

Synthetic Refrigerant Stewardship

Milestone 2: Report 1

Critique existing system(s) including product regulations

This scoping report has been prepared by the Synthetic Refrigerant Stewardship Working Group as part of a process to develop an industry led product stewardship programme for synthetic greenhouse gas refrigerants in New Zealand.

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Table of Contents

1. Background.....	5
2. Introduction.....	6
3. Situational Analysis.....	6
3.1. Synthetic greenhouse gas refrigerants landscape in New Zealand	7
3.1.1. Synthetic greenhouse gas refrigerants entering New Zealand	7
3.1.2. Bulk Importers	8
3.1.3. Motor vehicles	9
3.1.4. Pre-charged units	11
3.1.5. Industry Organisations	13
3.1.6. End of life.....	14
3.1.7. Disposal – RECOVERY	15
3.2. The SGG refrigerants are destroyed through a Plasma Arc plant and the remaining waste, which is considered benign, is then disposed of via trade waste. International refrigerant recovery programmes	16
3.2.1. Australia	18
3.2.2. Canada.....	21
3.2.3. United Kingdom	22
3.2.4. Japan.....	23
4. Data Collection and Gap Analysis	25
4.1. Introduction.....	26
4.2. Environmental Protection Authority (EPA).....	26
4.2.1. Section 89 Report	27
4.2.2. Section 250 report	28
4.2.3. Limitations of the EPA data.....	30
4.3. Energy Efficiency and Conservation Authority.....	30
4.3.1. Limitations of the EECA data	31
4.4. New Zealand Customs data.....	32
4.4.1. Limitations of the NZ Customs Service data	34
4.5. Bulk importers' data	34
4.5.1. Limitations of the bulk importer's data.....	35
4.6. RECOVERY	36
4.6.1. Limitations of the RECOVERY data	36
4.7. Conclusions and recommendations.	37
4.7.1. Bulk Imports.....	37
4.7.2. Pre-charged Goods	37
4.7.3. Motor Vehicles	37
5. REGULATION / LEGISLATION REVIEW	39
5.1. Introduction.....	39

5.1.1.	The current regulatory (rule or directive by an agency) controls	41
5.1.2.	The current legislative (in law) controls	41
5.2.	Requirements for a regulated product stewardship scheme for priority products.....	46
5.2.1.	Data Management	48
5.2.2.	Advanced Disposal Fee	48
5.2.3.	Training and Qualifications	48
5.2.4.	Equipment standards	48
5.2.5.	Prohibition of intentional discharges.....	48
5.2.6.	Recycling controls.....	49
5.2.7.	Collection locations/services	49
5.2.8.	Storage controls.....	49
5.2.9.	Safe destruction.....	49
5.3.	Recommendations	49
5.3.1.	Data Management	49
5.3.2.	Training and Qualifications	50
5.3.3.	Equipment standards	50
5.3.4.	Prohibition of intentional discharges.....	50
5.3.5.	Recycling controls.....	50
5.3.6.	Collection locations/services	50
5.3.7.	Storage controls.....	51
5.3.8.	Safe destruction.....	51
6.	Conclusions and recommendations.	51
7.	APPENDIX A	53
8.	APPENDIX B	55
9.	APPENDIX C	57
10.	REFERENCES.....	74
11.	GLOSSARY OF TERMS	76

1. BACKGROUND

The Ministry for the Environment (MfE) consider that the collection and destruction of synthetic greenhouse gas (SGG) refrigerant gases within New Zealand should be improved and it has been proposed to declare these SGGs as priority products under the Waste Minimisation Act 2008 (WMA). This declaration would require a product stewardship scheme to be developed and accredited for these gases and also open the option of regulation to require any sale of such gases to only be done in accordance with such a scheme. In parallel with public consultation on proposed priority product declaration, MfE has encouraged co-design with stakeholders of proposals for improved schemes for priority products..

The WMA encourages waste reduction in New Zealand and aims to lessen the environmental harm of waste. To encourage waste minimisation, protect the environment and provide wider social, economic and cultural benefits, the Act:

- establishes a process for government accreditation of product stewardship schemes which recognises those businesses and organisations that take responsibility for managing the environmental impacts of their products
- requires product stewardship schemes to be developed for certain 'priority products' where there is a high risk of environmental harm from the waste or significant benefits from recovering the product
- allows for regulations to be made to control the disposal of products, materials or waste, require take-back services, deposit fees or labelling of products
- allows for regulations to be made that make it mandatory for certain groups (e.g., landfill facility operators) to report on waste to improve information on waste minimisation

The refrigerant industry has worked for many years to provide an option for the safe destruction of these SGG refrigerant gases through the Trust for the Destruction of Synthetic Refrigerants (RECOVERY), a voluntary product stewardship programme. However, as a voluntary scheme, not all within the industry financially contribute or participate.

RECOVERY is supported by a voluntary advanced disposal fee (ADF) placed on imported bulk synthetic greenhouse gas refrigerants. Companies which do not pay the ADF include some bulk importers and importers of equipment with pre-charged SGG refrigerants, such as fridges, heat pumps and air conditioning units in motor vehicles.

MfE's interest in improving this situation is based on New Zealand's international obligations to ensure the gases' safe destruction which can be both ozone depleting and have a high global warming potential (GWP). The Ministry also recognises the obligations under the WMA to "*reduce harm*"; and the need for New Zealand to be able to demonstrate to its trading partners an environmentally sound chain of custody for our products.

A working group has been established to investigate how SGG refrigerants stewardship should look in New Zealand. It includes significant stakeholders who are industry groups and companies within the supply chain who would be directly or indirectly affected by declaration of synthetic greenhouse gas refrigerants as priority products under the Waste Minimisation Act 2008

This is the first report by the Working Group and outlines its findings about the:

- current life cycle of SGG refrigerants within New Zealand,

File Name: Synthetic Refrigerant Stewardship Milestone 2: Report 1– Critique existing system(s) including product regulations			
Release Date: 28-10-2019	Version: FINAL V2	Authorised by: Project Manager	Page 5 of 78

- data that is currently available and would be needed for stewardship of SGG refrigerants; and
- current legislative and regulatory controls on SGG refrigerants.

The report details the Working Group's findings and makes recommendations on what would be required to ensure a successful product stewardship scheme(s) is implemented in NZ. There are three key parts:

1. Investigates and analyses the current situation for SGG refrigerants in NZ;
2. Analyses the data collected and identifies gaps that would need to be addressed to successfully assess future stewardship schemes; and
3. Looks at the legislative and regulatory controls that are currently in place for the management of SGG refrigerants.

2. INTRODUCTION

SGG refrigerants have been imported and used within New Zealand for decades and perform a vital function in maintaining required temperatures in diverse sectors within New Zealand. From primary production through to domestic heating its safe to say that New Zealanders quality of life has significantly benefited from the introduction and use of SGG refrigerants

However, it has also been acknowledged for many years that these SGG refrigerants can have significant impacts on our environment if they are not properly managed. The safe stewardship of SGG refrigerants is considered as one of the most effective ways to reduce anthropomorphic global temperature rise.

The organisation Project Drawdown considers that the control of leaks of SGG refrigerants through better management of equipment and recycling, recovery and safe end of life destruction, is the more effective at addressing global warming than any other initiative. It was rated higher than, reducing food waste, improved family planning, wind turbines and afforestation to name but a few.

3. SITUATIONAL ANALYSIS.

Under the Montreal Protocol it was recognised that chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs). posed a significant threat to the environment and it was agreed they would be phased out in preference for hydrofluorocarbons (HFCs).

Unfortunately, HFCs are significant greenhouse gases as they have a high global warming potential (GWP). Under the Kigali Amendment to the Montreal Protocol, it has been agreed that they will be phased down by more than 80% over the next 30 years. It has been estimated that this phasedown could avoid up to 0.5C of warming by 2100.

As part of the phase down of HFCs under the Kigali Amendment, the NZ government is, from 2020, requiring anyone wanting to import HFCs to apply to NZ Customs Service for an import permit. This permit will be based on historical data and the applicant may be granted up to 80% of what they have historically imported. In addition to the grand-parenting permit, importers who do not qualify for grand-parenting permit can apply for an allocation of Special Permit and those with grand-parenting permit can also apply for an additional allocation through a Special Permit.

HFCs are a group of SGG refrigerants which are currently imported into New Zealand (NZ) to heat and cool spaces in commercial and domestic settings, such as cool stores, supermarkets, offices and residential dwellings. They are also used in the air conditioning units of motor vehicles.

The government's main tool for reducing greenhouse gas emissions is the New Zealand Emissions Trading Scheme (ETS). It puts a price on greenhouse gas emissions with the intention of creating a financial incentive to reduce these emissions and reward those that eliminate or absorb greenhouse gases. As greenhouse gases with significant GWP, SGG refrigerants are included in the ETS.

For SGG refrigerants that are imported in bulk¹, the importer is required to register with the ETS and pay a fee (NZ Unit) to offset the potential greenhouse gas emissions associated with these gases. They are required to submit an annual emissions return by 31 March for the previous year's emissions (up to 31 December) and then surrender emission units (the fee) that they have previously bought by 31 May.

For SGG refrigerants that are contained in goods or motor vehicles they do not surrender units as their fee to the ETS but are subject to a levy at the point of import for goods and upon registration for vehicles. This levy is calculated annually and is based on the GWP of the refrigerant within the goods or motor vehicle and the current price of carbon.

For goods, motor vehicles and bulk SGG refrigerants that are exported from NZ, there is the ability to reclaim the fees paid to the ETS. There is also the ability to claim emission credit units for certain SGG refrigerants that are exported for destruction. This is a facility that RECOVERY uses to reduce the cost of its scheme.

Due to the policy tools to phase out and phase down these high GWP refrigerants, manufacturers have been working on alternatives for several years. These gases have significantly lower GWP and are commercially available. However, many of these new gases, such as the Hydrofluoro-olefins (HFOs), are mildly flammable which presents potential problems for workplace identification, handling and management practices.

This report provides an overview of the current situation within NZ for SGG refrigerants, and reviews the processes from importation through to offshore destruction. It also provides an analysis of overseas SGG refrigerant programmes currently in place.

The information within this report has been gathered through desktop research and conducting interviews with the SGG Refrigerant Working Group representatives. A list of the interviews carried out for this project is provided in the list of references.

3.1. Synthetic greenhouse gas refrigerants landscape in New Zealand

3.1.1. Synthetic greenhouse gas refrigerants entering New Zealand

There is currently no production of SGG refrigerants within New Zealand so all SGG refrigerants are imported from overseas. There are three main ways that this import streams:

- Bulk
- Automotive (covering the air conditioning units of motor vehicles); and
- Pre- Charged (covering goods that use refrigerants such as fridges, dehumidifiers and heat pumps).

¹ It should be noted that the term bulk does not refer to the size of the import but that the SGG refrigerant has been imported in a raw form and is not contained in goods or equipment.

The diagram below provides an overview of these three streams each of which will be expanded in more detail in subsequent sections.

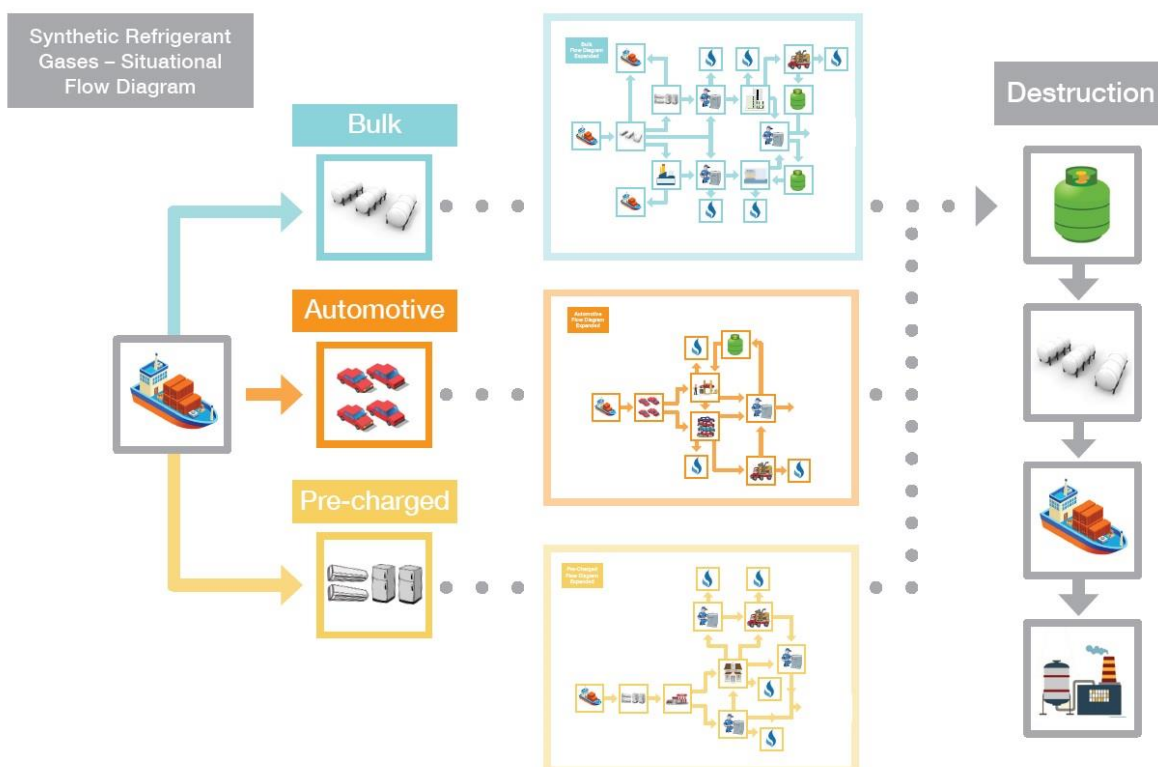


Figure 1 Graphical representation of the three main import streams of SGG refrigerants.

For these three streams there is currently only one destruction option which is the RECOVERY programme. Unwanted refrigerants are collected and combined into larger cylinders which are shipped overseas for destruction.

3.1.2. Bulk Importers

There are many different types of SGG refrigerants imported into New Zealand, some as a single refrigerant but many as a blend of different refrigerants combined to produce a refrigerant that meets the needs of the equipment it is to be used in.

The majority are imported in disposable refrigerant cylinders nominally 11 to 14 kg. These are either decanted or on sold to third parties and used to charge new commercial and residential AC units or to replace SGG refrigerant lost through leaks to the atmosphere. Some of the imported bulk SGG refrigerant is also exported for wholesale overseas to places such as the Pacific Islands to be used to charge or top up equipment.

In the diagram below we have provided an overview of the life of bulk SGG refrigerants as they move from import through use to disposal. Some of the gases will be lost at various points and these are represented by the blue flamelike symbol (this does not indicate that they are combusted).

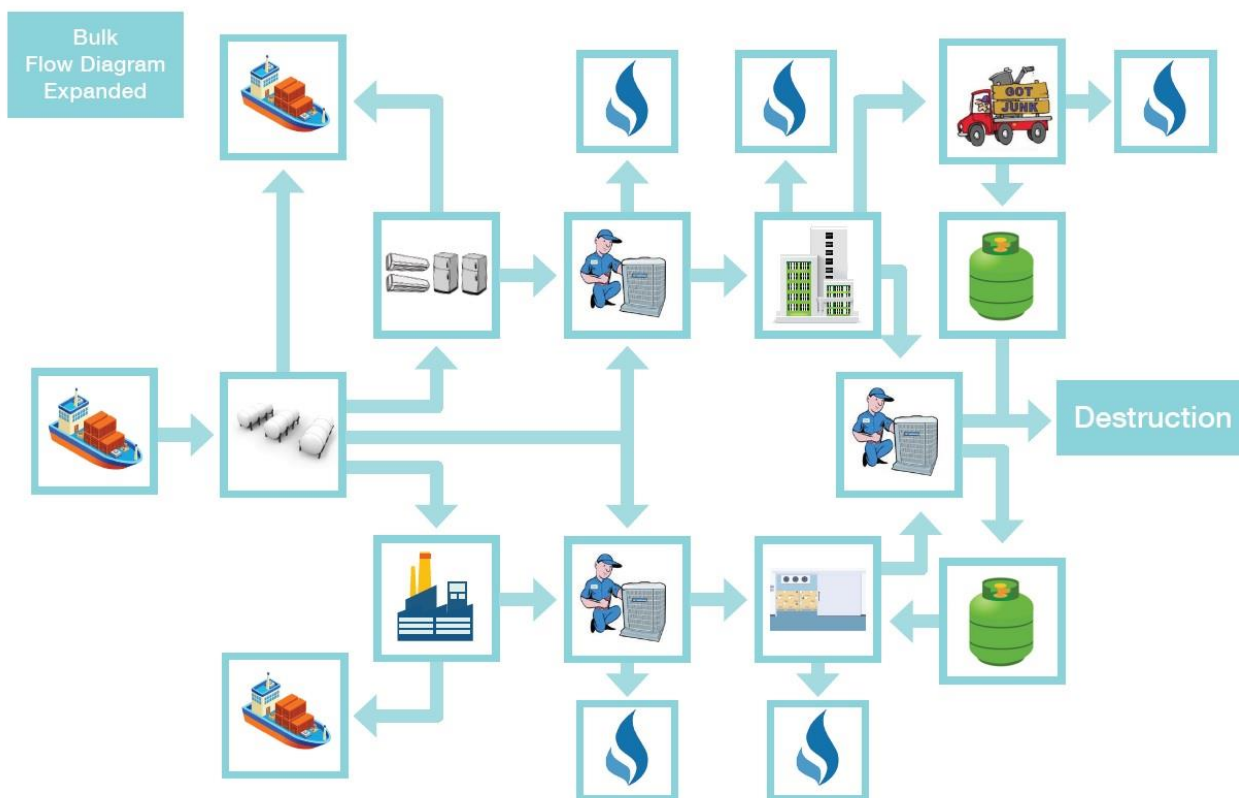


Figure 2 Graphical representation of the life of bulk refrigerants.

