REFRIGERANT
RECLAIM
AUSTRALIA

ANNUAL REPORT
2016 — 2017

CHAIRMAN'S REPORT

2016/17 has been another very successful year for Refrigerant Reclaim Australia and the refrigerant product stewardship program. Our continued success is due to the ongoing commitment to the recovery and return of contaminated and unwanted refrigerant, the prevention of emissions, and compliance with environment protection regulations by the Australian refrigeration and air conditioning industry. The volume of refrigerant being returned continues to grow. When reclaimed material is included collections for 2016/17 totalled 496 tonnes compared to 443 and 407 in the preceding years.

Increasing quantities of recovered refrigerant are being retained for reuse and reclamation. The primary refrigerant being retained is R22. Whilst it's difficult to ascertain the actual volume being retained some indication is given by the reduction in R22 received for safe disposal. Collections of that refrigerant peaked at 260 tonnes per annum and is now less than 30 tonnes. Of the refrigerant that was recovered and entered the RRA program, around 170 tonnes was reclaimed to new specification and sold back into the market.

A major internal IT project was commenced and the first stage successfully implemented. The new systems streamline reporting with substantial improvements for our contributors, and improved accuracy. The project is scheduled to be completed in the new year.

Another project completed this year was the design and manufacture of high-pressure cylinders suitable for the A2L rated refrigerant R32. RRA now has a fleet of cylinders tested, valved, and labelled for high-pressure flammable refrigerants to meet demand for the increasing volume of flammable refrigerants being recovered.

RRA has contributed to the industry in many other ways during the year. Our commitment to the CSIRO atmospheric research program and the Cape Grim research station remains strong. That atmospheric research station recently celebrated its 40th anniversary and the Chief Executive of the CSIRO particularly thanked RRA for our long-term support. Similarly, our continuing role as a major sponsor of the World Skills apprenticeship competition supports widespread involvement and promotes improved training and higher standards. Our new initiative to promote and improve national communication and cooperation by TAFE colleges and teachers continues to grow with two national meetings held during the year. Further development will occur in 2017/18.

Of course, RRA's input and support for industry is much broader than just these major initiatives, and we will continue to meet demands and expectations in accordance with our and industry objectives.

John McCormack
RRA Chairman

2016/17 PERFORMANCE

The amount of refrigerant entering the RRA program continued to grow in 2016/17 to further enhance the environmental performance of the industry.

The amount of refrigerant being reclaimed grew strongly to 170 tonnes. This refrigerant is essentially harvested from the waste stream and purified to new specification. Additionally, a large volume of refrigerant was retained for reuse by contractors and equipment owners due to the growing scarcity of phased out refrigerants, particularly R22.

While some recovered refrigerant was reclaimed we note that all contaminated, unwanted, and unusable refrigerant received at our processing centre was safely destroyed to prevent its emission to the atmosphere.

All refrigerant wholesalers participate and take back recovered refrigerant. This means the collection network for recovered refrigerant stretches around and across Australia making it easy to send contaminated and unwanted refrigerant for safe disposal.

Revenue from the refrigerant levy contributed 86% of revenue while investments provided the balance. $3.6 million dollars was provided back directly to the industry through rebates for returning refrigerant.

Total refrigerant recovery grew to 496 tonnes (170 tonnes reclaimed) compared to 443 tonnes. The quantity of refrigerant recovered since the program commenced stands at 6,339 tonnes almost all of which has been destroyed. 408 tonnes has been reclaimed (purified to new specification) and 115 tonnes was used for feedstock (remade) in the very early days of the program.

HIGHLIGHTS

- A total of 1060 companies now contribute to the RRA product stewardship program: 1032 importers of refrigerant contained in products. 28 importers of refrigerant in cylinders and ISO containers.
- Bulk importer contributions were 53% of total levy revenue whilst equipment importers contributed 47%.
- Levy revenue provided 86% of total revenue with the balance 14% provided by investment income.
- Total refrigerant recovered for the year was 496 tonnes.
- The volume of refrigerant recovered since the program began until end June 2017 totalled 6,339 tonnes.
- Contractor rebates this year totalled $1.3 million and wholesaler rebates totalled $2.3 million so that $3.6 million was provided back directly to the industry.
- RRA finished the year with a surplus of $8.2 million, which leaves the program well placed to meet future challenges and growing recovery in the years ahead.
- Total equity in the RRA Environment Trust has grown to $71.7 million.

