

REFRIGERANT RECLAIM AUSTRALIA

Destruction of Waste ozone Depleting Substances
and Synthetic Greenhouse Gases Program



Summary

Refrigerant Reclaim Australia (RRA) has developed and managed the Australian program that collects, takes back, and destroys waste and unwanted refrigerants to prevent their emission to the atmosphere. Initially established for ozone depleting refrigerants (ODS) the program was expanded to incorporate synthetic greenhouse gas refrigerants (SGG) prior to the introduction of legislation requiring their recovery. The program operated on a voluntary basis for the first eleven years until the introduction of the OPSGGM Act took effect in 2004.

Subsequent to the introduction of the Act a condition was placed on licences that required companies to exercise product stewardship over the refrigerants they imported. RRA has successfully fulfilled this role whilst maintaining voluntary membership. Importers and other industry actors have been free to establish alternative programs yet have chosen to support the RRA not-for-profit scheme.

During its almost twenty years of operating RRA has been wholly funded by industry, with the exception of a small grant provided under the Greenhouse Gas Abatement Program for which RRA provided the most certain lowest cost abatement achieved under that initiative. During this period RRA has taken back and destroyed approximately 4,700 tonnes of ODS and SGG refrigerants, as well as other difficult to dispose of substances for which recovery programs did not exist. The environmental benefit is substantial and equates to preventing the destruction of approximately eight million tonnes of stratospheric ozone, and to preventing the emission of approximately ten million tonnes of CO₂e equivalent.

Given the long-term success of the program, RRA is surprised that the government is intent on introducing a taxpayer funded incentive payment for destruction. This action will cause substantial disruption to current industry practises and cost some \$90 million over the next three years for little, if any, additional environmental benefit. In doing so it appears that government will remove the need for product stewardship of refrigerants, which we see as a retrograde step from an environmental protection standpoint.

The impermanent nature of the proposed incentive payment is of great concern to RRA, and the industry more broadly. The proposed payment is part of what is essentially a funding program. Funding for the program exists only for three years and may be cancelled by the government without notice. There is no guarantee that funding will be renewed.

What will be the outcome should the machinery surrounding the current program be dismantled, and when funding for the government incentive is cancelled or not renewed?

We believe the government should enhance the existing program and increase the level of emission abatement by better enforcing current regulations and conditions, and developing proper product stewardship schemes for end-of-life (EOL) consumer durables such as motor vehicles, refrigerators and air conditioners.

EOL consumer durables and motor vehicles are the sectors that least access the RRA program. The establishment of product stewardship programs that will ensure the full recycling of those products, and the recovery of any contained ODS and SGG, will enhance the existing recovery program and provide improved environmental outcomes.

The current product stewardship program and recovery from the EOL sectors will also be enhanced by more vigorous enforcement of existing regulations. Regulations and conditions requiring the recovery and safe disposal of waste and unwanted ODS and SGG already exist, and industry is frustrated that they are not properly enforced. Enforcement will lead to improved levels of compliance with a consequent increase in recovery and reduction in emissions.

Stakeholder Feedback

3. Reclamation

How will reclamation rates change under the equivalent carbon price?

Reclamation is the processing of recovered refrigerant that leads to a product that meets new specification. The volume of refrigerant being reclaimed will be driven by:

- **Reclamation capacity:** There is very limited capacity for reclamation in Australia now. In the absence of any other changes the high prices for new refrigerants should lead to an expansion of reclamation capacity as commercial entities seek to exploit the price umbrella created by the carbon price.
- **Cost of reclamation:** In the absence of any other changes the price differential created by applying a carbon price to refrigerants is such that reclamation will be highly profitable even with inefficient plant and highly contaminated product.
- **Price of new refrigerant (species):** The application of a carbon price raises the prices for all refrigerants creating opportunities for reclamation.
- **Demand for new refrigerant (species):** The application of the carbon price is likely to reduce demand for new refrigerant as the level of reuse of recovered refrigerant in the field increases. The high prices of refrigerant and potential for profit will lead to increasing levels of reuse, and the quality of the refrigerant being reused is likely to decline.