As you can see from the diagram, imported bulk SGG refrigerants are used to charge equipment manufactured within New Zealand which is then either exported overseas or installed onshore. This installation tends to be carried out by a service technician who would both install and decommission. When decommissioning happens there is the potential for the SGG refrigerant to be removed and stored for reuse in other similar equipment. This practice is known to happen within supermarkets and cold stores.

For equipment where the gas is not wanted for other uses there is anecdotal evidence that the SGG refrigerant is allowed to escape rather than incur the collection costs to take the gas to a RECOVERY collection point for free destruction.

3.1.3. Motor vehicles

All imported motor vehicles, buses and trucks are processed through the New Zealand Customs Service. These vehicles are often imported for re-sale and have SGG refrigerants within their AC units. In some instances, buses have two AC units, one for the driver's compartment and a second additional unit for the passenger's compartment. Often, mainly in second-hand buses, the second AC unit is replaced due to their poor quality².

² Interview with Malcolm Yorston and Jason Richards 2-5-2019

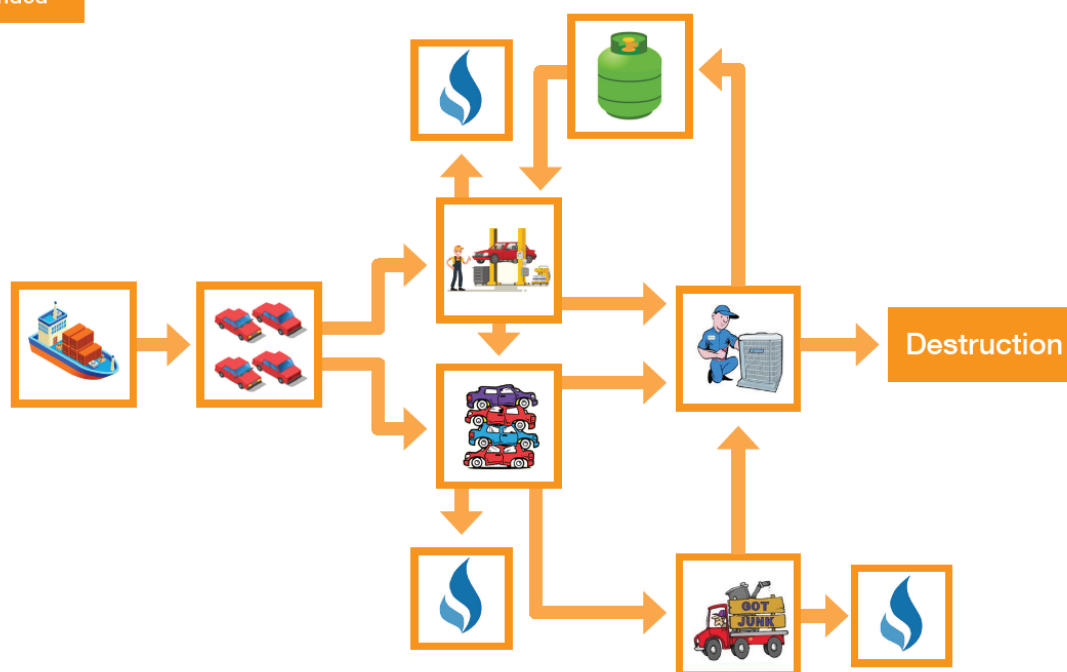


Figure 3 Graphical representation of the life of SGG refrigerants in motor vehicles.

Other motor vehicles are imported to source parts and these vehicles can also have AC units with SGG refrigerants.

All imported vehicles are required to go through a pre-import inspection at the border to ensure the vehicle is compliant to NZ standards. As part of the pre-vehicle inspection the AC unit is checked to ensure that it is operative and working effectively.

When a motor vehicle has passed the pre-vehicle inspection, it can then be registered and at this point a SGG refrigerant levy is paid. The levy is linked to the price of carbon and is updated annually by the Ministry for the Environment to reflect prevailing ETS costs. Levy rates vary between items and depend on the specific gas, the amount of gas and its GWP. The fee is based on the amount of emissions this vehicle can potentially emit into the atmosphere. The average amount of SGG refrigerant within a car's AC unit is approximately 620grams.

If an imported motor vehicle is not registered then there is no SGG refrigerant levy paid to the ETS, irrespective that this unit may potentially contain SGG refrigerants.

The automotive industry is often tasked with the problem of fixing AC units. If the unit has lost gas and needs to be refilled, then this is often undertaken by the mechanic by simply topping up the unit with gas purchased from a retail outlet. Unfortunately, this may only be a temporary fix as the cause of the problem may not have been rectified, resulting in the release of more SGG refrigerant to the atmosphere.

If the problem requires additional attention then the system may require de-gassing, which needs to be undertaken by an Approved Filler: (Health and Safety at Work (Hazardous Substances) Regulations 2017).

The refrigerant technician is usually able to identify the type of SGG refrigerant by a small metal disk that is attached to the AC unit. This is the only identification symbol on the AC unit. There are no warning signs of the SGG refrigerant's GWP properties, which may be an issue for the people working on motor vehicles who are not aware of their climate change impacts.

Unfortunately, an AC unit isn't a vital component of a motor vehicle except for very warm regions and our interviews identified that they are often not serviced and are left to fail, venting their refrigerants due to the associated costs of replacement or repair.

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 vehicles³. If they are not reused, then they are sent to RECOVERY for disposal. Unfortunately, there are operators who release refrigerant gas to the atmosphere intentionally or unintentionally when a vehicle is crushed.

3.1.4. Pre-charged units

Goods such as air conditioning units, fridges and freezers and dehumidifiers are imported into NZ pre-charged with SGG refrigerants. As they contained GWP gases they are required to pay a levy to the ETS based on the number of units and the type/s of refrigerant contained within these units.

The fee is based on the SGG refrigerants' GWP potential, the higher the GWP, the higher the levy paid to the ETS. This levy tends to be passed onto the consumer within the purchase price. Some companies choose to clearly identify the ETS levy on sales receipts so that their customer knows its not an additional cost they have added but one imposed by the government others choose to just include it within the item's price⁴.

There are no restrictions on the numbers of units that can enter NZ and the amount of SGG refrigerant contained within these units can range from 800g for residential units and up to 20kgs for industrial units. Quite often these units are charged with blended mixtures of SGG refrigerants.

These units are then forwarded to distribution and installation companies and retail stores. Most of these units are installed within the commercial and domestic sectors, specifically for small offices and the residential dwellings.

AC units have a life expectancy of around 10-15years depending on the quality of the unit, its installation, and whether a service schedule has been implemented.

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.

³ Interview with Harry Dodson and Jason Richards 3-5-2019

⁴ Interview with Peter Hutson and Jason Richards 10-5-2019

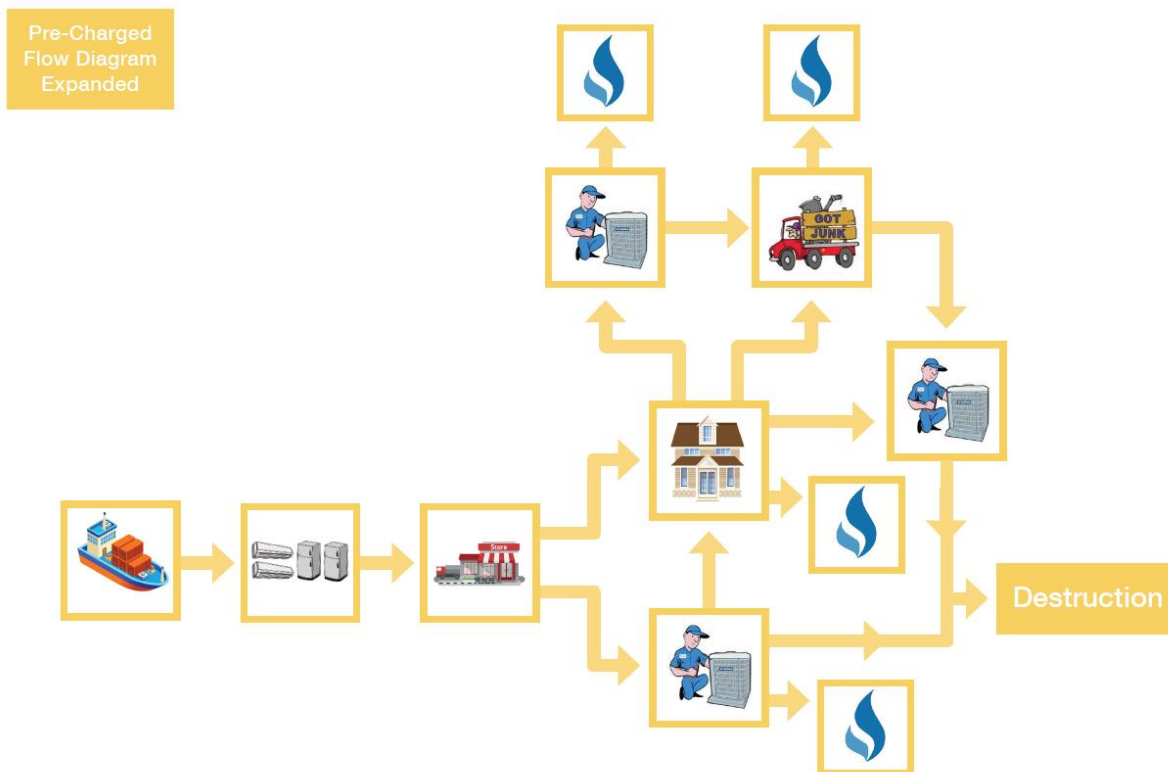


Figure 4 Graphical representation of the life of SGG refrigerants in pre-charged goods.

There are no regulations controlling who can install a pre-charged AC unit. The only regulation is that an electrician is required to wire in the unit. The manufacturers do recommend that the purchaser seeks a certified person to charge the unit.

The Institute of Refrigeration, Heating and Air Conditioning Engineers (IRHACE) and Climate Control Companies Association of New Zealand (CCCANZ) members are charged with operating to a the code of conduct of their organisations ensuring installation and charging of units is completed to industry best practice. Unfortunately there is currently no regulation for installation of any units other than handling of refrigerants under the Approved Filler License and possession of an EST (Electrical Service Technician qualification) and obligations under the Health and Safety at Work Act 2017. Consumers can use the services of any individual which is often the electrician wiring in the unit who will also charge the unit with SGG refrigerants. The electrician is unlikely to have the training or expertise to know how to properly install and charge the AC unit leading to an increased risk of the units failing and venting their SGG refrigerant to the atmosphere.

It is considered there is a lack of knowledge and awareness amongst consumers that SGG refrigerants have significant GWP properties. This is compounded by a lack of labels, or warnings that could inform them of the risks to the environment from the release of the SGG refrigerants.

SGG refrigerants are constantly being developed to lower their GWP potential. However, this can cause further complications, such as introducing gases with flammability properties.

Pre-charged units are known to lose SGG refrigerants⁵ due to poor installation and no servicing. Potentially having a flammable SGG could add further complications specifically around health and

⁵ Interview with Rodger Wyatt and Jason Richards 9-5-2019

safety for all parties involved. However, there is the potential that the use of SGG refrigerants with flammable properties could lead to an improved management regime where installers take greater care due to the potential increased risk.

When an AC unit is decommissioned it is required to be de-gassed prior to being removed. Under the Health and Safety at Work (Hazardous Substances) Regulations 2017, anybody handling or recovering compressed gases must have had suitable training and hold a current Approved Filler License.

De-gassing is undertaken by extracting the SGG refrigerant contained within the unit. The attached metal tag informs the technician of the SGG refrigerant type. Reusing is challenging as the majority of SGG refrigerants are blends and are known to fractionate, so the SGG refrigerant collected may not be exactly the same as what the unit was charged with. This means that unless the fractions can be separated and then combined in the correct ratio the SGG refrigerant blend may not perform to the required standard within other units.

De-gassing is common practice within the commercial sector. However, within the residential sector it is considered not to be, due to the consumer's ability to purchase a new AC unit off the shelf and use an electrician to install and charge the unit.

It is likely that the homeowner would either remove the old unit themselves or get the electrician to do that prior to connecting up the new unit. It is unlikely in either of these scenarios that the old unit would be degassed prior to removal. As there are no requirements for records to be held regarding installations, charging or degassing of these units, it is almost impossible to prove that intentional venting occurs.

3.1.5. Industry Organisations

There are three main refrigerant industry organisations that offer support and training to refrigeration technicians working with SGG refrigerants:

- Institute of Refrigeration Heating and Air Conditioning Engineers
- Climate Control Companies Association
- Refrigerant License New Zealand

Institute of Refrigeration Heating and Air Conditioning Engineers (IRHACE)

IRHACE is the membership body to which individuals belong and provides support, training and education. It also, promotes the development of practise guides and industry standards and provides a forum for its members to share knowledge.

Climate Control Companies Association (CCCA)

CCCA is the industry association for Heating, Ventilation, Air Conditioning, and Refrigeration (HVAC&R) companies in NZ. The role of the CCCA is to promote high standards of business competence and promote the advancement of education, best practice, and technology in HVAC&R.

Refrigerant License New Zealand (RLNZ)

RLNZ provides training courses to the HVAC&R industry and is currently the only private trainer that can offer unit standards on Approved Filler courses. Manukau Institute of Technology and Southern Institute of Technology in their capacity as Technical Institutes offer unit standards. RNLZ provide training for MIT and SIT on a contract basis. RNLZ are the only trainer who have completed a formal moderation with a standards setting body being the industry ITO, Competenz. People can be certified through trainers other than RNLZ but won't receive unit standards as part of their training. There are no prerequisites as to who can attend the courses.

RLNZ offers day long Approved Filler courses which require the trainee at the end to prove that they have learnt the skills and are competent. These certificates last for 5 Years and there are no audits conducted within this period around competency. Once certificates have expired these can be renewed for a further 5 years, but the holder is required to show that they have maintained their competence either face to face or on-line.

Competenz

Competenz, whilst not a refrigerant specific organisation is the standards setting body for the HVAC&R Industry. Competenz, does, as an industry training organisation (ITO), offer apprenticeships of around 4 years in length. There are approximately 7000 refrigerant technicians certified in NZ and of these approximately 2500 have received their training through the ITO.

Many of the qualifications, unit standards and training manuals were developed for HCFCs and HFCs and concerns have been raised that they may not address the potential flammable properties that the newer SGG refrigerants may have. Where they do not, qualifications, unit standards and manuals are being rewritten to address potential flammability issues and the refrigerants that will become commonly used and ensure that all remain safe during installation, use, servicing and decommissioning.

3.1.6. End of life

3.1.6.1. Scrap metal dealers

Scrap metal dealers are often presented with unwanted fridges, freezers, air conditioning units and de-humidifiers that are generally sent for scrap because the compressor is no longer working or the unit has lost its SGG refrigerant to the atmosphere.

There are an estimated 3.27 million domestic refrigerators and freezers in New Zealand and over half of these are thought to contain high GWP gases. Their expected life ranges from 10 to 25 Years and at their end of life they have little value other than their salvageable recyclable materials.

Often these units are still charged with SGG refrigerants when scrapped, which is problematic as they have no primary identifiers of their high GWP properties when lost to the atmosphere.

Larger commercial scrap metal dealers ensure that all SGG refrigerants are removed⁶ prior to scrapping. If they accept large volumes from a third party, then documentation is required as evidence that the units have been degassed, and for smaller lots an Approved Filler will also be working on site to collect the gases. Unfortunately, it is considered that the smaller operators are unlikely to replicate this practice.

3.1.6.2. Councils

There are varying approaches to the management of SGG refrigerant containing goods by councils across the country. Some allow these to be dropped off free of charge and others charge a fee.

Some transfer stations have Approved Fillers on site which enables these units to be de-gassed and the SGG refrigerant collected before being sent to RECOVERY for destruction. Others will consolidate units so they can be degassed by an Approved Filler who is brought in to carry out this work.

⁶ Interview with Korina Kirk and Jason Richards 16-5-2019

3.1.7. Disposal – RECOVERY

The Trust for the Destruction of Synthetic Refrigerants known as RECOVERY was formed in 1993 to promote and facilitate the collection, storage and disposal of surplus synthetic refrigerant gases, largely recovered from equipment reaching the end of its service life.

RECOVERY is funded through a voluntary advanced disposal fee (ADF) that is placed on every kilogram of bulk refrigerant when sold. There is a higher fee for SGG refrigerants that have flammable properties as it costs more to destroy these.

The ADF is paid on a voluntary basis by participating bulk importing companies only. Not all bulk importers are part of the RECOVERY programme.

RECOVERY is an industry led not for profit organisation, managed and administered by Price Waterhouse Cooper.

RECOVERY has collection hubs in Auckland, Wellington and Christchurch, where certified technicians can receive and transfer SGG refrigerants into larger cylinders for offshore destruction.

For other city centres, Patton's stores offer the ability for technicians to drop off a cylinder, which will then be sent through to one of the main consolidation hubs. BOC Gases also offer this service in some locations where Patton does not operate. When the cylinders are dropped off the name of the person and the amount dropped off is recorded. There are no data collected that identifies where, or from which sector, the SGG refrigerant has been extracted.