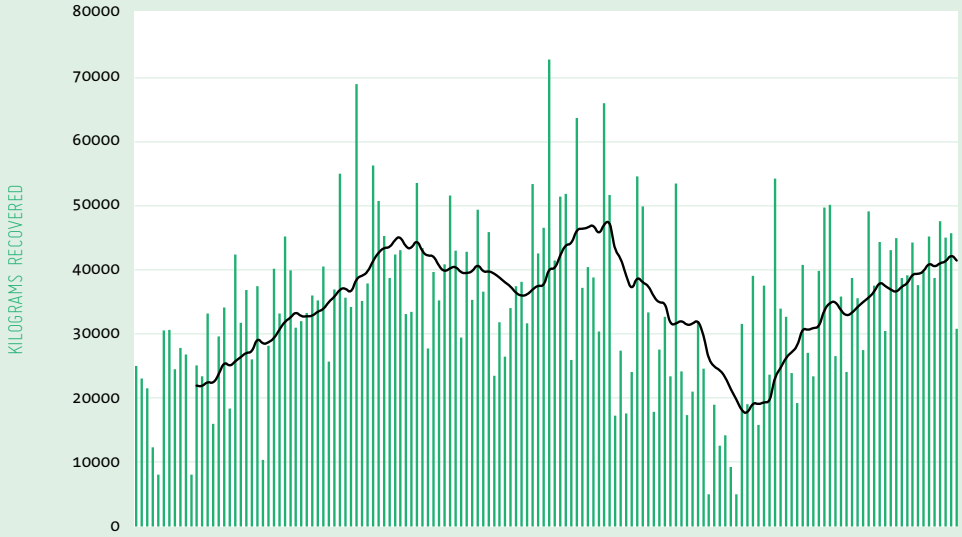
LONG-TERM PERFORMANCE

The graph Refrigerant Recovery plots monthly collections from 2005 till now. The trendline is a moving 12 month average. The impacts of the global financial crisis reduced industry activity and caused higher levels of reuse thereby lowering collections. As the economy recovered returns improved to a higher peak. The following rapid and deep decline was caused by the introduction of the carbon tax. Since it was repealed the quantity being recovered and returned for safe disposal has grown strongly.

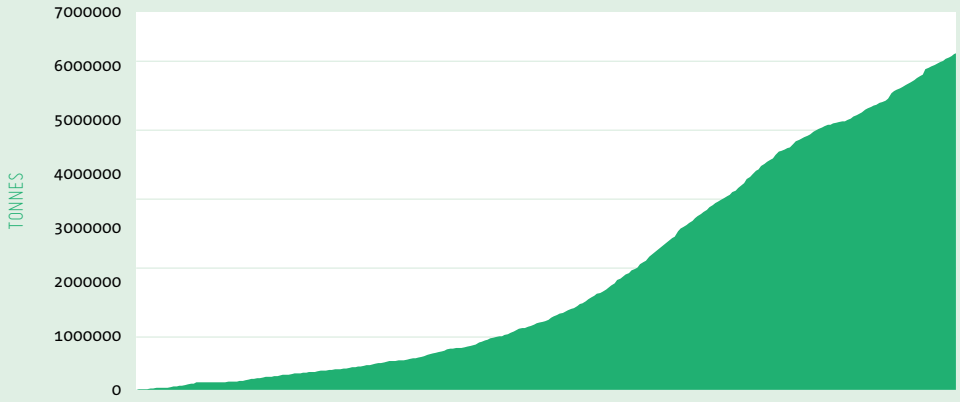
Recent years have seen increasing quantities of refrigerant being retained and reclaimed. A little more than 14 tonnes is being retained each month for returning to new specification; this takes the current average monthly return to 41 tonnes.

Since commencement in 1993, RRA has taken back and safely disposed of 6,339 tonnes of waste and unwanted ozone depleting and synthetic greenhouse gas refrigerants, as can be seen in the graph titled Cumulative Recovery.