How will the proposed incentives options affect this?

As a general comment, higher feedstock costs (recovered refrigerant) mean higher costs for reclaimed product and a consequent reduction in the profitability of that commercial activity.

The price increases for refrigerant vary based on their GWP. High incentives for refrigerants with lower GWPs have the potential to make reclamation viable only from an environmental protection perspective, and therefore unattractive for commercial operators.

The supply and demand balance for HCFC22 will lead to a tolerance for higher incentives. This product will be available in only limited quantities and demand for new specification product is likely to exceed supply for some time. The environmental benefits of reclaiming HCFC22 are not clear. When released this product depletes the ozone layer, it is in the late stage of being phased out, and there are various commercially available replacements. Each kilogram reclaimed and sold back into the market is placed at the risk of emission.

4. Additional Abatement

What level of destruction incentive could promote greater recovery from fire extinguishers, insulation foams, vehicles and domestic or small commercial refrigerators and air conditioning units?

Regulations already exist that require the recovery of ODS and SGG refrigerants from vehicles, and domestic or small commercial refrigerators and air conditioning units. The current lack of compliance has much to do with a lack of enforcement of the existing regulations. The other major factor influencing the recovery performance from these sectors is the lack of properly organized and managed recycling programs for consumer durables in Australia.

Australia lacks regulations requiring the proper recycling of end-of-life (EOL) consumer durables such as motor vehicles, refrigerators and air conditioners. The countries of the European Union, and others such as Norway and Japan have successfully established programs. The consultation paper notes the Japanese recovery program exceeds the recovery rate of our program due to their EOL recycling programs.

It is important to note that these programs were established to properly recycle EOL consumer durables, and that the collection of refrigerant is an ancillary benefit. Refrigerators are not recycled simply to recover the refrigerant or the foam-blowing agent, but to recover and make available for reuse the contained metals and plastics. In Europe, 85% of a refrigerator is reused. We understand the figure in Australia is 50%.

Paying recyclers to obey the law through the provision of higher incentives will have a lesser impact than proper enforcement of existing or strengthened regulations, and the establishment of recycling programs for EOL consumer durables.

5. Impact on destruction incentives from the phase-out of HCFCs

What is the likely need for HCFC destruction over the coming years?

HCFC22 will not be in high demand forever. It will become obsolete.

- The product is being phased out with only a small quantity available for import from 2015.
- No new HCFC equipment has been imported since July 2010.
- The highest volume imported product that contained HCFC22, split air conditioning systems, changed over to an alternative refrigerant in 2007.

The 12,000 tonnes contained in the market far exceeds the service requirement going forward as much of the installed equipment will become obsolete by the end of this decade. Once demand collapses, as it must, reclamation will not be a profitable process and the refrigerant

will need to be recovered and returned for destruction. We expect the annual volume of HCFC22 being returned for destruction to peak at 500 tonnes.

Exporting recovered or reclaimed HCFC22 may be considered an alternative to destruction. RRA considers recovering the refrigerant in Australia then exporting it for probable emission elsewhere to be a misguided approach.

All CFCs, such as R11 and R12, collected by RRA are destroyed. A similar scenario of obsolescence is likely to be case for high GWP refrigerants, as products with much lower environmental impact and pricing are developed and made available.

7. Destruction of Waste ODS and SGG Program Design Considerations

7.1, 7.2, 7.3

What requirements should an accredited destruction provider meet?