For those not near one of the main collection hubs, there can be a reasonable length of time from when a cylinder is dropped off, to when it is returned empty to the technician. This can be operationally problematic, resulting in gases intentionally being released to the atmosphere⁷.

The time between shipping bulk cylinders offshore for destruction to receiving them back, can also be considerable due to NZ not having a suitable disposal facility. This can also result in backlogs of cylinders awaiting consolidation.

RECOVERY accepts SGG refrigerants at their main hubs and collection points free of charge. However, for some owners of SGG refrigerants there can be significant costs in getting a technician out to de-gas their equipment and take it for destruction. Anecdotal evidence has indicated that this can be a significant disincentive to some and that they release the SGG refrigerant rather than pay for it to go to the RECOVERY drop off.

Refrigerants such as R32, which have flammable properties, are required to be shipped straight to Auckland where they have a purpose-built plant that can handle flammable gases. However, it must go into a special cylinder (left hand thread) of which there are few in the country.

When the SGG refrigerants reach Australia, a sample is analysed by a mass spectrometer to determine the types and quantities of refrigerants contained within that cylinder and a full detailed report is generated for RECOVERY. This documentation is then forwarded to the EPA and RECOVERY receives credits based on the amount of certain (but not all) SGG refrigerants and their GWP that have been destroyed.

⁷ Interview with Peter Hutson and Jason Richards 10-5-2019

3.2. The SGG refrigerants are destroyed through a Plasma Arc plant and the remaining waste, which is considered benign, is then disposed of via trade waste. International refrigerant recovery programmes

Following is an overview of the refrigerant recovery programmes operating in Australia, Canada, UK and Japan. Secondary research was conducted to gather the details for each of the programmes. Specific programme websites, along with a report by Navigant Consulting, which was commissioned by the US Air Conditioning, Heating and Refrigeration Institute (AHRI) on refrigerant management in 2016 (report appended), provided the basis of the information presented.

Within Table 1 below, there are Reported Rates given. These are the rates that schemes report for the recovery of SGG refrigerants. However, the schemes calculate these rates in different ways. For example, for some they exclude gases that will have leaked or been released during their life, so their rate is a percentage of what is available for collection rather than what has been imported into the country. We consider that this is not a suitable measure for a successful stewardship scheme as the aim of any stewardship scheme should be to ensure that intentional and unintentional releases of SGG refrigerants are minimised as far as practicable.

Country	Agency	Refrigerants	Industries	Legislation	Funding/Scheme type	Reported Rates
Australia	Refrigerants Reclaim Australia (RRA)	CFC HCFC HFC	Stationary equipment Domestic appliances Vehicles	Ozone Protection and Synthetic Greenhouse Gas Management Act 1989	Product Stewardship Scheme Funded by import levies Rebates for recovered gases Robust licensing (ARC) – fee schedule Self reporting – fact sheet	49-70% - (2016-17)
Canada	Refrigerant Management Canada (RMC) part of HRAI	CFC HCFC HFC	Stationary equipment Domestic appliances Vehicles (user pays)	P2 Plan for Halocarbon Refrigerants for the HVACR industry	Product Stewardship scheme Funded by sales levies: <ul style="list-style-type: none"> - Of new or reclaimed HCFC and HCFC blended refrigerants - \$4.50/kg (\$NZ5.07) - Of new or reclaimed HFC and HFC blended refrigerants - \$1.00/kg (\$NZ1.13) 	Not reported
UK	Dept for Environment, Food & Rural Affairs Environment Agency REFCOM	CFC HCFC HFC	Stationary equipment Domestic appliances Vehicles	EU F-Gas Regulation Ozone Regulation	Multiple Product Stewardship schemes Funded by licensing fees (importers, wholesalers, installers, technicians), central and local government (n/c to end users) Highly regulated licensing, training certification etc & reporting	65-92% est
Japan	Ministry Economy, Trade & Industry Ministry for Environment	CFC HCFC HFC	Stationary equipment Domestic appliances Vehicles	Home Appliances Recycling Law End-of-Life Vehicle Recycling Law	Multiple Product Stewardship schemes – legislated consumer, retailer and manufacturer responsibility Funding varies per industry	>40%

Table 1 Summary overview of international SGG refrigerant product stewardship schemes.

3.2.1. Australia

The Australian scheme is industry-led and supported by central government which collect import levies based on bi-annual (self) reporting.

Scheme overview/process

All of Australia's synthetic refrigerants and approx. 90% of air conditioning and refrigeration equipment are imported. It is mandatory for importers (of both bulk and pre-charged) to have a license from the federal government and to participate in an approved product stewardship scheme. Licensee importers are required to provide [6 monthly reports](#) to the Department for the Environment, from which a levy invoice is raised.

There are three connected industry-based associations which are involved in the responsible management of refrigeration. Refrigeration Australia (RA) provides advocacy and advice to the Australian government. Under RA are a further two organisations which provide the day to day application of the refrigerant scheme:

- Australia Refrigeration Council (ARC), which oversees the refrigerant handling licensing/ refrigerant trading authorisation and industry training.
- Refrigerant Reclaim Australia (RRA), which oversees the only authorised product stewardship scheme for refrigerants. As part of the scheme RRA offers a rebate for returned refrigerants.

Technicians are able to charge customers/end users for the costs associated with recovering refrigerant and also receive a rebate for returning refrigerant to RRA collection sites (participating wholesalers). Once a wholesaler accumulates enough refrigerant, RRA is contacted to arrange bulk collection and transport to its plasma arc destruction facility.

Legislation

[Ozone Protection and Synthetic Greenhouse Gas Management Act 1989](#)

Training

ARC oversees the licensing to ensure all technicians involved in installation, degassing etc are fully trained and hold the required qualifications.

Financial

There are three levels of fees/levies: import licences, handling licences and levies on volumes imported.

Import licensing fees:

Licence type	Cost (\$AU)	Notes
Equipment licence (EQPL)	\$3,000 NZ\$3,180	Non-refundable application fee
HCFC & SGG (HFCs, PFCs, SF6 and NF3) quota/controlled substances licence	\$15,000 NZ\$15,898	<p>Non-refundable application fee - may be waived by the minister if the:</p> <ul style="list-style-type: none"> • Licence is for the manufacture, import or export of less than half a tonne of a scheduled substance; and • Minister or delegate is satisfied that the import, export or manufacture is for test purposes; or • HCFC will be imported or exported for the purpose of disposal using a Montreal Protocol approved destruction technology. <p>Applying to import, manufacture or export both synthetic greenhouse gases and HCFCs, a non-refundable application fee of \$30,000 applies as two licences are required.</p> <p>Two year licence</p>
Essential uses licence	\$3,000 NZ\$3,180	Non-refundable application fee. Generally for lab or analytical research.
Used substances licence	\$15,000 NZ\$15,898	<p>Non-refundable application fee - may be waived by the minister if the:</p> <ul style="list-style-type: none"> • The scheduled substance to which the licence relates will be imported or exported for the purpose of the disposal of the substance; and • The disposal will be carried out by a technology approved by the parties of the Montreal Protocol.

Levies:

The following levies (\$AU) are applied:

- HCFCs - \$3,000 (NZ\$3,180) per ozone depleting potential tonne (equivalent to \$165 per metric tonne for the most common HCFC – HCFC22)
- Synthetic greenhouse gases - \$165 (NZ\$175) per metric tonne.

Refrigerant handling licensing fees:

Permit type	Year(s)	2019 Fees (AU\$)	2019 Fees (NZ\$)
Refrigerant Handling Licence (RHL)	2	\$150	\$159
	3	\$225	\$239
Restricted Refrigerant Handling Licence (RRHL)	2	\$150	\$159
	3	\$225	\$239
Trainee Refrigerant Handling Licence (TRHL)	1	\$32	\$34
Refrigerant Trading Authorisation (RTA)	2	\$480	\$509
	3	\$720	\$763
Restricted Refrigerant Trading Authorisation (RRTA)	2	\$150	\$159
	3	\$225	\$239

Key successes/challenges*

Key successes	Key challenges
Large membership base for RRA (900+ members)	Utilisation of a single organisation/system raises concerns and complaints of anti-competitiveness
Sophisticated investing has enabled RRA to generate large funding reserve (AU\$50M+)	Aggressive phase-out regulations and costly alternatives encourage contractors to retain and reuse impure or contaminated recovered HFCs
PSS was developed by industry; originally voluntary	High cost of destruction services may disincentivise proper EOL management
Industry-government collaboration	Costs incentivises counterfeit refrigerants
Design changes to equipment are shifting industry to hydrocarbon refrigerants for most domestic appliances/equipment	Very low-GWP refrigerants will not require RRA's collection and disposal infrastructure, resulting in a major loss in funding
Inclusion of all synthetic refrigerants (CFCs, HCFCs, HFCs) has levelled playing field	RRA focuses on destruction; leaves reclamation to industry, where recordkeeping, compliance may be lower
Robust recordkeeping requirements enable very close tracking of program performance	Carbon pricing (recently repealed) discouraged good behaviour by drastically increasing the price of synthetic refrigerants; reuse of un-reclaimed, out-of-spec refrigerant became more common
Awards for execution by UN, U.S. EPA	Phase down is causing industry to stockpile R-22 (~30% of recovered R-22; ~50% during carbon taxation period)
Built upon existing distribution channels	Phase down and carbon pricing decreased motor vehicle compliance
Recovery from domestic equipment still very low	Lack of maintenance and EOL reporting requirements is the major data/performance gap
No mandatory leak testing	

*As reported in Research Project 8018, Review of Refrigerant Management Programs – Navigant Consulting

3.2.2. Canada

The Canadian industry led scheme covers stationary and domestic equipment which is funded via sales levies. Automotive is funded by a user pays system.

Scheme overview/process

The Heating, Refrigeration, Air Conditioning Institute (HRAI) is an industry organisation representing the interests of the industry. HRAI provides training and, via Refrigerant Management Canada (RMC), offers a collection and destruction service for refrigerants. The RMC programme is funded by an environmental levy remitted by refrigerant manufacturers, importers and reclaimers on sales of HCFCs and as of February 2017, HFC refrigerants were levied from the stationary refrigeration and air conditioning industry. The monies received from this levy funds all aspects of the programme, including the collection, transportation, storage and the disposal of refrigerants that enter the programme.

Legislation

[P2 Plan for Halocarbon Refrigerants for the HVACR industry](#)

Training

The HRAI offer training programmes for industry.

Financial

Sales levies:	CAN\$
New or reclaimed HCFC and HCFC blended refrigerants	\$4.50 per kilogram NZ\$5.16
New or reclaimed HFC and HFC blended refrigerants	\$1.00 per kilogram NZ\$1.15

Key successes/challenges*

Key Successes	Key Challenges
Industry funded and managed	Includes refrigerant from stationary HVAC/R industry [and air conditioning] only (excludes vehicles)
High participation rate (95%)	Automotive and appliance industries have ignored attempts to join voluntary program
Built on existing infrastructure— “contractors don’t know who we are”	Phase-out of HCFCs is reducing funding source
Very low industry burden	Voluntary program with no regulatory backdrop to prevent free riders
“Vibrant supply chain (reclamation, destruction) for refrigerant end-of-life”	Excludes HFCs, which can have high GWP

*As reported in Research Project 8018, Review of Refrigerant Management Programs – Navigant Consulting

3.2.3. United Kingdom

The UK programme is determined by EU regulations and is led by government with support from industry, which administers the registration of refrigerant professionals. NB: there may be some subtle changes due to Brexit.

Scheme overview/process

The Department for Environment, Food and Rural Affairs (DEFRA) oversees the policy and regulation of the industry in line with EU requirements. The Environment Agency polices and checks compliance within the industry while Customs and Revenue has overview of refrigerant imports (bulk and pre-charged). Various industry member organisations manage training and certification of professionals/refrigeration companies. There are robust annual [reporting requirements](#), which must be kept for five years.

Legislation

[EU F-Gas Regulation](#)

[Ozone Regulation](#)

Training

All handlers of refrigerants are required to hold [industry qualifications](#).

Financial

Number of engineers	Full certification (valid for 3 years)	NZ\$
Micro (1 certified engineer)	£99-150	\$193-293
Small (2-9 certified engineers)	£129-184	\$252-359
Medium (10-49 certified engineers)	£249-310	\$486-605
Large (50 or more certified engineers)	£499-680	\$973-1,326

Key successes/challenges*

Key successes	Key challenges
No direct cost to consumer for appliance disposal	Unregulated export of refrigerators and freezers, which may not be disposed of as responsibly as domestic destruction (not believed to be significant)
Collaborative teaching approach: REAL Skills, REAL Zero, REAL Alternatives	Appliance recycling infrastructure was not ready for foam regulations; hurt appliance recycling market
Robust recordkeeping requirements	No national programmes for motor vehicle recycling
Strict supply-side controls drive technology adoption, market behaviour service	No industry-run bulk collection, reclamation, destruction
Multiple product stewardship schemes promote competition	

*As reported in Research Project 8018, Review of Refrigerant Management Programs – Navigant Consulting

3.2.4. Japan

Japan's programme relies (and legislates) on producer and end user responsibility.

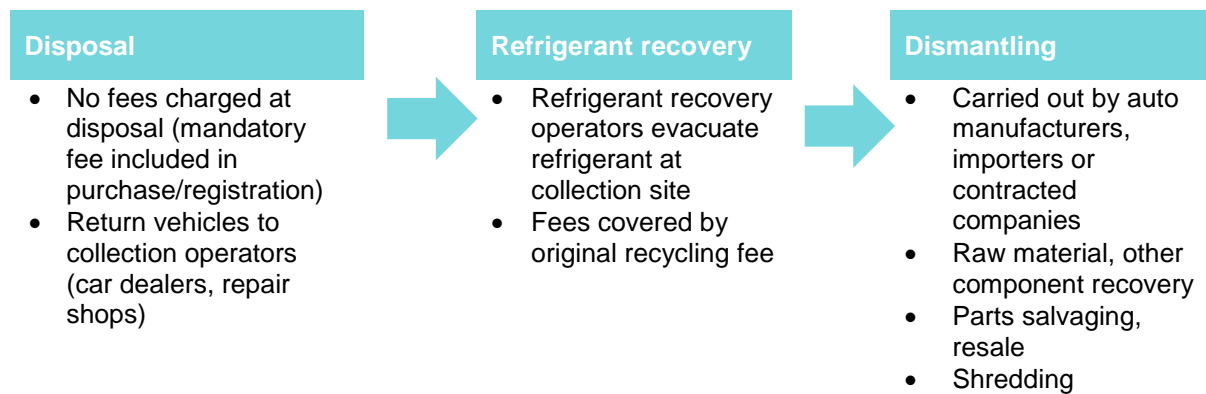
Scheme overview/process

Each industry (domestic appliance), automotive and stationary equipment manage the individual flows of refrigerant gases coupled with robust reporting requirements overseen by the Ministry of Economy, Trade and Industry (METI) and a strong culture of environmental protection. The diagrams below outline the individual flows:

Domestic appliance flow (METI Home Appliances Recycling Law)



Automotive flow (METI End-of-Life Recycling Law)



Training

Professionals are required to have adequate training, which is offered by regional government and industry.

Legislation

[Home Appliances Recycling Law](#)

[End-of-Life Vehicle Recycling Law](#)

Financial

Specific fees and levies for Japan were difficult to find – the following references were found online:

Vehicles

Recycling fees depend on the type of vehicle and are the sum of fees for processing fluorocarbons, airbags and ASR, and those for fund management and information handling, amounting to 6,000 to 18,000 yen (about \$NZD84-250). (NB: this [reference was from a 2006 article](#))

Appliances – each manufacturer/retailer sets reasonable recycling, transport and collection fees. Indicative recycling fees are*:

Appliance	Recycling fee range
TV	3,000-3,500 yen NZ\$42-49
Air Conditioning	2,041 yen \$28
Refrigerator/Freezers	5,092-5,524 yen NZ\$71-77

*Fees found https://www.rkc.aeha.or.jp/consumer/recycle_price.html#3030

Under the Home Appliances Recycling Law there are fines [of 200,000-500,000 yen \(NZ\\$2,790-6,977\) for non-compliance](#).

Key successes/challenges*

Key successes	Key challenges
Motor vehicle refrigerant recycling hugely successful because recycling fees charged at vehicle purchase	Fees for proper appliance and commercial equipment disposal at end-of-life results in some noncompliance
Environmental education and public perception encourages responsible refrigerant management	While a leader in appliance recycling, only 30% of available refrigerant is recovered from domestic appliances
Industry heavily involved in developing strategies for compliance, best practices	Limited to no public reporting requirements for Group A & B (domestic appliance) performance decreases public accountability
Industry accommodates mandatory recycling regulation with innovative and competitive product stewardship schemes	Recovery of commercial-equipment refrigerant (~30%) lags other jurisdictions
Strong regulatory framework for ODS refrigerants helps guide management	Full regulatory framework only recently extended to HFCs

*As reported in Research Project 8018, Review of Refrigerant Management Programs – Navigant Consulting

4. DATA COLLECTION AND GAP ANALYSIS

Good data is essential for any successful product stewardship scheme. It enables the schemes to determine the size of the problem and develop strategies to effectively manage the environmental and human health impacts of products through its life cycle.

Data is vital to calculate the likely operational cost of any scheme(s) design and the rate of any advanced disposal fee that may be proposed. It would also be used to determine how successful a scheme(s) has been in stewarding the product through its life to its final safe disposal during annual reviews.

The Working Group has assessed the available data and determine its suitability and what would be needed for a successful co-regulated product stewardship scheme(s).

4.1. Introduction

For this discussion document we have sourced data from multiple sources. We have used current and historical published reports, publicly available databases and directly contacted companies and individuals to request access to any data they may hold.