Refrigerant Recovery 2005 - 2017. Kilograms per Month - 12 Month Trendline



Cumulative Recovery 1993-2017

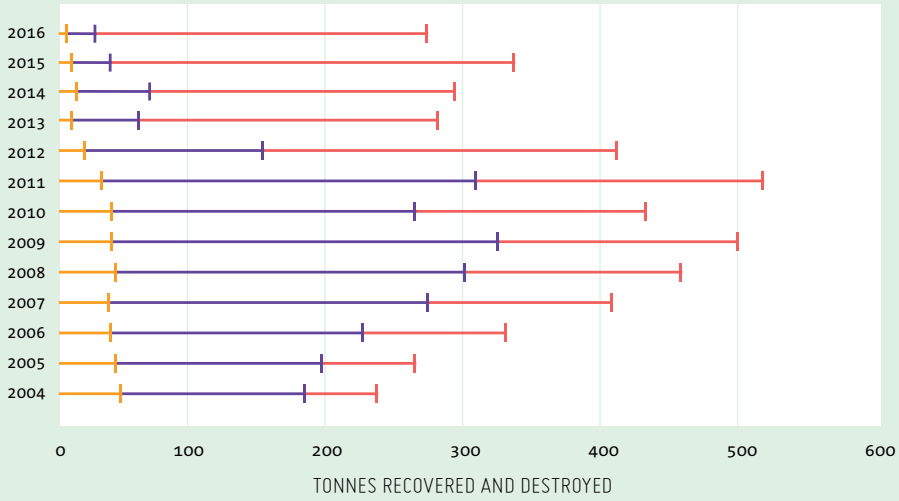


The types of refrigerant being collected have changed over time. In the early years CFCs dominated recovery until HCFCs, mainly R22, became the most returned refrigerant in the 2000's.

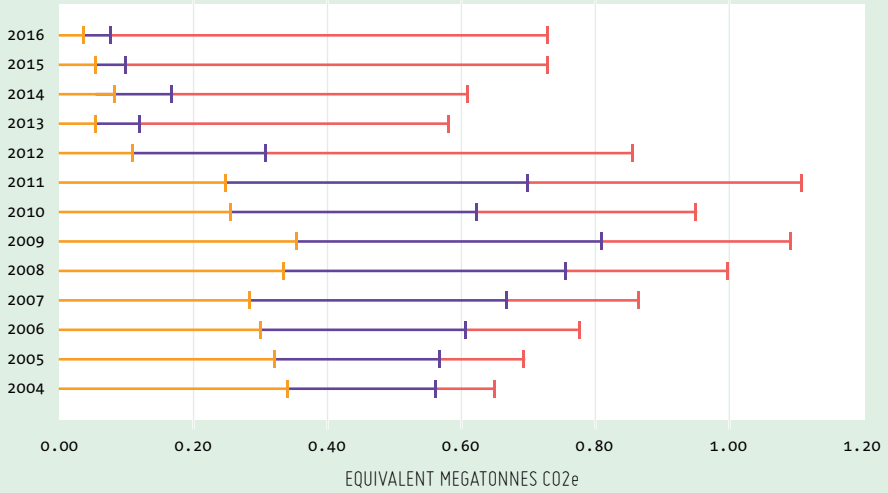
The phase out of R22 has resulted in its retention by the commerce chain. The volume of HFCs recovered has grown consistently since collections began in 2002/03 and their volume will continue to grow strongly.

The wonderful effort by the whole industry has been achieved kilogram by kilogram and year after year. The results are spectacular with more than 10 million tonnes of stratospheric ozone saved from destruction, and the prevention from emission of more than 10 million tonnes of carbon dioxide equivalent.

Refrigerant Recovered and Destroyed in Tonnes



Abatement of Carbon Dioxide Equivalent Megatonnes CO2e



CHALLENGES ARE ONGOING

RECOVERY FROM END-OF-LIFE EQUIPMENT AND MOTOR VEHICLES

Australia has poor regulations covering the recycling and proper disposal of consumer durables such as refrigerators and air conditioning systems, and motor vehicles. The potential for losses from decommissioned split air conditioning systems is a particular concern. Approximately half the installed bank of refrigerant in Australia is contained within this type of system. With around one million new systems being installed every year the volume in the bank will continue to grow. As the systems have low leakage rates it is very likely a large proportion of the initial charge will remain in the system at end-of-life. Our challenge is to ensure the refrigerant is recovered and safely disposed of rather than emitted when the system is uninstalled.