Destruction providers must exhibit the following attributes:

- Operate nationally: Whether broad product based or sector specific, destruction providers must be able to accept, collect, and transport product from anywhere in Australia, without additional charges based on location.
- Demonstrated capacity for access: Destruction providers must be able to demonstrate they have a proven and workable collection program.
- Safe handling and storage: Destruction service providers must be able to demonstrate that recovered ODS and SGGs will be handled and stored safely in accordance with all relevant state and commonwealth standards and codes.
- Safe disposal: Destruction providers must demonstrate that recovered ODS and SGGs will be destroyed using a UNEP approved technology at a facility approved by the commonwealth, and that destruction will be achieved in accordance with all relevant state and commonwealth standards and codes.
- Contracts and arrangements: Destruction providers must hold contracts with approved service providers should they not be a fully integrated operation able to carry out all activities by its own endeavours.
- Environment protection: Destruction providers must demonstrate a commitment to protecting the environment.
- Governance: Destruction providers must be properly constituted corporate entities with demonstrated adherence to good governance principles, and a track record of independent audit.

Should destruction providers have broad coverage or should they be able to provide targeted services?

Destruction providers may be established for specific sectors such as fire protection and electricity distribution, but must operate on a national basis. The lack of a requirement to operate nationally will create the opportunity for operators to pick only the most favourable or easily accessed areas, and will leave the larger part of Australia without services, or with much higher costs.

The consultation paper states that ‘widespread collection and destruction of ODS and SGGs is not currently taking place’ in sectors such as ‘automobiles and portable domestic appliances’. This statement is incorrect. The recovery and return of refrigerant in these sectors is widespread but, in our opinion, falls short of the optimum level. This situation is due to a lack of enforcement of existing regulations, and the absence of properly managed recycling programs for consumer durables.

A more vigorous effort to enforce existing regulations will precipitate improved compliance and much higher returns from EOL automobiles and portable domestic appliances.

7.4

What requirements should an accredited destruction facility meet?

Destruction facilities and their owners must meet the following criteria:

- The process and plant be of a type approved by UNEP.
- The plant will have a demonstrated destruction removal efficiency of at least 99.99%.
- The owner and plant have approval from the commonwealth.
- The owner and plant meet all necessary state laws with particular reference to environmental standards, emissions, and storage.

Is it feasible to identify the species of gases presented to accredited destruction facilities before incentive payments are made?

Yes, it is feasible to identify the species of gases presented to destruction facilities before incentive payments are made. RRA has been doing this for many years. In RRA’s case, it is essential for all recovered refrigerant to be tested prior to destruction so that the composition of the waste stream is known. We expect this will be the case for all technologies.

Testing is essential for a range of reasons:

- Identification of mix components: The composition of the waste stream to be destroyed must be known to allow for the most efficient processing.

- Identification of hazardous substances: Recovered refrigerant may contain hazardous substances such as hydrocarbons and chloromethane. It is essential for these mixtures to be handled properly to prevent injury to personnel. Hydrocarbons, due to their prevalence, create particular problems with transport, handling, and decanting, and have necessitated costly changes to equipment and practises.
- Fraudulent returns: Australian industry has shown admirable restraint from sending fraudulent returns to RRA in the many years we have been operating. Even so, it is important to ensure the integrity of the program by testing for such activity. The advent of potentially much higher payments may create an environment where benefits from illegal activity are such that fraudulent returns become inevitable.

7.5, 7.6

Who should be able to claim incentive payments from destruction providers and what conditions should they be required to meet?

Since its inception, RRA's program has made payments to contractors returning recovered refrigerant, and to wholesalers accepting and handling the product on RRA's behalf. Payments have been relatively small compared to the potential payments based on GWP. The impending involvement of government in the payments process, and the potential for much higher payments, will alter these long-standing arrangements. Some issues to consider are as follows:

- Ownership: Refrigerant in a system belongs to the owner of the system, unless other arrangements exist such as leases or maintenance agreements. Until now, although not especially codified, the convention has been that the refrigeration contractor takes ownership of the refrigerant, and the responsibility for its safe disposal, when it is recovered from the system, and the owner is charged for the service. This may remain the case in the future but the potential for high payments for returned refrigerant, or at the extreme SF₆, is likely to disrupt this approach. A supermarket may contain 800 kilograms of refrigerant. Should it be closed and dismantled and the recovered refrigerant not be of a purity to be recycled, the potential destruction payments based on GWP may exceed \$40,000.00. In this circumstance, and likely for all situations where high GWP SGGs are involved, the equipment owner will seek to assert ownership and secure any payments available.
- Provenance: Destruction providers will need to be certain of the ownership of refrigerant prior to passing on incentive payments. Persons presenting ODS and SGG for destruction will need to provide evidence of their ownership of the product, its origin or prior ownership, or some form of authority for accepting the payment.

- Potential to restrict acceptance of gas to handling licence holders: The consultation paper suggests restricting acceptance of gas to handling licence holders. This may be possible but it could not be done in such a way as to deny the ownership rights of the equipment owner.
- Contaminants: It is inevitable that contaminants such as oil and moisture are present in recovered refrigerant. Whilst it is possible to accurately determine the ODS and SGG present in a mixture, it is not possible to ascertain the precise amount of oil to any degree of certainty. Oil is extracted from recovered refrigerant prior to destruction and accounts for between three and five per cent by weight. Until now, RRA has paid rebates on the whole weight returned but the consultation paper notes that government would pay incentives based only on the quantities of gases destroyed.

7.7

What is the quantity of high GWP SGGs that will likely be sent for destruction?

From time to time RRA has taken back and destroyed small of SF₆ on a voluntary basis, as there has been no other avenue available for safe disposal. With the exception of providing this free service RRA does not participate in the market, although we have encouraged the sector to establish reclamation facilities in the past.

The amount of SF₆ that will be presented for destruction in the future will, to a significant extent, be dependent on the quantum of the payment. The carbon price for SF₆ is in the order of \$550.00 per kilogram. Should the payment for return and destruction be set at a similar amount there will be considerable scope for profit and the possible encouragement of nefarious activity.

RRA is able to formally expand its program to incorporate the recovery and destruction of SF₆, and other very high GWP SGG. Were we to do so it would be necessary to implement exacting controls and processes to ascertain the provenance of the product.

Should high GWP gases be included in the destruction program?

The emission of one kilogram of SF₆ is the equivalent of emitting 23.9 tonnes of CO₂. Given the potential impact inclusion in a destruction program would seem mandatory.

If high GWP gases are included in the destruction program, what incentives should they receive and should there be restrictions on who can claim incentives?

Participants in this sector are better placed to answer these questions. However, we offer the following commentary. The SF₆ contained in systems is most commonly the property of the system owner, unless some other commercial arrangement has been made. Any claim for

incentives should be accompanied by proof of ownership. As the quantum of the payment for the payment for destruction increases so does the potential for inappropriate claims. But higher incentives for SF₆, and other very high GWP SGG, may be justified given the environmental impact of its release to atmosphere.

8. Destruction Incentive Options

Option One

Would a flat rate incentive payment provide a workable program for industry?

Yes, a flat rate incentive payment would provide a workable program for industry. This has been the de facto arrangement since the industry funded program commenced. In addition to the annual review there may need to be some through-the-year flexibility in the rate to accommodate unexpected increases in costs caused by external factors.

If a GWP-based flat rate was implemented, which calculation would industry prefer:

- **the average of the gas species and volume of ODS and SGG sent for destruction during the past year?**

This approach has the potential to provide a distorted outcome as high GWP refrigerants will be selectively recycled and reclaimed due to the profit they will generate. This will mean that the average GWP of recovered refrigerant sent for destruction will be lower than the average collected or installed in the bank.

This measure may also be distorted by ODS. CFCs are redundant and all the recovered volume is sent for destruction. CFC12 has a GWP of 10600. CFCs currently account for 8% of the refrigerant taken back and destroyed by RRA. The proportion of CFCs may grow as the reuse of recovered SGG increases and the volume of that species being sent for destruction declines.