We have sought and obtained data from the following:

- Environmental Protection Agency
- Energy Efficiency and Conservation Authority
- New Zealand Customs Service via Stats NZ
- Bulk Importers
- RECOVERY

Data has been accepted as is from the sources either directly or via their published reports. Where these reports have lacked the data needed we have made direct representation to those agencies to attempt to fill the gaps in the data sets.

Where we have been unsuccessful to address the data gaps and there are still limitations in the data sets, we have discussed these within the relevant section.

4.2. Environmental Protection Authority (EPA)

Under the Climate Change Response Act (CCRA) s227, a fee is imposed on SGG refrigerants imported in bulk and in motor vehicles air conditioning units, and on goods that contain SGG refrigerants. The CCRA requires the EPA to receive, collate and publish information about these goods and the levies paid. The data is collected by calendar years and reported in financial years 1 July to 30 June. Given this, we have chosen to collect and report data in financial years to be consistent with the EPA reports.

The EPA produce two reports:

1. s250 report that details information relating to pre-charged leviable goods and motor vehicles brought into NZ and
2. s89 report that details bulk imports of SGG refrigerants.

4.2.1. Section 89 Report

Reports published from 2013 to 2018 have been analysed and the data is given below.

	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
Bulk Imported (tonnes CO2e emissions)	1,862,834	527,384	1,685,087	846,567	2,195,029	1,886,828
Bulk exported (tonnes CO2e emissions)	2,429	71,870	75,102	175,849	345,845	479,545

Table 2a: CO2e of imports and exports for bulk SGG refrigerants

The report also provides data on the number of mandatory participants in the ETS for SGG refrigerants.

For the 2017-2018 reporting period there were 22 parties registered as importing hydrofluorocarbons or perfluorocarbons and 13 parties registered as exporting.

Whilst these are the numbers given it does not mean that 22 parties imported SSG refrigerants within that year. Direct enquiries with companies identified as being bulk importers on the list have shown that whilst some are registered, they have never or, have in the past but currently do not, import SGG refrigerants.

The EPA have provided us with the kg of SGG refrigerants imported into NZ. However, at the time of writing they were unable to provide the amount exported so these figures would be greater than the net imports of SGG refrigerant.

	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
Bulk Imported (kg all gases)	NA	NA	NA	NA	923,414	724,427
Bulk exported (kg all gases)	NA	NA	NA	NA	NA	NA

Table 2b: Kilograms of imports for bulk SGG refrigerants

4.2.2. Section 250 report

The s250 EPA levy reports provide more useful data than the s89 reports as it reports the amounts of SGG refrigerants levied rather than the potential impact on climate change from those gases.

		2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
Pre-charged goods SGG refrigerants (kg)		230,775	198,754	249,320	251,903	231,334
Motor Vehicles - HFC-134a (kg)		118,027	165,461	175,575	196,790	200,854
No. Motor Vehicles registered		193,140	271,790	288,061	321,500	328,404
No of pre-charged items imported	Containing HFC-134a	177,060	129,539	64,851	75,030	53,336
	Containing R404A	11,876	559	1,506	1,776	4,269
	Containing R410A	108,127	106,515	139,886	131,975	96,289
	Containing R32	-	-	-	-	34,447
	Total	297,063	236,613	206,243	208,781	188,341
Levy collected for motor vehicles and pre-charged (\$)		\$1,449,375	\$386,598	NA	\$3,417,269	\$8,897,230

Table 3: Data from the EPA s250 report

	Number of leviable motor vehicles registered	Quantity of synthetic greenhouse gas (kg)
Small passenger motor vehicles (MA, MB, MC)	263,999	158,399
Medium passenger vehicles (MD)	1,503	1,202
Large passenger vehicles (ME)	572	2,288
Small goods vehicles (NA)	54,494	32,696
Large goods vehicles (NB, NC)	7,836	6,269
Total number of leviable motor vehicles	328,404	200,854

Table 4: 2017-2018 Breakdown of the s250 EPA data for leviable motor vehicles

	Class of leviable good	No. who imported goods	Number of consignments imported	Quantity of SGG (kg)
1	Air-conditioning units (household and small commercial window- or wall-mounted heat pumps)	22	315	80,532
2	Air-conditioning units for installing in vehicles (not including those already installed in vehicles)	1	2	3
3	Air-conditioning units (household and small commercial heat pumps)	13	86	23,782
4	Air-conditioning units (large commercial and industrial reversible heat pumps)	6	29	658
5	Air-conditioning units (household and small commercial heat pumps, not covered under headings 1 to 4)	12	25	1,726
6	Air-conditioning units (large commercial and industrial heat pumps not covered under headings 1 to 5)	4	5	368
7	Air-conditioning unit parts (for all types of household, commercial, and industrial heat pumps)	10	476	109,316
8	Combined refrigerator-freezers	11	131	1,753
9	Refrigerators (household)	15	81	481
10	Chest freezers	15	76	791
11	Upright freezers	17	83	318
12	Refrigerating units (such as commercial display cooling and freezing equipment)	71	351	3,447
13	Heat pumps (other than air-conditioning machines described in classes covered under headings 1 to 7)	16	51	2,105
14	Refrigerating units (water coolers, ice- or ice-cream makers, refrigerated transport units, and other commercial cooling and freezing equipment not expressly covered in classes covered under headings 1 to 13)	82	299	5,697
15	Parts for refrigerating or freezing units (charged with refrigerant for all types of household and commercial equipment) and some heat pumps	3	7	34
16	Refrigerated beverage-vending machines	6	13	11
17	Dehumidifiers	3	7	213
18	Refrigerated containers, vehicles, trailers, tankers, and vessels	10	57	99
			2,0941	231,334

Table 5 Breakdown of the s250 EPA data for pre-charged goods.

4.2.3. Limitations of the EPA data

The s250 report on leviable goods provides details of the number and type of motor vehicles registered and goods sold together with the quantity of SGG refrigerants imported, reported in kilograms

The s89 report provides details of all emissions and removals for New Zealand and as such report bulk SGG refrigerant imports as CO₂e rather than kilograms. Given that SGG refrigerant gasses have differing global warming potentials and many of these imports are blends of various SGG refrigerants, it is not possible to accurately calculate the kilograms of imported gas from these data.

A request has been made to the EPA to have access to the kg data for bulk imports and exports. At the time of writing this approval has not yet been received.

No flammable SGG refrigerants were reported to have been imported in the report.

Finally, motor vehicles are only reported when they are registered to drive on the road. There are some vehicles that are imported and are not driven on the public roads and so may not be registered nor included in these data.

4.3. Energy Efficiency and Conservation Authority

The Energy Efficiency and Conservation Authority (EECA) collects data on specific commercial and industrial products sold in New Zealand under their Equipment Energy Efficiency (E3) programme. E3 is a trans-Tasman programme to raise the energy efficiency of these goods through applying minimum energy performance standards.

Importers, manufacturers and sellers of these regulated products in New Zealand must provide information on the sale, import or export of these goods under the Energy Efficiency (Energy Using Products) Regulations 2002.

	2012 - 2013	2013 - 2014	2014 -2015	2015 -2016	2016 -2017	2017- 2018
Fridges and Freezers	185,000	198,889	192,825	194,209	220,682	235,992
Refrigerated cabinet displays	7,136	7,017	6,709	6,572	8,098	8,888
Heat pumps/ air conditioners	99,027	97,524	103,701	116,599	138,043	149,951
Clothes dryers	46,065	44,083	49,879	56,834	60,929	70,364
TOTAL	337,228	347,512	353,113	374,214	427,751	465,195
Total (ex. clothes dryers)	291,163	303,430	303,234	317,380	366,823	394,831

Table 6: Sales of SGG refrigerant containing goods within the EECA E3 programme

4.3.1. Limitations of the EECA data

The EECA data is reported in calendar years so it has been necessary to adjust it to make it comparable with the EPA levy data. Without access to the raw data it was considered that the most appropriate way to do this was to divide each calendar year by two and add the result together. For example:

$$(2018/2) + (2017/2) \approx 1 \text{ July } 2017 \text{ to } 30 \text{ June } 2018$$

Given this method, this data should only be considered indicative of the number of those goods sold in NZ during this period.

Also, the data does not include all ETS leviable goods that would be reported in the EPA report. EECA have produced reports on sales of fridges and freezers; heat pumps and air conditioners; clothes driers (there is no breakdown of the number of condensing dryers and heat pump dryer); and refrigerated display cabinets. Therefore dehumidifiers, charged refrigeration parts, refrigerated units (such as containers vehicles, trailers, tankers and vessels) would not be included in this data set.

The reports do not identify where flammable refrigerants have been used.

Although the legislation requires the reporting on goods imported, exported or sold, the data in the EECA reports only contains the sales. Therefore, there is no information to identify sales of imported goods or those manufactured in NZ for sale domestically or for export.

Goods manufactured in NZ would have used bulk imported SSG refrigerants and therefore would not be counted in the EPA s250 dataset. This would be one of the main reasons why the data gathered here varies from that published in the EPA s250 levy report.

	2017- 2018
EECA E3 data	465,195
EPA goods s250 data	231,334

Table 7: Comparison of the EPA s250 goods imported data with the EECA E3 goods sold data

4.4. New Zealand Customs data

The CCRA requires the New Zealand Customs Service to collect the ETS levy for SGG refrigerants. We have collected import and export customs data from the Stats NZ Infoshare website (<http://archive.stats.govt.nz/infoshare/>). Using the Infoshare database we extracted the data for the period 1 July 2013 to 30 June 2018, using the category “fluorinated, brominated or iodinated derivatives of acyclic hydrocarbons” and the codes starting with 2903.39 ****.

This included data for the following chemicals:

Chemical	Quantity data available
1,1,1,2,2,3,4,5,5,5-Decafluoropentane (HFC-43-10mee)	
1,1,1,2,2,3-Hexafluoropropane (HFC-236cb)	
1,1,1,2,3,3,3-Heptafluoropropane (HFC-227ea)	
1,1,1,2,3,3-Hexafluoropropane (HFC-236ea)	
1,1,1,2-tetrafluoroethane (HFC-134a)	Yes
1,1,1,3,3,3-Hexafluoropropane (HFC-236fa)	
1,1,1,3,3-Pentafluorobutane (HFC-365mfc)	
1,1,1,3,3-Pentafluoropropane (HFC-245fa)	
1,1,1-Trifluoroethane (HFC-143a)	
1,1,2,2,3-Pentafluoropropane (HFC-245ca)	
1,1,2,2-Tetrafluoroethane (HFC-134)	
1,1,2-Trifluoroethane (HFC-143)	
1,1,3,3,3-Pentafluoro-2-(trifluoromethyl)-prop-1-ene	
1,2-Difluoroethane (HFC-152)	
difluoroethane (HFC-152a)	Yes
Difluoromethane (HFC-32)	
Ethylene dibromide (ISO) (1,2-dibromoethane)	
Fluoromethane (HFC-41)	
n.e.c. in item no. 2903.3	Yes
Pentafluoroethane (HFC-125)	
Perfluorinated saturated fluorides (PFCs)	
Trifluoromethane (HFC-23)	

	Imports				
	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
Fluorinated, brominated or iodinated derivatives of acyclic hydrocarbons; 1,1,1,2-tetrafluoroethane (HFC-134a) (kg)	110,054	313,137	195,805	253,236	178,918
Fluorinated, brominated or iodinated derivatives of acyclic hydrocarbons; difluoroethane (HFC-152a) (kg)	0	0	0	0	500
Fluorinated, brominated or iodinated derivatives of acyclic hydrocarbons; n.e.c. in item no. 2903.3 (blends) (kg)	21,653	107,663	138,468	138,869	365,930

Table 8: Imports of bulk SGG refrigerants extracted from Infoshare

	Exports				
	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
Fluorinated, brominated or iodinated derivatives of acyclic hydrocarbons; 1,1,1,2-tetrafluoroethane (HFC-134a)(kg)	2,073	761	465	985	3,052
Fluorinated, brominated or iodinated derivatives of acyclic hydrocarbons; difluoroethane (HFC-152a) (kg)	0	0	0	15	0
Fluorinated, brominated or iodinated derivatives of acyclic hydrocarbons; n.e.c. in item no. 2903.3 (blends) (kg)	39	1,479	2,581	2,800	1,846

Table 9: Exports of bulk SGG refrigerants extracted from Infoshare

	Re-exports ⁸				
	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
Fluorinated, brominated or iodinated derivatives of acyclic hydrocarbons; 1,1,1,2-tetrafluoroethane (HFC-134a)(kg)	841	113	0	1,632	3,550
Fluorinated, brominated or iodinated derivatives of acyclic hydrocarbons; difluoroethane (HFC-152a) (kg)	0	68	452	2,616	0
Fluorinated, brominated or iodinated derivatives of acyclic hydrocarbons; n.e.c. in item no. 2903.3 (blends) (kg)	0	2,918	1,540	3,881	7,754

Table 10: Re-exports of bulk SGG refrigerants extracted from Infoshare

⁸ Re-exports are goods brought into New Zealand and exported without a 'substantial transformation' (defined as products that have had 50 percent or more value added). Goods that have been substantially transformed are classified as domestic exports. Trans-shipment goods are not included. Goods that are re-exported will have been previously included in import statistics in some form.

	Net Import				
	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
Fluorinated, brominated or iodinated derivatives of acyclic hydrocarbons; 1,1,1,2-tetrafluoroethane (HFC-134a) (kg)	107,140	312,263	195,340	250,619	172,316
Fluorinated, brominated or iodinated derivatives of acyclic hydrocarbons; difluoroethane (HFC-152a) (kg)	0	-68	-452	-2,631	500
Fluorinated, brominated or iodinated derivatives of acyclic hydrocarbons; n.e.c. in item no. 2903.3 (blends) (kg)	21,614	103,266	134,347	132,188	356,330
Total	128,754	415,461	329,235	380,176	529,146

Table 11: Imports of bulk SGG refrigerants extracted from Infoshare

4.4.1. Limitations of the NZ Customs Service data

This database is reliant on the users using the correct harmonised system codes (HS codes - an international system of names and numbers used to classify traded products) when they declare their imports.

This leads to potential errors. For example, there are negative numbers for net imports for HFC -152a. For a single year this could be a timing issue, but this occurred in three of the four years where data has been recorded. Furthermore, the bulk of these have been re-exported. This is where a good is imported and then exported “without substantial transformation”. These re-exports occurred in years where little or no HFC-152a was imported. This could only occur either through an error in recording or misreporting.

There were no imports of R32 or other flammable SGG refrigerants recorded in the extracted data set.

4.5. Bulk importers' data

As part of this work we requested data from the known bulk importers of SGG refrigerants. Nineteen companies were approached with a request to provide information (see Appendix B). These companies were:

AHI Carrier (NZ) Limited (Totaline)	Daikin
Axieo Operations (New Zealand) Ltd	Glowbal
B & C Martella Limited (trading as Industrial Refrigeration Marlborough)	Heatcraft New Zealand Limited
Blueon Limited	ILYS (trading as Cooling Supplies)
BOC Limited	Pan Pacific Auto Electronics
Chemiplas	Patton Limited
CoolDrive	Polymer Group Limited
Countdown	Realcold
	Refrigeration Specialties Ltd

Of these, four indicated they either have never or no longer import SGG refrigerants. These were:

- Axieo Operations (New Zealand) Ltd reported they do not import SGG refrigerants
- B & C Martella Limited reported that although they had registered to import SGG refrigerants this had not happened and they do not intend to import SGG refrigerants in the future.
- Blueon Limited is no longer in business.
- Tauranga168 Asia Supermarket Limited is a small corner supermarket that has in the past imported refrigerants but not in last year and they were unsure whether they would again in the future.

4.5.1. Limitations of the bulk importer's data

At the time of writing nine companies have provided us with the data we requested. Of the remaining companies contacted, a number are RECOVERY members, so although missing from this data set their data would be included in the aggregated data provided in 4.6.

Two of the contacted bulk importers have not provided data nor are they participants in the RECOVERY scheme so, at the time of writing, we have no way to determine the amount they import.

At least one of the bulk importers uses the SGG refrigerant gas to produce a closed cell polyurethane insulation foam that contains the HFC. Although the HFC will escape over time it will never be able to be recovered and safely disposed. Therefore, this data should be excluded when determining the effectiveness of any current or future product stewardship scheme.

We have provided assurances that any data provided will remain confidential and only used when aggregated with other data.

	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
Net Imports (n=9)	NA	122,651	600,038	281,648	205,472

Table 12: Net amount of bulk SGG refrigerants imported by those importers who provided data

The data we have received (above) varies significantly from year to year and there is no trend that we could identify with the data available. This may improve if we receive data from those parties that have either not provided it or restricted it's use.

There were no imports of flammable SGG refrigerants recorded in the data provided.

4.6. RECOVERY

RECOVERY is the only accredited voluntary product stewardship scheme operating in New Zealand. They collect SGG refrigerants throughout the country and export them to Australia for destruction.

The data we have used has been sourced either directly from the trust or from their annual returns reports. These are publicly available on the Charities Services website <https://www.register.charities.govt.nz/Charity/CC36997>.

The participating wholesalers are:

AHI Carrier (NZ) Limited
BOC Limited
Chemiplas NZ Limited
Cooling Supplies
Glowbal NZ Limited

Patton Limited
Realcold NZ Limited
Reece New Zealand Limited
Refrigeration Specialties Limited

These data show the type of SGG refrigerants that were collected and from this we can see they are still collecting and disposing of CFCs more than 20 years after their importation was stopped. This shows there can be a significant lag between importation and disposal.