LICENSING AND COMPLIANCE

Whilst Australia has a comprehensive licensing system it falls short of the ideal of being a full national trade skills competency based program. This is due to it being based on environmental legislation that prescribes certain refrigerants, rather than being based wholly on trade skills. This leads to the strange situation where licences and authorisations are required to work with and purchase some refrigerants but not others, despite the work and competencies required being identical. RRA strongly supports the expansion of the current licensing initiative to become a true trade licence that incorporates all work with all refridgerants throughout Australia.

GROWING USE OF FLAMMABLE REFRIGERANTS

A major challenge is the transition to increased use of flammable refrigerants. The introduction of Class A2L mildly flammable refrigerants will require profound changes to the way refrigerant is managed and handled. Refrigerants such as R1234yf and R32 will be used in increasing quantities and will grow to be more than half the bank of refrigerant by 2030. Over the next few years collection, transport, handling, and destruction systems and equipment will need to be upgraded to handle increasing volumes of flammable refrigerants. All actors in the recovery chain will be impacted.

GROWING VOLUME OF REDUNDANT REFRIGERANT

Another imposing challenge is the potential for rapidly increasing amounts of refrigerant requiring destruction as some refrigerants may become redundant. While the transition from R134a to R1234yf in the automotive sector may not result in large volumes of unwanted refrigerant it is quite likely that the change away from R410A to R32 will. There is currently about 20,000 tonnes of R410A installed in split air conditioning systems in Australia. As those systems reach end-of-life in the 2020's very large volumes of refrigerant will likely become available for recovery and safe disposal.

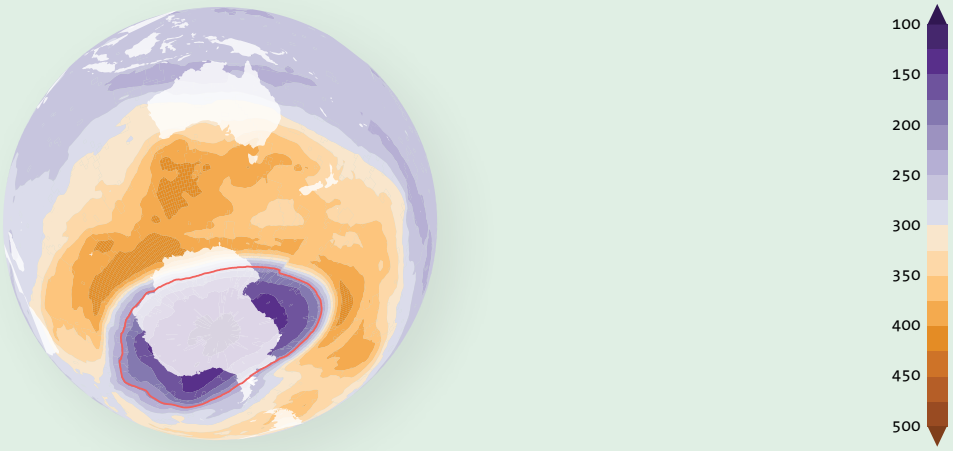
THE ATMOSPHERE

CFCS AND HCFCS

Recently, atmospheric scientists from the NASA Goddard Space Flight Center reported the first observation of declining chlorine levels from CFC emissions in the Antarctic ozone hole.

Measurements of stratospheric chlorine and ozone made by NASA's Aura satellite using microwave limb sounder technology show that 20 per cent less ozone was depleted during the Antarctic winter of 2016 than in 2005.

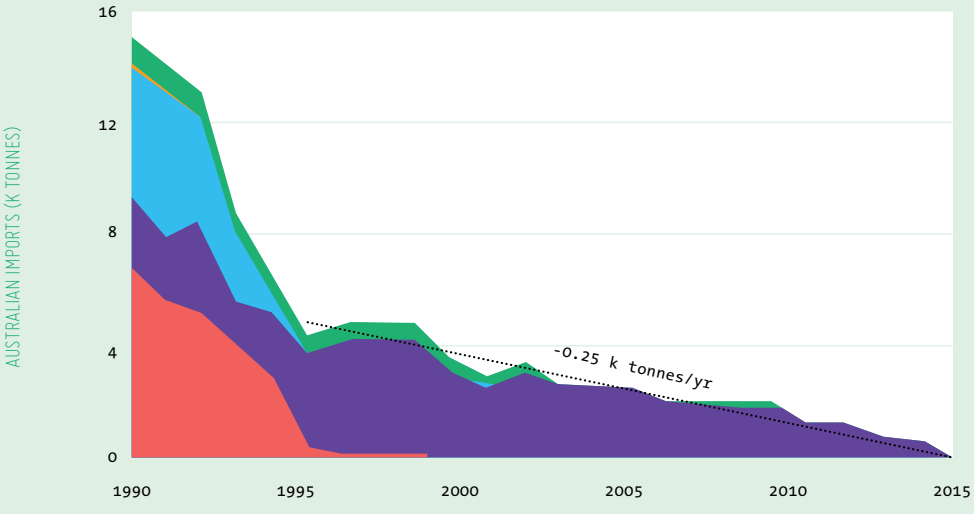
Measurements of chlorine within the Antarctic ozone hole from NASA's Aura satellite.



