Table 14 Composition of synthetic refrigerant scheme co-design working group

Sector	Entities represented
Commercial/industrial heating, ventilation, air conditioning and refrigeration	Institute of Refrigeration, Heating and Air Conditioning Engineers (IRHACE)*
	Climate Control Companies Association New Zealand (CCCA)*
	Beattie Air*
	Temperzone*
Automotive air conditioning	Automotive Parts Importers Association (APIA)
Technician training	Refrigerant License Trust Board (operating as Refrigerant License New Zealand)
Bulk refrigerant importers	Chemiplas
Heat pump installers	Heat Pump Suppliers Association (HPSA)*
Automotive sector	Motor Industry Association Incorporated (MIA*)
	Motor Trade Association (Inc.) (MTA)*
	Imported Motor Vehicle Industry Association Incorporated (VIA)*
Project Manager	3R Group Ltd

Note: representatives of those organisations marked with an asterisk were re-interviewed as part of this analysis.