		2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
Net bulk imports (kg)			420,344	516,866	447,190	415,826	416,175
Flammable bulk imports (kg)				459	1,041	3,383	2,680
SGG refrigerants collected (kg)		33,893	29,619	30,947	31,600	35,249	38,624
SGG refrigerants destroyed	CFC			9	68	894	253
	HCFC			2,647	5,505	5,746	5,330
	HFC			14,298	31,138	31,515	33,503
	Total (kg)	34,489	34,632	16,954	36,711	38,155	39,086

Table 13: Import, collection and disposal data for the Recovery Trust

The net bulk imports is the amount declared by the participants excluding SGG refrigerants that have been exported. For the years 2013-2014, 2014-2015, 2015-2016 and 2016-2017 there are significant discrepancies between these data and the data obtained from the NZ Customs Service. During these years, more was declared by RECOVERY than was recorded as having been imported (and not exported) for those years.

The imports of bulk flammable SGG refrigerants are on average (for the past 4 years) 0.4% of the total imports.

4.6.1. Limitations of the RECOVERY data

RECOVERY's bulk import data is recorded at the point of sale rather than when it is imported into the country. This means there is potential for SGG refrigerants to be imported in one year but not sold and declared until the next year.

4.7. Conclusions and recommendations.

Data for SGG refrigerants is conflicting and confusing due to it being collected and reported in differing years and by different agencies for different purposes. There appears to be little consistency when comparing one data set with another even though reporting of some of the data is required by law.

4.7.1. Bulk Imports

The NZ Customs Service data differs significantly from the data provided by the RECOVERY. In most years participants declare significantly more SGG refrigerants than was identified as having been imported.

This discrepancy could be put down to the different recording system (RECOVERY participants report it when the SGG refrigerant is sold – NZ Customs Service report it at the point of import) but that would not explain the year on year differences.

4.7.2. Pre-charged Goods

With the pre-charged goods there are also significant variations between data sets. The data reported by the EPA in their s 250 reports varies significantly with that reported by EECA for their E3 programme.

The EECA data are in some years more than double that of the EPA. Again, this could be an issue with reporting; the EPA data reports imports and the EECA data sales. However, the EECA data set does not include goods that are meant to be included in the EPA data such as dehumidifiers, and refrigerant containing parts. Recording sales would also include the sale of goods manufactured in New Zealand. These would have used refrigerant imported in bulk, refrigerant that would have been reported in the EPA's s89 report not the s250 report. However, for this to be the issue, NZ would at times be manufacturing and selling more of these goods than were imported.

4.7.3. Motor Vehicles

Given that motor vehicles are required to pay the SGG levy at point of registration rather than on import this has the potential for some imported vehicles to not appear in any of the data sets we have obtained. However, this is not considered to be a significant number of vehicles and therefore it is likely to be an inconsequential amount of SGG refrigerant.

	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
Customs - Bulk net imports (kg)	128,754	415,461	329,235	380,176	529,146
Pre-charged SGG refrigerant (kg)	230,775	198,754	249,320	251,903	231,334
Motor vehicle SGG refrigerant (kg)	118,027	165,461	175,575	196,790	200,854
Total imports of SGG refrigerants (kg)	477,556	779,676	754,130	828,869	961,334
Total destroyed by RECOVERY	34,632	16,954	36,711	38,155	39,086

Table 14: Estimated amount of all SGG refrigerant imported into NZ (net) and safely destroyed

We have chosen to use the 2017 -2018 NZ Customs Service for bulk imports as it is comparable with data received from the RECOVERY. This gives a net total of SGG refrigerants imported as 529,146 kg

For imported goods containing SGG refrigerants, we have used the EPA s250 report. This indicates there were 231,334 kg of SGG levied refrigerant in pre-charged goods and 200,854kg of SGG levied refrigerant in imported motor vehicles.

Combining these three figures gives a total of 961,334kg of imported SGG refrigerants for the 2017-2018 year.

However, this also included imported gases that are used to produce closed cell insulation foams which are contained in the foam and unable to be recovered through a SGG refrigerant stewardship scheme.

This figure should therefore be subtracted from the total. However, given that only one company who carries this out provided us with data, we have chosen not to do this as it would identify their bulk imports and would breach the undertaking, we have given to maintain the confidentiality of their data. However, we can say that subtracting the amount would not have a significant impact of the quantum of the figure.

Given that RECOVERY dispose of less than 40,000 kg per year which implies more than 920,000 kgs of SSG refrigerant per year are either lost to the environment or form part of an increasing bank of SGG refrigerants that will need to be safely disposed in future years.

Finally, it has proved very difficult to obtain good accurate data for SGG refrigerants and this should be considered an area that needs addressing within any future mandated product stewardship scheme.

The EPA currently collect data for bulk imports, pre-charged goods and motor vehicles. Their s250 reports report the kilogram amount of SGG refrigerant imported. However, they do not report the same information for the bulk imports. This should be addressed and access to the kilogram amount of bulk SGG refrigerant provided to any current and future stewardship scheme(s).

5. REGULATION / LEGISLATION REVIEW

5.1. Introduction

Under the Waste Minimisation Act 2008 (WMA) the Minister has the ability to declare a product as a priority product, providing, they can show that the product either poses a significant threat to the environment, or that there are significant benefits from reduction, recycling, recovery or treatment of the product, and it can be managed under a product stewardship scheme.

The WMA encourages a reduction in the amount of waste we generate and dispose of in New Zealand and aims to lessen the environmental harm of waste.

This Act also aims to benefit our economy by encouraging better use of materials throughout the product life cycle, promoting domestic reprocessing of recovered materials and providing more employment.

To encourage waste minimisation, protect the environment and provide wider social, economic and cultural benefits, the Act:

- puts a levy on waste disposed of in landfills to generate funding to help local government, communities and businesses reduce the amount of waste
- establishes a process for government accreditation of product stewardship schemes which recognises those businesses and organisations that take responsibility for managing the environmental impacts of their products
- requires product stewardship schemes to be developed for certain 'priority products' where there is a high risk of environmental harm from the waste or significant benefits from recovering the product
- allows for regulations to be made to control the disposal of products, materials or waste, require take-back services, deposit fees or labelling of products
- allows for regulations to be made that make it mandatory for certain groups (e.g., landfill facility operators) to report on waste to improve information on waste minimisation
- clarifies the roles and responsibilities of territorial authorities with respect to waste minimisation
- establishes the Waste Advisory Board to give independent advice to the Minister for the Environment on waste minimisation issues.

Specific Section of the Act that applies to product controls:

Section 23: Regulations in relation to products (whether or not priority products), materials, and waste

- (1) The Governor-General may, by Order in Council made on the recommendation of the Minister, make regulations for 1 or more of the following purposes:

Control or prohibition on disposal, sale, etc

- (a) controlling or prohibiting the disposal, or anything done for the purpose of disposing, of products or waste:

- (b) controlling or prohibiting the manufacture or sale of products that contain specified materials:

Take-back services, fees, and refundable deposits

- (c) requiring specified classes of person to provide a take-back service for products, and prescribing requirements for—
 - (i) the take-back service; and
 - (ii) the reuse, recycling, recovery, treatment, or disposal of products taken back:
- (d) setting fees payable for the management of a product and specifying—
 - (i) the class or classes of person who must pay the fee; and
 - (ii) the stages in the life of the product where the fee must be paid; and
 - (iii) the purposes to which the fee must be applied:
- (e) requiring specified classes of person to charge a deposit on the sale of a product, requiring the deposits to be refunded in specified circumstances, and prescribing requirements for the application of any deposits not refunded:

Labelling of products

- (f) prescribing requirements for the labelling of a product:

Quality standards

- (g) for any product or material that has become waste, prescribing standards to be met when reusing, recycling, or recovering the product or material:
- (h) requiring specified persons or specified classes of person to ensure that the standards prescribed under paragraph (g) are met:

Information to be collected and provided

- (i) requiring specified persons or specified classes of person to collect, and provide to the Secretary, information about any requirements imposed in regulations made under paragraph (a), (b), (c), (d), or (e):

Miscellaneous

- (j) providing for any other matter contemplated by this Part.

(2) The Minister must not recommend the making of regulations—

- (a) under subsection (1)(a), unless he or she is satisfied that there is adequate infrastructure and facilities in place to provide a reasonably practicable alternative to disposal or, if not, that a reasonable time is provided before the regulations come into force for adequate infrastructure and facilities to be put in place:
- (b) under subsection (1)(b), unless a reasonably practicable alternative to the specified materials is available.

(3) Before recommending the making of regulations under subsection (1), the Minister must—

- (a) obtain and consider the advice of the Waste Advisory Board; and
- (b) be satisfied that—
 - (i) there has been adequate consultation with persons or organisations who may be significantly affected by the regulations; and
 - (ii) the benefits expected from implementing the regulations exceed the costs expected from implementing the regulations; and
 - (iii) the regulations are consistent with New Zealand’s international obligations.

It is likely that SGG refrigerants will be declared priority product(s) and will be required to be part of a regulated product stewardship scheme that would seek accreditation by the Minister for the Environment.

The act of declaring a product “priority” doesn’t in itself require business and organisations to participate in product stewardship, the regulations in relationship to the products imported and distributed do. (refer extract of the WMA 2008 Section 23 above).

Therefore, it is important the Working Group understand what regulatory/legislative controls are currently in place, understand the gaps and consider what regulatory controls may be required to ensure the success of any future regulated product stewardship scheme(s).

There are already many Acts and Regulations that control the management of SGG refrigerants within New Zealand. This report looks at those that currently or may in the near future, control or influence the stewardship of SGG refrigerants.

This document looks to identify what the current controls are, discuss what would be needed for a successful regulated product stewardship scheme(s) and highlight current gaps that we would recommend be addressed under future regulations.

Below is the list of legislation, regulation and controls that are considered to impact the management of SGG refrigerants within New Zealand and were reviewed for this section. Note: We have not listed legislation that would control the general activities of a commercial operation.

5.1.1. The current regulatory (rule or directive by an agency) controls

- Climate Change (Other Removal Activities) Regulations 2009 (CCORAR)
- Climate Change (Synthetic Greenhouse Gas Levies) Regulations 2013 (CCSGGLR)
- Hazardous Substances Disposal Notice 2017 (HSDN)
- Health and Safety at Work (Hazardous Substances) Regulations 2017 (HSWHSR)
- Ozone Layer Protection Regulations 1996 (OLPR)

5.1.2. The current legislative (in law) controls

- Climate Change Response Act 2002 (CCRA)
- Hazardous Substances and New Organisms Act 1996 (HSNO)
- Health and Safety at Work Act 2015 (WSWA)
- Land Transport Act 1998 (LTA)

- Ozone Layer Protection Act 1996 (OLPA)
- Resource Management Act 1991 (RMA)
- Waste Minimisation Act 2008 (WMA)

These were reviewed in detail to identify the specific parts that could apply.

The matrix presented in Table 1 shows where it is considered that the reviewed controls interact with various key stages of the life cycle of refrigerants; from importation through to disposal. The following briefly outlines these stages:

Import and Export

There is no onshore production of refrigerants in New Zealand, so all refrigerants are imported either as individual refrigerants or as blends. They can arrive in bulk or pre-charged in other goods such as heat pumps or air conditioning units in motor vehicles. Some of these are then re-exported (no substantial transformation) to other countries either in bulk or in equipment and goods or exported in goods and equipment manufactured in New Zealand.

Manufacture

As discussed above there is no onshore production of refrigerants in NZ. However, there is the production of equipment and goods that contain refrigerants which are sold both within NZ and overseas.

Sale

SGG refrigerants are sold within NZ wholesale in bulk or within imported pre-charged goods and motor vehicles or NZ manufactured goods. This part covers motor vehicles up to but not including registration.

Installation/Use

This is the installation of refrigerant containing equipment and goods and their use and the servicing of that equipment and goods during its life. It also covers the use of motor vehicles from the point of registration. (Reference the IHRACE Work Plan to develop industry credentials – this can be seen as a product regulation⁹).

Recycling/reuse

Refrigerants are reused in NZ when they are removed from one system and charged into another. This part covers the extraction of refrigerant from goods or equipment with the intention of either reusing it within other equipment or reprocessing it so it can be used in goods, motor vehicles and equipment.

Storage

SGG refrigerants are stored at various stages in their lifecycle, be that prior to sale, during servicing or awaiting reuse or disposal. This is storage of refrigerants whilst not in goods, motor vehicles or equipment.

Disposal

This is the final stage of a refrigerant's lifecycle where it is sent for safe destruction.

⁹ Milestone 3: IRHACE develop scope for industry credentials which sets the benchmark for industry installation, maintenance and decommissioning best practice to reduce risk of harm to the environment and human health. To unit standard level. The above includes consultation with the broader stakeholders and will include interviews and submissions

As SGG refrigerants can be both flammable and non-flammable different controls can apply.

Where this is the case, we have highlighted in red controls that only apply if the SSG refrigerant is classified as a hazardous substance under the Hazardous Substances and New Organisms Act 1996, for example, Difluoromethane R32. For clarification these are in addition to those other controls.

Where an individual section of an Act or Regulation controls SSG refrigerant management it is provided with the notation “s” and then the number of the section. Where larger portions apply such as parts (pt) or articles (art) these have been provided rather than list all the sections that could apply. However, in some situations both the part and sections within the part have been listed as it was considered beneficial to the reader that these individual sections be detailed.

More detail of the requirements of these parts, sections and articles can be found in Appendix C.

	Import	Export	Manufacture	Sale	Installation/Use	Recycling/Reuse	Storage	Disposal
Legislative controls								
Climate Change Response Act 2002	s40, s48, s50 (2) pt4, s139, s140, s227, s228, s229 s233, s244, s246 s248, s253, s259, s260, s268	s40, s48, s50 (2), pt4, s139, s140, s268	s40, s48, s50 (2), pt4, s139, s140, s268	s40, s48, s50 (2), s227, s228	s40, s48, s50 (2), s139, s140, s264, s265, s268	s40, s48, s139, s140, s264, s265, s268	s40, s48, s139, s140, s264, s265, s268	s40, s48, s50 (2), pt4, s139, s140, s264, s265, s268
Hazardous Substances and New Organisms Act 1996			s76	s76	s76	s76	s76	s76
Land Transport Act 1998				s243	s243			
Ozone Layer Protection Act 1996	s6, s10		s6, s10	s6	s6			
Resource Management Act 1991					s15, s17	s15, s17	s15, s17	s15, s17
Waste Minimisation Act 2008 (Future potential)	S9, s10, s12, s22, s23, s24	S9, s10, s12, s22, s23, s24	S9, s10, s12, s22, s23, s24	S9, s10, s12, s22, s23, s24	S9, s10, s12, s22, s23, s24	S9, s10, s12, s22, s23, s24	S9, s10, s12, s22, s23, s24	S9, s10, s12, s22, s23, s24
Regulatory controls								
Climate Change (Other Removal Activities) Regulations 2009		pt2						pt2
Climate Change Synthetic Greenhouse Gas Levies Regulations 2013	S4 s5 s12 s13							
Hazardous Substances Disposal Notice 2017								s7
Health and Safety at Work (Hazardous Substances) Regulations 2017	pt2, pt4, pt15 (s15.64, s15.65, s15.66)	pt2, pt4, pt15 (s15.64, s15.65, s15.66)	pt2, pt4, pt15 (s15.64, s15.65, s15.66)	pt2, pt4, pt15 (s15.64, s15.65, s15.66)	pt2, pt4, pt15 (s15.64, s15.65, s15.66)	pt2, pt4, pt15 (s15.64, s15.65, s15.66, s15.78),	pt2, pt4, pt15 (s15.64, s15.65, s15.66)	pt2, pt4, pt15 (s15.64, s15.65, s15.66), pt16 pt17
Ozone Layer Protection Regulations 1996	s3, s7, s12, s19, sch6, s28, s29, s30, s31, s32, s37, art4b	s22, s23, s37, art 4a, art4b	s24	s25		s37, art4a, art4b		art4a, art4b

Table 15: Details of current legislation that controls SGG refrigerants during their lifecycle.

There are a number of agencies responsible for administering or implementing the legislative and regulatory controls given above. They are:

The **Ministry for the Environment** (MfE) which is responsible for:

- leading the development, coordination and implementation of climate change policy including managing policy development for the Emissions Trading Scheme (ETS).
- administering the Resource Management Act, the Climate Change Response Act, Ozone Layer Protection Act, Waste Minimisation Act and the Hazardous Substances and New Organism Act.
- administering the Climate Change (Other Removal Activities) Regulations and the Climate Change (Synthetic Greenhouse Gas Levies) Regulations.

The **Environmental Protection Authority** (EPA) which is responsible for:

- administering the ETS including compliance, reporting and market information and operates the New Zealand Emissions Trading Register.
- administering the Hazardous Substances Disposal Notice
- permitting the import or export of bulk HFCs after 31 December 2019
- regulation of hazardous substances under the Hazardous Substances and New Organisms Act. This includes approvals to import and manufacture and reassessments.

The **New Zealand Customs Service** which is responsible for:

- administering part of the synthetic greenhouse gas provisions of the Climate Change Response Act and the Synthetic Greenhouse Gas Levy for imported pre-charged goods (excluding vehicles).
- Regulating imports and exports into and out of New Zealand.

The **New Zealand Transport Agency** (NZTA) which is responsible for:

- administering part of the synthetic greenhouse gas provisions of the Climate Change Response Act and the Synthetic Greenhouse Gas Levy for imported vehicles.
- Regulating land transport.

The **Ministry of Business, Innovation, and Employment** (MBIE) which is responsible for:

- administering the Health and Safety at Work Act.
- administering the Energy Efficiency (Energy Using Products) Regulations.