Recovery of the ozone layer is a direct result of worldwide action to phase out of CFCs under the Montreal Protocol. It means the ozone hole will diminish over the coming decades, reducing harmful UV radiation.

The impact of the Montreal Protocol and its phase-out of the manufacture and use of ozone depleting substances is profound. The chart below displays the decline in imports and manufacture in Australia.

Australian imports (tonnes) of ODSs).



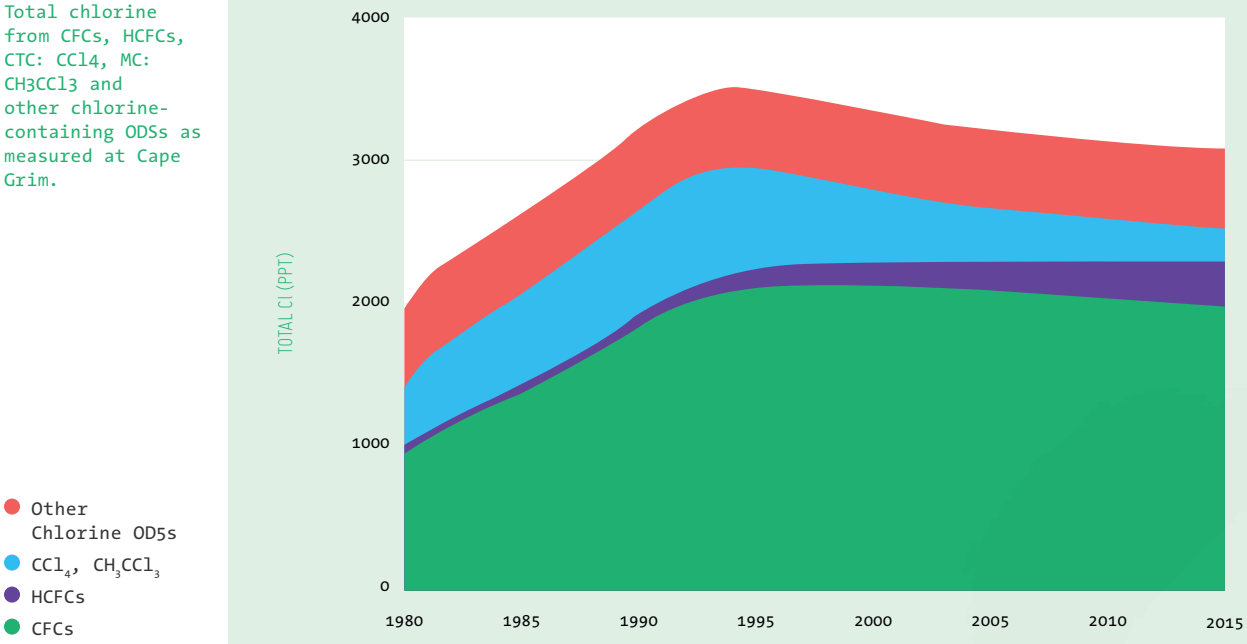
The diligence of those working in the refrigeration and air conditioning industry, to bring about equipment and installation improvements, reduced leakage rates and the recovery and destruction of contaminated and unwanted refrigerants has made a substantial contribution to these massive reductions in emissions.

The world's most comprehensive list of ozone depleting substances is measured at the CSIRO Cape Grim facility in Tasmania, which in 2016 showed atmospheric levels of most CFCs had either stabilised or are in decline, except for slow increases in levels of R13 and R115.