- **the gas species and volume in the Australian bank of equipment?**

This would seem to be the approach that would best reflect the existing liability. This metric will provide a relatively consistent outcome, is easily understood, and will be influenced neither by selective reuse, nor changes in imports as described below. An incentive calculated this way would more accurately account for refrigerant to be recovered.

- **the gas species and volume imported to Australia in the previous year?**

If the incentive was based on a fixed percentage this measure would, over time, provide a lower value incentive as those with lower GWP replace higher impact products. This transition will not be driven by local legislation but by a global shift to lower GWP products such as in the automotive sector where R1234y/f (GWP 4) will replace R134a (GWP 1420), and in the air conditioning sector where replacements with GWPs of between 500 and 650

will take over from the current product R410A that has a GWP of 1725. Very low GWP products are also becoming available for the foam sector.

Are there any other ways to calculate a flat rate incentive payment?

The consultation paper assumes an incentive payment is required. Australian industry has been managing the recovery and destruction of unwanted and waste refrigerant for many years without the need of a taxpayer-funded incentive payment. We urge the government to reassess its position to provide a destruction incentive and instead use some of the budgeted funds to improve enforcement of the existing regulations, and to establish proper recycling programs for EOL consumer durables such as motor vehicles, refrigerators, and air conditioners.

The consultation paper notes that the incentive payment may be calculated on a cost basis or by using a GWP multiplier. Both approaches can deliver a workable outcome but the chosen metric must be applied openly and consistently until all ODS and SGG products included in the program have been recovered and safely destroyed.

Option Two

To what extent would it be practical and cost-effective for destruction providers to measure the composition of gases surrendered to them?

RRA has been doing this successfully for many years and has extensive records of the types of refrigerant collected from around the nation.

What technology options are available to do this and what are the costs?

Gas chromatography is the most accurate technology for analysing recovered refrigerant. The costs will vary depending on the volume of tests carried out, and whether the testing is done 'in-house' or by an external laboratory.

The latest refrigerant gas analysers are able to identify a limited range of refrigerants such R134a, R407C, R410A, R22, and hydrocarbons, with a reasonable degree of accuracy.

Where gas composition measurement is practical and cost-effective would the benefits of GWP-based rebates flow through the supply chain and to whom?

The flow of benefits through the supply chain will be influenced by the amount of refrigerant being returned. The matter of ownership has been discussed above. It is impractical to test small quantities and owners of small systems are unlikely to benefit from higher incentive payments. Owners of larger systems are likely to benefit from higher incentive payments as and they will manage their relationship with contractors accordingly. Alternatively, they may

shorten the supply chain by going direct to destruction providers with their recovered product.

Contractors recovering and returning refrigerant will benefit from higher incentive payments to destruction providers. High incentive payments would lead to competition among destruction providers that would likely drive up the payments they make to contractors for recovered product.

Where gas composition measurement is not practical, how would destruction providers structure the incentives paid to the supply chain? For example, would they be based on average GWP or a lower flat rate?

The basic rules of commerce suggest that commercial for profit organisations acting as destruction providers will seek to pay the lowest incentives possible to the supply chain, whilst working to maximise their profitable collections. It is likely a range of approaches would be developed to take advantage of the particular strengths of the destruction provider, and to best meet the needs of the sectors in which they operate.

How would industry manage the flexible prices of a GWP-based model after 2015?

It is likely that destruction providers would cease accepting recovered ODS and SGG should the price for carbon price fall such that the incentive payment was lower than the costs of recovery and safe disposal. An incentive payment based on GWP may need a built in floor price to prevent such an eventuality.

Would the hybrid model be a workable program for the industry?

Yes, the hybrid model could provide a workable program for industry. A flat rate that ensures the costs of recovery and safe disposal are met augmented by an additional component, based on the carbon price and the GWP of the bank, would provide certainty and potentially higher payments to the supply chain.