Worksafe which is responsible for:

- regulating the Health and Safety at Work Act and the Health and Safety at Work (Hazardous Substances) Regulations.
- administering the rules for the use of hazardous substances in the workplace.

5.2. Requirements for a regulated product stewardship scheme for priority products

It is considered that the following requirements would be essential to ensure that any regulated product stewardship scheme(s) for SGG refrigerants are safely stewarded through their lifecycle from importation / manufacture through use to their final safe disposal at end of useful life.

- a) **Data management** - A requirement for those who import, export, manufacture, sell, collect and/or dispose of SGG refrigerants to collect, maintain and provide on request data relating to their SGG refrigerants.
- b) **Advanced Disposal Fee** - A requirement to pay an advanced disposal fee that is set at a level that can cover the cost of final collection and safe disposal. It should also cover promotional and administration costs involved with the scheme.
- c) **Training and Qualifications** - A requirement that all who handle, install, service/maintain, remove and/or dispose of SGG refrigerants are suitably trained and qualified.
- d) **Equipment standards** - That all equipment used during the lifecycle of SGG refrigerants is of a suitable standard and is regularly maintained to ensure that SGG refrigerants are not lost to the environment.
- e) **Recycling controls** - That any recycling of SGG refrigerants is carried out in a manner that ensures that SGG are not released to the environment. Is carried out by suitable qualified persons using appropriate equipment.
- f) **Prohibition of intentional discharges** - That the intentional release of SGG refrigerants is prohibited and that there are legal consequences for such releases.
- g) **Collection locations/services** – In order to be successful any product stewardship scheme needs a good distribution of collection locations and/or services where collections for larger volumes can be carried out on site.
- h) **Storage controls** - That SGG refrigerants held in storage for either recycling or disposal are done so in containment systems that meet current suitable standards.
- i) **Safe destruction** - That collected unwanted SGG refrigerants are safely destroyed and records of this destruction are maintained.

Table 16 below is a representation of where the current legislation has controls that are the same or similar to those that are considered essential for a successful product stewardship scheme. By looking at these and discussing them in detail it is considered that we can better identify the current gaps that would need to be addressed for any regulated product stewardship scheme.

	Import	Export	Manufacture	Sale	Installation/ Use	Recycling/ Reuse	Storage	Disposal
Data management	CCRA s48, s50 (2), s139, s140, s248, s253, s259, s260, s268 WMA s23, s24	CCRA s48, s50 (2), s139, s140 CCORAR pt2 WMA s23	CCRA s48, s50 (2) WMA s23	CCRA s48, s50 (2), s139, s140 WMA s23	CCRA s48, s50 (2), s139, s140	WMA s23		CCORAR pt2 WMA s23
Advanced Disposal Fee	WMA s23	WMA s23	WMA s23	WMA s23	WMA s23	WMA s23	WMA s23	WMA s23
Training and Qualifications			HSWHSR pt4 s15.66		HSWHSR pt4 s15.66	HSWHSR pt4, s15.66	HSWHSR pt4, s15.66	HSWHSR pt4, s15.66
Equipment standards	HSWHSR pt2, pt15	HSWHSR pt2, pt15	HSWHSR pt2, pt15	HSWHSR pt2, pt15	HSWHSR pt2, pt15	HSWHSR pt2, pt15	HSWHSR pt2, pt15	HSWHSR pt2, pt15
Prohibition of intentional discharges	RMA s15, s17	RMA s15, s17	RMA s15, s17	RMA s15, s17	CCRA s264 RMA s15, s17	CCRA s264 RMA s15, s17	RMA s15, s17	CCRA s264 RMA s15, s17
Recycling controls				WMA s23		WMA s23		WMA s23
Collection locations/services				WMA s23		WMA s23		WMA s23
Storage controls	HSWHSR pt2, pt15	HSWHSR pt2 pt15	HSWHSR pt2, pt15	HSWHSR pt2, pt15	HSWHSR pt2, pt15	HSWHSR pt2, pt15	HSWHSR pt2, pt15	HSWHSR pt2, pt15
Safe destruction								HSDN s7

Table 16: Outline of the current controls that potentially overlap with the requirements for a successful product stewardship scheme.

5.2.1. Data Management

Currently the Climate Change Response Act 2002 (CCRA) s 48, s 50 (2) and s 246 enables Regulations to be made that require persons to maintain records who *“imports, exports, manufacture, sales, and the nature of the use of products that contain hydrofluorocarbons...”*. These regulations are the Climate Change (Other Removal Activities) Regulations 2009 (CCORA) and the Climate Change (Synthetic Greenhouse Gas Levies) Regulations 2013 (CCSGGLR).

The CCORA (pt2) addresses the removal (export or destruction) of SGGs from NZ and its implications for the Emissions Trading Scheme.

The CCSGGLR details the levies that are required to be paid on importation of SGG, who should pay (the importer – not including motor vehicles which is the registrant) and when it should be paid (on import – except motor vehicles which is on registration).

The CCRA also outlines that it is a requirement to collect and keep records (s248) that they can be required to be provided (s253) and that it is an offence not to collect and keep (s259 (just for importers and s260) them.

Finally, the Waste Minimisation Act requires that information be collected and provided (s23 (i)) for specific wastes or products. It also requires the NZ Customs Service to provide (s24) any information it has on imports (but not exports) of priority products.

5.2.2. Advanced Disposal Fee

The Waste Minimisation Act provides for the application of fees to cover the cost of managing a product and specifying, who can apply, when it can be applied, and for what it can be used.

5.2.3. Training and Qualifications

The Health and Safety at Work (Hazardous Substances) Regulations 2017 (s 15.66) outlines the requirements for approved fillers and the compliance certificate they must obtain. It also outlines the (pt 4) training, supervision and certification for those that handle SGGs that are hazardous substances under HSNO.

5.2.4. Equipment standards

The Health and Safety at Work (Hazardous Substances) Regulations 2017 (pt2), details the labelling, signage and packaging for hazardous substances. It also (pt15) details the requirements for cylinders, fittings and the records that Worksafe must be keep for cylinders.

5.2.5. Prohibition of intentional discharges

Climate Change Response Act 2002 (s 264) states that it is an offence to knowingly and without justification release SGGs whilst “installing, operating, servicing, modifying, dismantling, or disposing of any electrical switchgear, refrigeration or air-conditioning equipment, or other heat-transfer medium” and the potential fines that would result.

The Resource Management Act (s 15) prohibits the discharge of a contaminant into air unless it is allowed by regulation, resource consent or a rule in a regional plan, it also outlines (s 17)

that it is every person's responsibility to avoid, remedy or mitigate any adverse effect on the environment from an activity. This would be enforced by a regional council. However, the Resource Management (Energy and Climate Change) Amendment Act 2004 requires local authorities to not consider the "the effects on climate change of discharges into air of greenhouse gases". This amendment makes it unlikely that a regional council could prevent or prosecute a person who intentionally released a SGG refrigerant.

5.2.6. Recycling controls

The Waste Minimisation Act (s23) can require certain persons to reuse, recycle, recover, treat or dispose of products that have been required to be taken back.

5.2.7. Collection locations/services

The Waste Minimisation Act (s23) can require take back services for products and prescribe the requirements of that service.

5.2.8. Storage controls

The Health and Safety at Work (Hazardous Substances) Regulations 2017 (pt2) details the storage requirements for hazardous substances and (pt15) for gasses under pressure.

5.2.9. Safe destruction

The Hazardous Substances Disposal Notice 2017 (s7) requires that a person disposing of a class 2 substance must dispose of it by treating it in a manner that changes its characteristics or composition so that it is no longer hazardous.

5.3. Recommendations

There are a number of gaps in the current legislative framework. To deliver a successful product stewardship scheme for NZ that minimises the risk of harm to the environment and human health, there are a number of areas that would need to be addressed through regulation. These areas are:

5.3.1. Data Management

Currently there is a requirement for multiple parties to collect, maintain and provide information on refrigerants under their management but this requirement does not cover the whole lifecycle and relates to the collection of levy money.

For a successful product stewardship scheme there should be a requirement for all to maintain records and ensure they use suitably qualified and competent persons.

It is not considered practicable for this to apply to the domestic sector. However, any scheme should promote the safe installation and removal of refrigerant containing goods. Advanced Disposal Fee

There is currently no requirement to charge an Advanced Disposal Fee on refrigerants. This would be essential for any scheme and should be set at a rate that ensures the collection,

storage, management and promotion of the scheme and the safe destruction of the collected refrigerants.

5.3.2. Training and Qualifications

There are requirements for persons in control of a business or undertaking to ensure that persons undertaking work with refrigerants are suitably trained and qualified. However, this does not appear to extend to installations undertaken outside of a place of work such as a home owner installing their own heat pump.

Given the risks to the environment that unintentional releases of SGG refrigerants can have, it is considered that this should be addressed.

5.3.3. Equipment standards

As with training and qualifications above, there are requirements on equipment used for gasses under pressure that apply in a place of work. However, again this does not appear to extend to other locations.

5.3.4. Prohibition of intentional discharges

There are controls that prohibit the intentional release of SGG refrigerants. However, it does not cover the whole lifecycle of the gases and provides potential loopholes that could enable intentional discharges in some situations.

5.3.5. Recycling controls

There are no specific controls on recycling or reuse.

Currently, whilst there is a market to reuse refrigerants, given the requirement to phase out CFCs and HCFC and phase down HFCs reuse/recycling would appear to potentially impede those goals. However, there may still be the need to use HFCs for a number of years to come and a desire to reuse and recycle lower global warming potential (GWP) SGG refrigerants. Therefore, controls should be developed to ensure that the recycling and reuse of SGG refrigerants is undertaken in a manner that minimises the risks to the environment whilst not impeding the requirement to phase out and phase down those SGG refrigerants that are ozone depleting and have a high GWP.

5.3.6. Collection locations/services

There are currently no controls on the location of collection points or services to safely collect and dispose of SGG refrigerants.

It is not considered practicable or effective to have any regulation that specifically identify where collection services should operate. It would be more effective for these to be left to individual schemes to decide the most effective locations and service provided. However, it is important that access to collection points and services are available in locations that enable participation in the scheme.

5.3.7. Storage controls

It is considered that there are sufficient controls on the storage of SGG refrigerants. Whilst these controls relate just within places of work, it is considered unlikely that significant quantities of SGG refrigerants would be stored in other locations.

5.3.8. Safe destruction

There is a requirement for SGG refrigerants that are hazardous substances to be treated so that it is no longer hazardous. This does not mean that the SGG refrigerant is required to be safely destroyed. Given that these refrigerants are classified as a hazardous substance due to their flammability this treatment could take the form of dilution with a non-flammable gas. However, this may not significantly reduce its global warming potential.

It is therefore considered that there should be a requirement to ensure that all unwanted SGG refrigerants are safely destroyed in a manner that eliminates or significantly reduces their global warming potential.

6. CONCLUSIONS AND RECOMMENDATIONS.

This section contains the conclusions and recommendations that the Working Group considers to be necessary for an effective SGG refrigerant product stewardship scheme.

The desktop research and interviews conducted with the majority of members within the SGG Working Group has identified strengths and gaps in how SGG refrigerants are managed currently within NZ. The recommendations below are suggestions of what would need to be implemented to ensure an effective SGG refrigerant stewardship scheme

We have provided specific conclusions and recommendations at the end of Part 2 and 3 of this report. However, we have included some of the key points from those parts within this section.

Data Management

Data for SGG refrigerants are conflicting and confusing being collected and reported in differing years and by different agencies for different purposes. There appears to be little consistency when comparing one data set with another even though reporting of some of the data is required by law

For an effective stewardship scheme to be successful it is important that it has access to good data. These data need to be easily accessible and not onerous on those who provide or collect the data. Given that data on SGG refrigerants are already required to be provide for ETS purposes it is recommended that any requirement to provide data from importers and exporters are collected in the same format and timeframes (calendar year) as what is required under the ETS.

Regulatory controls

There are several legislative or regulatory controls for the management of SGG refrigerants. However, there are significant gaps that need to be addressed. For example, the ability for

unskilled homeowners or tradespeople to install and charge refrigerant containing equipment can lead to the loss of SGG refrigerants.

The requirement for suitable competency training and qualifications would reduce the likelihood of these emissions.

In most situations within NZ it is illegal to intentionally release refrigerants to the atmosphere. However, there would appear to be some situations where this is possible. It is very difficult to prove intentional release of these gases but the requirement to maintain records of how an owner/user disposed of unwanted SGG refrigerants would encourage them to safely dispose of the gases and aid in any potential enforcement that might be required.

Overall management

One key factor that is critical for the success of any product stewardship scheme is good engagement and participation. It is vital that those that have refrigerants know the risks they pose to the environment through release to the atmosphere, are aware of the safe disposal options, and are motivated to use them.

This engagement is critical within both the HVAC&R sector and their customers. One barrier to participating in the current RECOVERY scheme would appear to be the cost of collecting the unwanted refrigerant from the equipment's location. If these collection costs were to be covered by the scheme then that would be a significant barrier eliminated. However, it may not be cost effective for the collection of SGG refrigerants from small pre charged goods and vehicles.

A rebate scheme used overseas, could be considered. This would compensate people dropping off SGG refrigerants for safe destruction from any ADF that has been applied. Technicians who are removing small amounts of gas, who currently consider it easier and cheaper to release to the atmosphere, may reconsider if there is a rebate available. This may also incentivise consumers to use the services of refrigeration technicians as this may help to offset the overall cost.

The introduction of new SGG refrigerants with flammable properties, will require additional training to be carried out. It should be ensured that the current training unit standards keep up with the changing face of SGG refrigerants and HFOs. This will ensure anyone working with SGG refrigerants and HFOs will be aware of the associated risks to clients, to themselves and the wider public.

The public are often unaware of which goods contain refrigerants and this is not helped by the limited identification measures. The small metal tag has no significance to the public. Often consumers remove, scrap or dump AC units and are not aware of their potential GWP properties and often results in the public degassing units. Incorporating a warning sign could inform the consumers and end users of the detrimental GWP properties which results in the unintentional degassing of units. It would also allow the consumer to make an informed decision around how and who the unit is sent to at the end of its life.

7. APPENDIX A

Synthetic Greenhouse Gas Refrigerant Working Group Members

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3R Group Ltd	Adele Rose	CEO Lead Project Manager	PO Box 1216 Hastings 4156	adele@3R.co.nz
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HPSA Heat Pump Suppliers Association	Peter Hutson	BDT: National Technical and Training Manager	1 Parliament Street. PO Box 30772, Lower Hutt 5040, New Zealand.	phutson@bdt.co.nz
Imported Motor Vehicle Industry Association Incorporated (VIA)	Malcolm Yorston	Technical Manager	PO Box 14 143, Panmure, Auckland	malc@via.org.nz
IRHACE Institute of Refrigeration, Heating and Air Conditioning Engineers	Christine Johnston	General Manager	PO Box 207084, Botany Junction, Auckland. 2164	christine@irhace.org.nz

Name of Organisation	Contact Person	Position	Postal Address	Email Address
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Motor Industry Association Incorporated (MIA)	Leo Mortimer	Principal Technical Advisor	PO Box 31221, Lower Hutt, 5040	leo@mia.org.nz
Motor Trade Association (Inc.) (MTA)	Ian Baggot	Sector Manager - Energy and Environment	Level 12 Nokia House 13-27 Manners Street Wellington 6011	ian.Baggott@mta.org.nz
Refrigerant Recovery NZ	John Bowen	RECOVERY Programme Manager & Refrigerant Consultant (IRHACE)	Trust for the Destruction of Synthetic Refrigerants (Att: Rod Tapp) C/- Private Bag 92 162 Auckland 1142	k.john.bowen@outlook.com
Temperzone	Carl Easton	Group Supply Manager	Private Bag 93303, Otahuhu, Auckland, New Zealand	ceaston@temperzone.com

8. APPENDIX B

SYNTHETIC GREENHOUSE GAS REFRIGERANT STEWARDSHIP PROGRAMME

Importer Survey

This survey has been sent to you as you have been recognised as being an importer of synthetic greenhouse gas (SGG) refrigerants in the New Zealand market.

Purpose: To establish volume of product to market within project scope

Introduction

A working group has been established to design a product stewardship solution for SGG refrigerants. In order to design a nationwide solution, we need to understand the volume and flows of SGG refrigerants.

The working group's goal is to provide an industry-led solution for the recovery of SGG refrigerants to minimise the release of SGG refrigerants to the air; and to maximise the safe collection and destruction of unwanted SGG refrigerants.

Confidentiality

Your confidentiality in completing this survey is assured.

This data will only be presented in an aggregated form. The data will be received by 3R Group as the independent project managers. Any identifiers will be removed before the information is placed into a spreadsheet showing total quantities.

We thank you for your participation. If you have any concerns, please feel free to contact me.

Darren Patterson

Business Development Director
3R Group Ltd – Project Managers
021 440 832 | darren@3R.co.nz

If you would like to know more about the project, please click here

<https://refrigerantstewardship.co.nz>

SYNTHETIC GREENHOUSE GAS REFRIGERANT STEWARDSHIP PROGRAMME

Importer Survey - Data Input Form

We are tracking the main phases of synthetic greenhouse gas refrigerants to market, from import through to the consumer. Therefore, we need to understand which area(s) of the supply chain you service.