For two consecutive measurement periods, 2014-2015 and 2015-2106, emissions of R12 declined at the fastest rate (11 k tonnes per year) since 2005 (14 k tonnes).

Between 2015 and 2016, total CFCs in the background atmosphere and chlorine from CFCs both declined by 0.5 per cent.

Total chlorine from CFCs, HCFCs, CTC: CCl4, MC: CH3CCl3 and other chlorine-containing ODSs as measured at Cape Grim.



Continued growth in atmospheric levels of all the major HCFCs were measured at Cape Grim in 2016, but increased at a slower rate than 2015 while the minor HCFCs declined slowly.

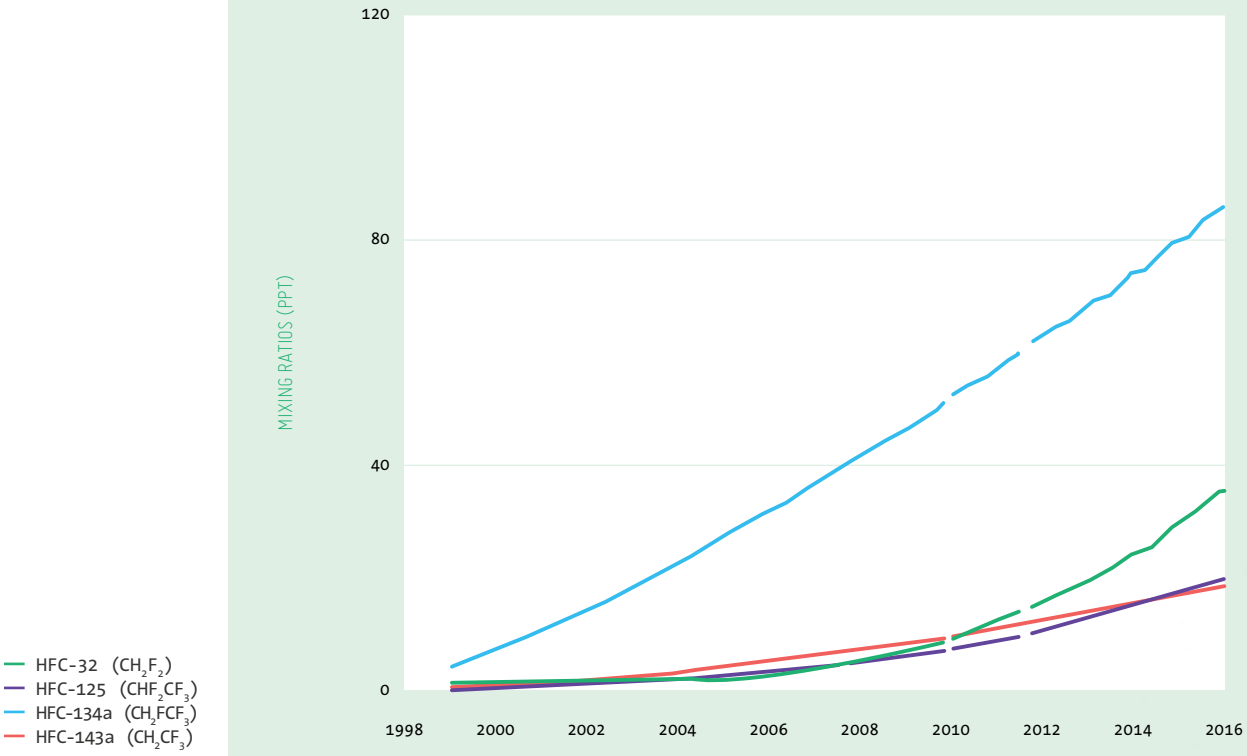
Higher levels of R22 in the atmosphere meant total HCFC levels and those of chlorine from HCFCs both increased by 1.4 per cent in the period 2015-2016.

HFCS

According to Cape Grim data, R134a accounts for almost half of all HFCs in the atmosphere. Between 2015 and 2016, R134a concentrations increased by 5.6 ppt (6.9 per cent).

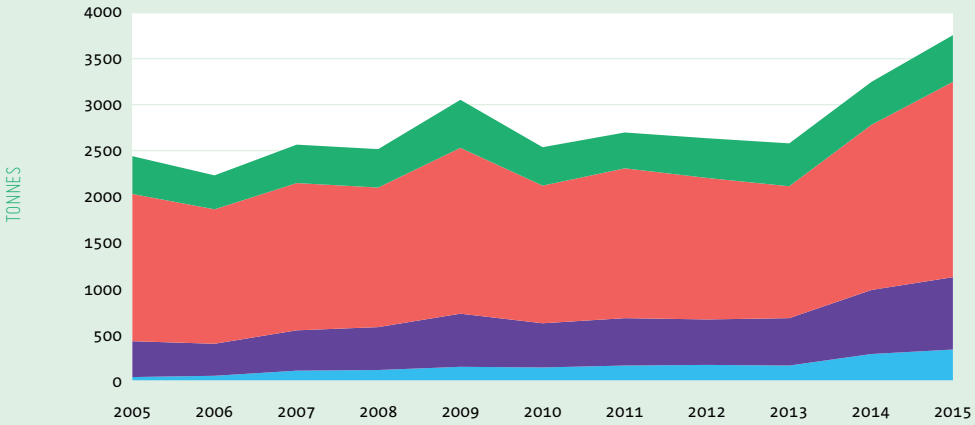
For perspective, the combined concentration of all other HFCs measured at Cape Grim increased by 6.9 ppt (up 8.5 per cent) in the same period. Notable increases included R32 (up 17.6 per cent), R125 (up 13.0 per cent), R143a (up 8.8 per cent) and R23 (up 3.4 per cent).

The recent rapid increase in R32 emissions is likely related to this refrigerant's popularity in new air-conditioning systems and its presence in the refrigerant blend R410A.



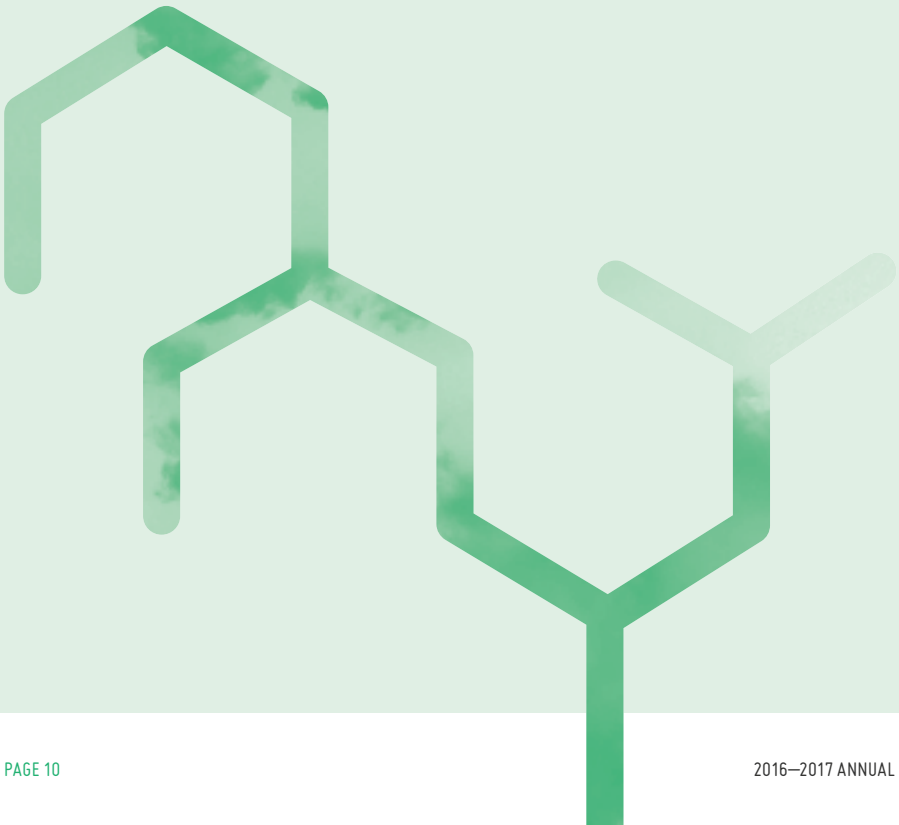
Cape Grim data suggests Australian emissions of R134a had begun to decline after a peak of 1811 tonnes in 2009, but an increase in emissions from 1438 tonnes in 2013 to 1803 tonnes in 2014 was followed by another increase, to 2125 tonnes in 2015.