Company name:

Primary address:

Trading name (if different):

Contact person:

Phone number:

Job title:

Email address:

		1 July 2013 -30 June 2014	1 July 2014 -30 June 2015	1 July 2015 -30 June 2016	1 July 2016 -30 June 2017	1 July 2017 -30 June 2018
Quantity Imported (kg)	R134a					
	1234yf					
	R32					
	Flammable blends					
	Non-flammable blends					
Quantity Exported (in bulk) (kg)	R134a					
	1234yf					
	R32					
	Flammable blends					
	Non-flammable blends					
Quantity Exported in equipment (kg of refrigerant)	Heat Pumps					
	Domestic Fridge/freezers					
	Vehicles					
	Commercial refrigeration					
	Air Conditioning					
	Other					
Sales - Domestic (kg of refrigerant)	Heat Pumps					
	Fridge/freezers					
	Vehicles					
	Other					
Sales- Commercial (kg of refrigerant)	Refrigeration					
	Air Conditioning					
	Wholesale bulk refrigerant					
	Other					

9. APPENDIX C

Provided below are the regulatory controls placed on SGG refrigerants within New Zealand. They are grouped into the main parts of their lifecycle import, export, manufacture, sale, installation/use, recycling/ reuse, storage and disposal.

Those highlighted in **red** apply only if the SSG refrigerant is classified as a hazardous substance under the Hazardous Substances and New Organisms Act 1996.

Where an individual section of an Act or Regulation controls SSG refrigerant management it is provided with the notation s and then the number of the section. Where larger sections apply such as Parts (pt) or Articles (art) these have been given rather than list all the sections that would apply. However, in some situations both the Part and Sections within the Part have been listed as it was considered beneficial that these individual Sections be detailed.

	IMPORTATION
Climate Change Response Act 2002	<p>s 40 – enables an inventory agency the ability to seek a warrant to enter premises to search for evidence of offence to fail to provide required information.</p> <p>s 48 – outlines fines that relate to false declarations.</p> <p>s50 (2) – outlines the ability to make regulations to keep and provide information</p> <p>pt 4 – establishes the Emissions Trading Scheme</p> <p>s 227 – provides for application of a levy on SGGs</p> <p>s 228 – outlines that the importer of goods (does not include motor vehicles) is responsible for paying the levy on SGGs</p> <p>s 229 - states person who imports a SGG is responsible for paying the levy</p> <p>s 233 – outlines how the levy rate is calculated.</p> <p>s 244 – outlines exemptions from payment of the levy.</p> <p>s 246 – enables regulations to be made relating to SGG levy.</p> <p>s 248 – outlines the requirement for importers of leviable goods to collect and keep required data and records.</p> <p>s 253 – enables the EPA to require information from a person to ensure compliance with the Act.</p> <p>s 259 – outlines that it is an offence to not collect and keep records and the fines that could result.</p> <p>s 260 – outlines that it is an offence to not provide required information and the fines that could result.</p> <p>s 268, 139 and 140 – outlines the liability for body corporates, company directors and management.</p>
Climate Change Synthetic Greenhouse Gas Levies Regulations 2013	<p>s 4 – applies a levy to specific motor vehicles</p> <p>s 5 – applies a levy to specific goods</p> <p>s 12 – exempts household goods of passengers from levy</p>
Hazardous Substances and New Organisms Act 1996	
Hazardous Substances Disposal Notice 2017	
Health and Safety at Work (Hazardous Substances) Regulations 2017	<p>pt 2 – outlines labelling, signage, safety data sheets and packaging for hazardous substances and the duties of a Person Conducting a Business or Undertaking (PCBU).</p>

	<p>pt 4 – outlines the training, supervision and certification for those that handle hazardous substances</p> <p>pt 15 – outlines the controls placed on gases under pressure. This includes equipment, cylinders, cylinder fittings, labelling, testing of cylinders, charging of gas containers, repair of cylinders and record keeping.</p> <p>s15.64– outlines restrictions on who can charge a gas container.</p> <p>s15.65 and 15.66 – details Approved fillers and compliance certification.</p>
Land Transport Act 1998	
Ozone Layer Protection Act 1996	<p>s 6 - prohibits the import of specific ozone depleting substances or goods</p> <p>s10 – enables the Minister to require the submission of a code of practice that includes training and other matters; and outlines fines for non-compliance.</p>
Ozone Layer Protection Regulations 1996	<p>s 3 – prohibits importation of bulk CFC, halon, carbon tetrachloride, methyl chloroform, HBFC, HCFC, or bromochloromethane.</p> <p>s 7a-k – prohibits importation of HFCs without permit which is applied to and issued by the EPA</p> <p>s 12 – prohibits importation of bulk recycled substances unless specific conditions are met.</p> <p>s19 – prohibits the importation of certain goods containing ozone depleting substances excluding packaging s 20 and personal effects</p> <p>s 21.</p> <p>sch 6 – details declining import limit for bulk HFCs from 2020 to 2036</p> <p>s28 to s32 – outlines the ability to exempt substances and goods that are prohibited under previous sections</p> <p>s37 – Offence to fail to notify importation or exportation of bulk recycled substance (other than HFC)</p> <p>art 4b – sets out the establishment for licensing for the import, export of new, used, recycled and reclaimed controlled substances.</p>
Resource Management Act 1991	
Waste Minimisation Act 2008 (Future potential)	<p>s 9 – outlines how the Minister can declare a product a priority product</p> <p>s 10 – states that product stewardship schemes are required for priority products.</p> <p>s 12 – outlines the guidelines for product stewardship schemes and what can be required.</p> <p>s 22 and 23 – details potential for regulations for priority products; such are prohibition, accreditation, required information, labelling quality standards, fees, monitoring charges.</p> <p>s 24 – requires the NZ Customs service to provide information about priority products.</p>

Table 17a: Details of legislation that controls importation of SGG refrigerants.

	EXPORT
Climate Change Response Act 2002	<p>s40 – enables an inventory agency the ability to seek a warrant to enter premises to search for evidence of offence to fail to provide required information.</p> <p>s48 – outlines fines that relate to false declarations.</p> <p>s50 (2) – outlines the ability to make regulations to keep and provide information</p> <p>pt 4 – establishes the Emissions Trading Scheme</p> <p>s 268, 139 and 140 – outlines the liability for body corporates, company directors and management.</p>
Climate Change (Other Removal Activities) Regulations 2009	Pt 2 – outlines information required and methods of calculating removals of SGG from New Zealand through exports or destruction.
Climate Change Synthetic Greenhouse Gas Levies Regulations 2013	
Hazardous Substances and New Organisms Act 1996	
Hazardous Substances Disposal Notice 2017	
Health and Safety at Work (Hazardous Substances) Regulations 2017	<p>pt 2 – outlines labelling, signage, safety data sheets and packaging for hazardous substances and the duties of a Person Conducting a Business or Undertaking (PCBU).</p> <p>pt 4 – outlines the training, supervision and certification for those that handle hazardous substances</p> <p>pt 15 – outlines the controls placed on gases under pressure. This includes equipment, cylinders, cylinder fittings, labelling, testing of cylinders, charging of gas containers, repair of cylinders and record keeping.</p> <p>s15.64– outlines restrictions on who can charge a gas container.</p>

	s15.65 and 15.66 – details Approved fillers and compliance certification.
Land Transport Act 1998	
Ozone Layer Protection Act 1996	
Ozone Layer Protection Regulations 1996	<p>s22 prohibits the exports of bulk CFC, halon, carbon tetrachloride, methyl chloroform, HBFC, or bromochloromethane and, under s 23B HCFC, unless it is to a complying country.</p> <p>s23 – prohibits the export of other controlled substances except under permit</p> <p>s37 – Offence to fail to notify importation or exportation of bulk recycled substance (other than HFC)</p> <p>art 4a – sets out a ban for the export of used, recycled and reclaimed substances other than for destruction</p> <p>art 4b – sets out the establishment for licensing for the import, export of new, used, recycled and reclaimed controlled substances.</p>
Resource Management Act 1991	
Waste Minimisation Act 2008 (Future potential)	<p>s 9 – outlines how the Minister can declare a product a priority product</p> <p>s 10 – states that product stewardship schemes are required for priority products.</p> <p>s 12 – outlines the guidelines for product stewardship schemes and what can be required.</p> <p>s 22 and 23 – details potential for regulations for priority products; such are prohibition, accreditation, required information, labelling quality standards, fees, monitoring charges.</p> <p>s 24 – requires the NZ Customs service to provide information about priority products.</p>

Table 17b: Details of legislation that controls exportation of SGG refrigerants

	MANUFACTURE
Climate Change Response Act 2002	<p>s40 – enables an inventory agency the ability to seek a warrant to enter premises to search for evidence of offence to fail to provide required information.</p> <p>s48 – outlines fines that relate to false declarations.</p> <p>s50 (2) – outlines the ability to make regulations to keep and provide information</p> <p>s 268, 139 and 140 – outlines the liability for body corporates, company directors and management.</p>
Climate Change (Other Removal Activities) Regulations 2009	
Climate Change Synthetic Greenhouse Gas Levies Regulations 2013	
Hazardous Substances and New Organisms Act 1996	s76 - enables the EPA to prescribe controls on any gas under pressure regardless of whether it is intrinsically hazardous.
Hazardous Substances Disposal Notice 2017	
Health and Safety at Work (Hazardous Substances) Regulations 2017	<p>pt 2 – outlines labelling, signage, safety data sheets and packaging for hazardous substances and the duties of a Person Conducting a Business or Undertaking (PCBU).</p> <p>pt 4 – outlines the training, supervision and certification for those that handle hazardous substances</p> <p>pt 15 – outlines the controls placed on gases under pressure. This includes equipment, cylinders, cylinder fittings, labelling, testing of cylinders, charging of gas containers, repair of cylinders and record keeping.</p> <p>s15.64– outlines restrictions on who can charge a gas container.</p> <p>s15.65 and 15.66 – details Approved fillers and compliance certification.</p>

Land Transport Act 1998	
Ozone Layer Protection Act 1996	<p>s 6 - prohibits the manufacture of specific ozone depleting substances or goods.</p> <p>s10 – enables the Minister to require the submission of a code of practice that includes training and other matters; and outlines fines for non-compliance.</p>
Ozone Layer Protection Regulations 1996	s24 – prohibits manufacture of specific substances and certain goods.
Resource Management Act 1991	<p>s 15 – outlines it is an offence to discharge a contaminant into air unless it is allowed by regulation and resource consent or a rule in a regional plan.</p> <p>s 17 – outlines it is every person's responsibility to avoid, remedy or mitigate any adverse effect on the environment from an activity.</p>
Waste Minimisation Act 2008 (Future potential)	<p>s 9 – outlines how the Minister can declare a product a priority product</p> <p>s 10 – states that product stewardship schemes are required for priority products.</p> <p>s 12 – outlines the guidelines for product stewardship schemes and what can be required.</p> <p>s 22 and 23 – details potential for regulations for priority products; such are prohibition, accreditation, required information, labelling quality standards, fees, monitoring charges.</p> <p>s 24 – requires the NZ Customs service to provide information about priority products.</p>

Table 17c: Details of legislation that controls the manufacture of SGG refrigerants or equipment that contains SGG refrigerants

	SALE
Climate Change Response Act 2002	<p>s40 – enables an inventory agency the ability to seek a warrant to enter premises to search for evidence of offence to fail to provide required information.</p> <p>s48 – outlines fines that relate to false declarations.</p> <p>s50 (2) – outlines the ability to make regulations to keep and provide information</p> <p>s 227 – provides for application of a levy on SGGs in a motor vehicle at registration.</p> <p>s 228 – outlines that the person who registers a motor vehicle is responsible for paying the levy on SGGs</p>
Climate Change (Other Removal Activities) Regulations 2009	
Climate Change Synthetic Greenhouse Gas Levies Regulations 2013	
Hazardous Substances and New Organisms Act 1996	s76 - enables the EPA to prescribe controls on any gas under pressure regardless of whether it is intrinsically hazardous.
Hazardous Substances Disposal Notice 2017	
Health and Safety at Work (Hazardous Substances) Regulations 2017	<p>pt 2 – outlines labelling, signage, safety data sheets and packaging for hazardous substances and the duties of a Person Conducting a Business or Undertaking (PCBU).</p> <p>pt 4 – outlines the training, supervision and certification for those that handle hazardous substances</p> <p>pt 15 – outlines the controls placed on gases under pressure. This includes equipment, cylinders, cylinder fittings, labelling, testing of cylinders, charging of gas containers, repair of cylinders and record keeping.</p> <p>s15.64– outlines restrictions on who can charge a gas container.</p> <p>s15.65 and 15.66 – details Approved fillers and compliance certification.</p>

Land Transport Act 1998	s 243 – requires the application of a SGG levy at registration of a motor vehicle
Ozone Layer Protection Act 1996	
Ozone Layer Protection Regulations 1996	s 6 - prohibits the sale of specific ozone depleting substances or goods. s25 – prohibits the sale of certain goods with s 26 excludes second hand goods.
Resource Management Act 1991	
Waste Minimisation Act 2008 (Future potential)	s 9 – outlines how the Minister can declare a product a priority product s 10 – states that product stewardship schemes are required for priority products. s 12 – outlines the guidelines for product stewardship schemes and what can be required. s 22 and 23 – details potential for regulations for priority products; such are prohibition, accreditation, required information, labelling quality standards, fees, monitoring charges. s 24 – requires the NZ Customs service to provide information about priority products.

Table 17d: Details of legislation that controls the sale of SGG refrigerants or equipment that contains SGG refrigerants

	INSTALLATION / USE
Climate Change Response Act 2002	<p>s40 – enables an inventory agency the ability to seek a warrant to enter premises to search for evidence of offence to fail to provide required information.</p> <p>s48 – outlines fines that relate to false declarations.</p> <p>s50 (2) – outlines the ability to make regulations to keep and provide information</p> <p>s 264 – outlines that it is an offence to knowingly and without justification release SGGs and the potential fines that would result.</p> <p>s 265 – outlines defence for release of SGGs is where it could not reasonably be avoided.</p> <p>s 268, 139 and 140 – outlines the liability for body corporates, company directors and management.</p>
Climate Change (Other Removal Activities) Regulations 2009	
Climate Change Synthetic Greenhouse Gas Levies Regulations 2013	
Hazardous Substances and New Organisms Act 1996	s76 - enables the EPA to prescribe controls on any gas under pressure regardless of whether it is intrinsically hazardous.
Hazardous Substances Disposal Notice 2017	
Health and Safety at Work (Hazardous Substances) Regulations 2017	<p>pt 2 – outlines labelling, signage, safety data sheets and packaging for hazardous substances and the duties of a Person Conducting a Business or Undertaking (PCBU).</p> <p>pt 4 – outlines the training, supervision and certification for those that handle hazardous substances</p> <p>pt15 – outlines the controls placed on gases under pressure. This includes equipment, cylinders, cylinder fittings, labelling, testing of cylinders, charging of gas containers, repair of cylinders and record keeping.</p>

	<p>s15.64– outlines restrictions on who can charge a gas container.</p> <p>s15.65 and 15.66 – details Approved fillers and compliance certification.</p>
Land Transport Act 1998	s 243 – requires the application of a SGG levy at registration of a motor vehicle
Ozone Layer Protection Act 1996	s 6 - prohibits the use of specific ozone depleting substances or goods.
Ozone Layer Protection Regulations 1996	
Resource Management Act 1991	<p>s 15 – outlines it is an offence to discharge a contaminant into air unless it is allowed by regulation, resource consent or a rule in a regional plan.</p> <p>s 17 – outlines it is every person's responsibility to avoid, remedy or mitigate any adverse effect on the environment from an activity.</p>
Waste Minimisation Act 2008 (Future potential)	<p>s 9 – outlines how the Minister can declare a product a priority product</p> <p>s 10 – states that product stewardship schemes are required for priority products.</p> <p>s 12 – outlines the guidelines for product stewardship schemes and what can be required.</p> <p>s 22 and 23 – details potential for regulations for priority products; such are prohibition, accreditation, required information, labelling quality standards, fees, monitoring charges.</p> <p>s 24 – requires the NZ Customs service to provide information about priority products.</p>

Table 17e: Details of legislation that controls installation and/or use of SGG refrigerants and its containing equipment.