Australian HFC emissions (tonnes, 2005-2015) from atmospheric data, collected at Cape Grim, Tasmania.



As Australia begins to phase down HFCs from January 1 2018 under the Kigali Amendment to the Montreal Protocol, emissions of HFCs including R134a will start to decrease again.

In Europe, trace levels of HFC-replacement refrigerants R1234yf and R1234ze have already been detected in urban and background air, and are expected to soon be detected at Cape Grim.



THE FUTURE

Two far-reaching milestones achieved in 2016/17 have set the scene for the next decade, from both national and international perspectives. In November 2016 the signatories to the Montreal Protocol agreed to extend that very successful global initiative to include the phase-down of synthetic greenhouse gas refrigerants. Locally, the completed review of the Ozone Protection and Synthetic Greenhouse Gas Management Act has led to a raft of amendments passing parliament, including incorporating the SGG phase-down.

HFC PHASE-DOWN

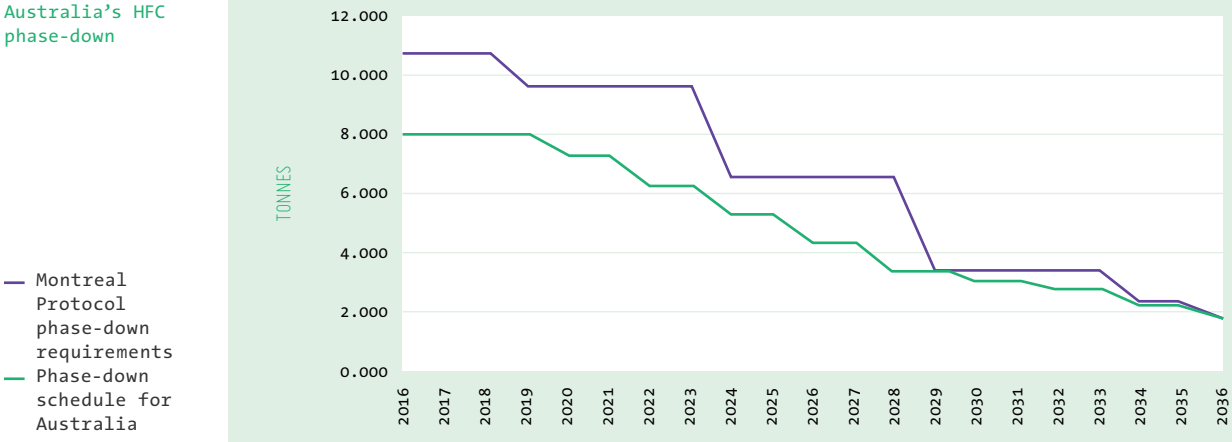
A phase-down schedule has been developed for Australia, in consultation with industry, to meet Montreal Protocol requirements. Australia's phase-down has regular, smaller, step-downs than the Montreal Protocol requirements.

The annual starting limit of HFC imports is 8.0 million tonnes CO2-e. The 15% residual import limit from 2036 is 1.6 million tonnes CO-e. This residual import limit will be an ongoing import limit.

The phase-down for Australia is shown by the green line and Australia's Montreal Protocol requirement by the purple line.

The Australian refrigeration and air conditioning sector has already achieved reduction in direct greenhouse gas emissions of 85% since 1990. The schedule described above will lead to a further reduction in emissions of 80% by 2036.

Australia's HFC phase-down



CONTINGENT LIABILITY

The volume of refrigerant installed in Australia continues to grow, and has now surpassed 45,000 tonnes. This bank of refrigerant is the liability that RRA must manage. Many years into the future, when revenue from imported refrigerants has declined, RRA must continue to collect and safely dispose of unwanted and contaminated recovered refrigerant. For this purpose funds have been accumulated in a Trust. Based on the installed bank of refrigerant and current costs, RRA's contingent liability is calculated to be in the order of $320 million.

INDUSTRY DEVELOPMENT

RRA will continue to provide strong support to the CSIRO, TAFE, and World Skills. Additionally, we will seek to undertake research in areas that will be of benefit to the industry, broader community, and the environment. Projects already underway include the development of a flammable refrigerant safety guide for the automotive sector, review and approval of an A3 rated flammable refrigerant recovery unit, improving the supply of refrigerants to TAFE, and research into split systems when they reach end-of-life.

For more information, please
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