	RECYCLING / REUSE
Climate Change Response Act 2002	<p>s40 – enables an inventory agency the ability to seek a warrant to enter premises to search for evidence of offence to fail to provide required information.</p> <p>s48 – outlines fines that relate to false declarations.</p> <p>s50 (2) – outlines the ability to make regulations to keep and provide information</p> <p>s 264 – outlines that it is an offence to knowingly and without justification release SGGs and the potential fines that would result.</p> <p>s 265 – outlines defence for release of SGGs is where it could not reasonably be avoided.</p> <p>s 268, 139 and 140 – outlines the liability for body corporates, company directors and management.</p>
Climate Change (Other Removal Activities) Regulations 2009	
Climate Change Synthetic Greenhouse Gas Levies Regulations 2013	
Hazardous Substances and New Organisms Act 1996	s76 - enables the EPA to prescribe controls on any gas under pressure regardless of whether it is intrinsically hazardous.
Hazardous Substances Disposal Notice 2017	
Health and Safety at Work (Hazardous Substances) Regulations 2017	<p>pt 2 – outlines labelling, signage, safety data sheets and packaging for hazardous substances and the duties of a Person Conducting a Business or Undertaking (PCBU).</p> <p>pt 4 – outlines the training, supervision and certification for those that handle hazardous substances</p> <p>pt 15 – outlines the controls placed on gases under pressure. This includes equipment, cylinders, cylinder fittings, labelling, testing of cylinders, charging of gas containers, repair of cylinders and record keeping.</p> <p>s15.64– outlines restrictions on who can charge a gas container.</p> <p>s15.65 and 15.66 – details Approved fillers and compliance certification.</p> <p>s15.78 – outlines controls around recharging cylinders with a different gas to ensure compatibility with the other gas and suitability of the cylinder.</p>
Land Transport Act 1998	

Ozone Layer Protection Act 1996	
Ozone Layer Protection Regulations 1996	<p>s37 – Offence to fail to notify importation or exportation of bulk recycled substance (other than HFC)</p> <p>art 4a – sets out a ban for the export of used, recycled and reclaimed substances other than for destruction</p> <p>art 4b – sets out the establishment for licensing for the import, export of new, used, recycled and reclaimed controlled substances.</p>
Resource Management Act 1991	<p>s 15 – outlines it is an offence to discharge a contaminant into air unless it is allowed by regulation, resource consent or a rule in a regional plan.</p> <p>s 17 – outlines it is every person's responsibility to avoid, remedy or mitigate any adverse effect on the environment from an activity.</p>
Waste Minimisation Act 2008 (Future potential)	<p>s 9 – outlines how the Minister can declare a product a priority product</p> <p>s 10 – states that product stewardship schemes are required for priority products.</p> <p>s 12 – outlines the guidelines for product stewardship schemes and what can be required.</p> <p>s 22 and 23 – details potential for regulations for priority products; such are prohibition, accreditation, required information, labelling quality standards, fees, monitoring charges.</p> <p>s 24 – requires the NZ Customs service to provide information about priority products.</p>

Table 17f: Details of legislation that controls the recycling and/or reuse of SGG refrigerants

	STORAGE
Climate Change Response Act 2002	<p>s40 – enables an inventory agency the ability to seek a warrant to enter premises to search for evidence of offence to fail to provide required information.</p> <p>s48 – outlines fines that relate to false declarations.</p> <p>s50 (2) – outlines the ability to make regulations to keep and provide information</p> <p>s 264 – outlines that it is an offence to knowingly and without justification release SGGs and the potential fines that would result.</p> <p>s 265 – outlines defence for release of SGGs is where it could not reasonably be avoided.</p> <p>s 268, 139 and 140 – outlines the liability for body corporates, company directors and management.</p>
Climate Change (Other Removal Activities) Regulations 2009	
Climate Change Synthetic Greenhouse Gas Levies Regulations 2013	
Hazardous Substances and New Organisms Act 1996	s76 - enables the EPA to prescribe controls on any gas under pressure regardless of whether it is intrinsically hazardous.
Hazardous Substances Disposal Notice 2017	
Health and Safety at Work (Hazardous Substances) Regulations 2017	<p>pt 2 – outlines labelling, signage, safety data sheets and packaging for hazardous substances and the duties of a Person Conducting a Business or Undertaking (PCBU).</p> <p>pt 4 – outlines the training, supervision and certification for those that handle hazardous substances</p> <p>pt 15 – outlines the controls placed on gases under pressure. This includes equipment, cylinders, cylinder fittings, labelling, testing of cylinders, charging of gas containers, repair of cylinders and record keeping.</p> <p>s15.64– outlines restrictions on who can charge a gas container.</p> <p>s15.65 and 15.66 – details Approved fillers and compliance certification.</p>
Land Transport Act 1998	
Ozone Layer Protection Act 1996	
Ozone Layer Protection Regulations 1996	
Resource Management Act 1991	<p>s 15 – outlines it is an offence to discharge a contaminant into air unless it is allowed by regulation, resource consent or a rule in a regional plan.</p> <p>s 17 – outlines it is every person's responsibility to avoid, remedy or mitigate any adverse effect on the environment from an activity.</p>

Waste Minimisation Act 2008 (Future potential)	<p>s 9 – outlines how the Minister can declare a product a priority product</p> <p>s 10 – states that product stewardship schemes are required for priority products.</p> <p>s 12 – outlines the guidelines for product stewardship schemes and what can be required.</p> <p>s 22 and 23 – details potential for regulations for priority products; such are prohibition, accreditation, required information, labelling quality standards, fees, monitoring charges.</p> <p>s 24 – requires the NZ Customs service to provide information about priority products.</p>
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Table 17g: Details of legislation that controls the storage of SGG refrigerants

	DISPOSAL
Climate Change Response Act 2002	<p>s40 – enables an inventory agency the ability to seek a warrant to enter premises to search for evidence of offence to fail to provide required information.</p> <p>s48 – outlines fines that relate to false declarations.</p> <p>s50 (2) – outlines the ability to make regulations to keep and provide information</p> <p>Pt 4 – establishes the Emissions trading scheme</p> <p>s 264 – outlines that it is an offence to knowingly and without justification release SGGs and the potential fines that would result.</p> <p>s 265 – outlines defence for release of SGGs is where it could not reasonably be avoided.</p> <p>s 268, 139 and 140 – outlines the liability for body corporates, company directors and management.</p>
Climate Change (Other Removal Activities) Regulations 2009	Pt 2 – outlines information required and methods of calculating removals of SGG from New Zealand through exports or destruction.
Climate Change Synthetic Greenhouse Gas Levies Regulations 2013	
Hazardous Substances and New Organisms Act 1996	s76 - enables the EPA to prescribe controls on any gas under pressure regardless of whether it is intrinsically hazardous.
Hazardous Substances Disposal Notice 2017	s 7 – requires that a person who disposes of a hazardous substance must treat it so it is no longer hazardous.
Health and Safety at Work (Hazardous Substances) Regulations 2017	<p>pt 2 – outlines labelling, signage, safety data sheets and packaging for hazardous substances and the duties of a Person Conducting a Business or Undertaking (PCBU).</p> <p>pt 4 – outlines the training, supervision and certification for those that handle hazardous substances</p> <p>pt 15 – outlines the controls placed on gases under pressure. This includes equipment, cylinders, cylinder fittings, labelling, testing of cylinders, charging of gas containers, repair of cylinders and record keeping.</p> <p>s15.64– outlines restrictions on who can charge a gas container.</p> <p>s15.65 and 15.66 – details Approved Fillers and compliance certification.</p> <p>pt 16 – outlines the controls on tank wagons and transportable containers of hazardous substances.</p> <p>pt 17 – outlines the controls on stationary containers of hazardous substances.</p>
Land Transport Act 1998	

Ozone Layer Protection Act 1996	
Ozone Layer Protection Regulations 1996	<p>art 4a – sets out a ban for the export of used, recycled and reclaimed substances other than for destruction</p> <p>art 4b – sets out the establishment for licensing for the import, export of new, used, recycled and reclaimed controlled substances.</p>
Resource Management Act 1991	<p>s 15 – outlines it is an offence to discharge a contaminant into air unless it is allowed by regulation, resource consent or a rule in a regional plan.</p> <p>s 17 – outlines it is every person's responsibility to avoid, remedy or mitigate any adverse effect on the environment from an activity.</p>
Waste Minimisation Act 2008 (Future potential)	<p>s 9 – outlines how the Minister can declare a product a priority product</p> <p>s 10 – states that product stewardship schemes are required for priority products.</p> <p>s 12 – outlines the guidelines for product stewardship schemes and what can be required.</p> <p>s 22 and 23 – details potential for regulations for priority products; such are prohibition, accreditation, required information, labelling quality standards, fees, monitoring charges.</p> <p>s 24 – requires the NZ Customs service to provide information about priority products.</p>

Table 17h: Details of legislation that controls the disposal/destruction of SGG refrigerants

10. REFERENCES

Legislation. Regulation and controls

Climate Change Response Act 2002 (CCRA)

<http://www.legislation.govt.nz/act/public/2002/0040/latest/DLM158584.html>

Climate Change (Other Removal Activities) Regulations 2009 (CCORAR)

<http://www.legislation.govt.nz/regulation/public/2009/0284/latest/DLM2381201.html>

Climate Change (Synthetic Greenhouse Gas Levies) Regulations 2013 (CCSGGLR)

<http://www.legislation.govt.nz/regulation/public/2013/0046/latest/whole.html>

Hazardous Substances and New Organisms Act 1996 (HSNO)

<http://www.legislation.govt.nz/act/public/1996/0030/latest/DLM381222.html>

Hazardous Substances Disposal Notice 2017 (HSDN)

<https://www.epa.govt.nz/assets/Uploads/Documents/Hazardous-Substances/EPA-Notices/Hazardous-Substances-Disposal-Notice-2017.pdf>

Health and Safety at Work Act 2015

<http://www.legislation.govt.nz/act/public/2015/0070/latest/DLM5976660.html?src=qs>

Health and Safety at Work (Hazardous Substances) Regulations 2017 (HSWHSR)

<http://www.legislation.govt.nz/regulation/public/2017/0131/25.0/DLM7309401.html>

Land Transport Act 1998 (LTA)

<http://www.legislation.govt.nz/act/public/1998/0110/latest/DLM433613.html>

Ozone Layer Protection Act 1996 (OLPA)

<http://www.legislation.govt.nz/act/public/1996/0040/latest/DLM391469.html>

Ozone Layer Protection Regulations 1996 (OLPR)

<http://www.legislation.govt.nz/regulation/public/1996/0222/18.0/DLM217751.html>

Resource Management Act 1991 (RMA)

<http://www.legislation.govt.nz/act/public/1991/0069/latest/DLM230265.html>

Waste Minimisation Act 2008 (WMA)

<http://www.legislation.govt.nz/act/public/2008/0089/latest/DLM999802.html>

Reports

Research Project 8018, Review of Refrigerant Management Programs – Navigant Consulting

Websites accessed

Project Drawdown <https://www.drawdown.org/solutions-summary-by-rank> 27 May 2019

File Name: Synthetic Refrigerant Stewardship Milestone 2: Report 1– Critique existing system(s) including product regulations			
Release Date: 28-10-2019	Version: FINAL V2	Authorised by: Project Manager	Page 74 of 78

Stakeholder interviews

DATE	NAME	INTERESTS & POSITION
3-5-2019	Harry Dodson	Chairperson - Automotive Parts Importers Association (APIA) Owner - Dodson Autospares Ltd
9-5-2019	Rodger Wyatt	Chair – Refrigerant License New Zealand Partner and Service Manager – Beattie Air Conditioning Service Ltd – CCCA Member IRHACE – Life Member/Past President
3-5-2019	Ivan Tottle	Business Development Director - Chemiplas NZ Ltd
10-5-2019	Peter Hutson	Rep SGGRSWG- Heat Pump Suppliers Association (HPSA) National Technical and Training Manager - BDT
2-5-2019	Malcolm Yorston	Technical Manager - Imported Motor Vehicle Industry Association Incorporated (VIA)
3-5-2019	Ian Baggot	Sector Manager Energy and Environment - Motor Trade Association (Inc.) (MTA)
15-2-2019	John Bowen	RECOVERY Programme Manager - Refrigerant Recovery NZ Refrigerant Consultant
3-5-2019	Carl Easton	Group Supply Manager - Temperzone
16-5-2019	Korina Kirk	Scrap Metal Recycling Association
21-3-2019	Colin Booth	Pattons

11. GLOSSARY OF TERMS

Advanced disposal fee (ADF): a fee paid in advance that covers the costs of collection and safe disposal/destruction of an item or product.

Alternative refrigerant: A refrigerant other than that for which a system was designed.

Bulk: Refers to SGG refrigerants that are imported in containers that are not goods or motor vehicles that are subject to the SGG levy. These containers can be any size and in some situations are small, containing a few 100ml

Blend: A combination of two or more refrigerants in a defined ratio that forms a refrigerant with specified thermodynamic properties.

Charge: To load or fill a compressed gas container with a gas or combination of gases.

Compliance Certifier: A person approved by Worksafe New Zealand to issue compliance certificates as outlined in regulation 6.22 of the Health and Safety at Work (Hazardous Substances) Regulations 2017.

Compressed gas: Gases and mixtures of gases stored under pressure.

Compressed gas container: Meaning as detailed in the Health and Safety at Work (Hazardous Substances) Regulations 2017.

Contaminated refrigerant: A refrigerant containing oil, acid, non-condensable substances and/or moisture and/or other foreign substances. This could include mixed refrigerants (cocktails) that are not manufactured products.

Cylinder : Has the meaning given to it in the Health and Safety at Work (Hazardous Substances) Regulations 2017. These are used to store or transport compressed, liquefied or dissolved gases, but do not include an aerosol or a cartridge. They have a water capacity of 120mls or greater if the content is a liquefied flammable gas, a water capacity of 500mls or greater if the content is other than a liquefied flammable gas, and a water capacity not exceeding 500L.

Decommissioning: The process whereby a system is deliberately rendered inoperable.

Destruction: A process whereby a refrigerant is permanently transformed or decomposed into other substances.

Disposal: To dispose of or to convey a product usually for scrapping or destruction.

Disposable container, disposable refrigerant container: A non-refillable cylinder.

Emissions Trading Scheme (ETS): The NZ government's main tool for reducing greenhouse gas emissions by putting a price on emissions of gases that have a global warming potential. It requires all sectors of New Zealand's economy to report on their emissions and, with the exception of biological emissions from agriculture, to purchase and surrender emissions units to the Government for those emissions.

EPA: Environmental Protection Authority is the New Zealand authority responsible for implementing the HSNO Act.

Fluorocarbon (SGG): A hydrocarbon in which some or all of the hydrogen atoms have been replaced by fluorine.

Fluorocarbon refrigerant: A refrigerant consisting of or containing fluorocarbon.

Gas Substance that:

- Is completely gaseous at 20°C and at 101.3kPa absolute pressure; or
- Has a vapour pressure of more than 300kPa absolute pressure at 50°C.

Global warming potential (GWP): The atmospheric warming impact of a gas compared with an equal mass of carbon dioxide over a specified period of time (usually 100 years).

HSW (HS) Act 2017: Health and Safety at Work (Hazardous Substances) Act 2017.

HSNO Act 1996: Hazardous Substances and New Organisms Act 1996.

Levy: A tax or fee *typically* imposed by government for a specific activity where normally the monies raised are hypothecated for a specific purpose.

Liquefied gas: A gas that has a critical temperature greater than -50°C and a boiling point not exceeding 20°C at 101.3 kPa absolute.

Low pressure liquefied gas: A liquefied gas with a critical temperature exceeding 65°C.

Maximum charge: Maximum amount of refrigerant that can be put in a cylinder, calculated by multiplying the water capacity of the cylinder by the refrigerant's fill ratio.

Maximum fill weight: This is calculated by adding the empty weight of the cylinder to the maximum charge.

Ozone Depletion Potential (ODP): The ODP of a chemical compound is the relative amount of degradation to the ozone layer it can cause

PCBU (Person Conducting a Business or Undertaking): In relation to a place that has a gas cylinder located in it, means:

- The person who is the owner, lessee, sub-lessee, occupier, or person in possession of the place or any part of it, or
- Any other person who, at the relevant time, is in effective control or possession of the relevant part of the place.

Permanent gas: A gas with a critical temperature not exceeding -50°C.

Plant: A combination of one or more refrigerating systems at a single site.

Pre-charged consumer products: Consumer products that are imported containing refrigerants.

Priority Product: A product whose waste will or may cause significant environmental harm; or there are significant benefits from the waste minimisation or treatment of the product. The Minister for the Environment must also:

- be satisfied that the product can be effectively managed under a product stewardship scheme
- consider the effectiveness of any relevant voluntary product stewardship scheme.

Reclaiming: To reprocess used refrigerant to new product specification by means which may include distillation.

Recovery: To remove refrigerant in any condition from a system and store it in an external cylinder, without necessarily testing or processing it in any way. It may be that the refrigerant is removed to enable the system to be repaired or de-commissioned.

Recycle: A process that uses a recycle unit in conjunction with a recovery unit, to process the refrigerant where it is going to be used again. The recycle unit removes the oil and solid gross contaminants only.

RECOVERY Trust NZ: The name of the Voluntary Stewardship Scheme which is held by The Trust for the Destruction of Synthetic. Collects SGG refrigerants and sends for them for destruction overseas.

Refrigerant: The medium used for heat transfer in a refrigerating system, which absorbs heat on evaporating at a low temperature and a low pressure and rejects heat on condensing at a higher temperature and higher pressure. Unless specified otherwise, 'refrigerant' in this guide refers to fluorocarbon refrigerant only. Note: The term 'gas' should be avoided when referring to refrigerants.

Refrigerated liquefied gas: A gas that, when packaged, is partially liquid because of its low temperature.

Refrigerating system: An assembly of piping, vessels, and other components in a closed circuit in which a refrigerant is circulated for the purpose of transferring heat.

Retrofit: To replace the original refrigerant (and components, lubricant, etc. as required) in a system with an alternative.

Returned refrigerant: Refrigerant recovered from a system and returned to the supplier (or equivalent) for reclaim or destruction.

Reuse: Use (charge) of recovered refrigerant without any processing to remove impurities.

RSWG: The Synthetic Greenhouse Gas Refrigerant Stewardship Working Group.

Synthetic greenhouse gas (SGG): artificial chemicals commonly used in refrigeration and air conditioning that have a high global warming potential because they can remain in the atmosphere for long periods of time and contribute to climate change.

Transport refrigeration: Any mobile refrigeration system other than air conditioning systems for passenger vehicles.

Volume of gas: The volume of a gas at 101.3 kPa absolute pressure and 15oC.

Waste Minimisation Act 2008 (WMA): Legislation that aims to encourages a reduction in the amount of waste generated and disposed of in New Zealand. The aim is to reduce the environmental harm of waste and provide economic, social and cultural benefits for New Zealand. It details the requirements that need to be met for a product to be a priority and the requirements for any mandatory product stewardship schemes.

Waste Minimisation Fund (WMF): A contestable fund managed by the Ministry for the Environment using monies collected from the Waste Disposal Levy, that aims to minimise waste.

Worksafe: WorkSafe is New Zealand's primary workplace health and safety regulator and enforcer.