2025 consultation

Submission type	Upload
Submitter	AIRAH
Response ID	E2

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July 11, 2025

Dear Net Zero Commission consultation team,

Many thanks for the opportunity to comment on the Net Zero Commission consultation paper.

AIRAH proudly represents a sector that is central to Australia's productivity and wellbeing: the heating, ventilation, air conditioning, and refrigeration (HVAC&R) and building services industry.

We are a long-standing and respected voice. Established in 1920, AIRAH has represented the industry for more than 100 years. We have a direct membership of around 4,500 professionals, and reach to more than 25,000 industry participants, including engineers, trades, educators, students, manufacturers, regulators, business leaders, and other industry experts.

In our modern world, HVAC&R systems are indispensable. They keep our indoor spaces liveable, they allow us to store and transport our food, they keep critical facilities such as data centres and hospitals running, and they underpin many of our industrial processes.

Not surprisingly, the HVAC&R sector is experiencing strong growth. According to the latest *Cold Hard Facts* report, the stock of vapour compression driven equipment that provides refrigeration, cooling, heating, comfort and utility services grew by around 15 per cent from 2016 to 2022, reaching a total of more than 62 million pieces of equipment.

These systems are also carbon intense. Turning again to the latest *Cold Hard Facts* report, published in December 2024, Australian refrigeration and air conditioning equipment is responsible for 12 per cent of total national emissions, and uses around a quarter of electricity nationally.

The HVAC&R industry therefore has a dual responsibility: to provide critical services to a society already experiencing the impacts of climate change, and to do so in a way that does not overburden the environment. This is reflected in our responses to the consultation questions, below.

As a member of ASBEC, we support the points put forward in their submission. In this submission we have focused on issues that are especially to the sectors that AIRAH and our members operate in.

If the team would like more information on any of the points below, please feel free to reach out.

Mark Vender
Advocacy and Policy Manager
AIRAH

Question 1: What can you tell us about your experience of the impacts of climate change and how can the commission seek to reflect and respond to this in its work?

Climate change has had and continues to have a major impact on the HVAC&R industry. As temperatures rise and heat regulation becomes a health and accessibility issue rather than a luxury, demand for cooling is growing rapidly. Not only do we need more HVAC&R systems, but increased ambient temperatures mean these systems need to work harder for longer to maintain acceptable indoor comfort levels.

This increased demand has many flow-on effects, including an increase in overall energy consumption by HVAC&R systems, as well as an increase in emissions from refrigerants, both of which exacerbate the climate crisis, creating a vicious cycle. Increased demand is also creating a skills shortage, where the number of HVAC&R technicians being trained cannot meet the industry's installation, maintenance, and repair needs.

Rising temperatures aren't the only effect of climate change that is relevant to the HVAC&R industry. A changing climate also brings with it greater humidity and an increase in the frequency and severity of extreme weather events.

Humidity is a major concern for building HVAC systems, which must be designed to effectively manage local humidity levels. If humidity increases and systems aren't adequately adapted (and maintained) to deal with this change, they can become breeding grounds for mould, impacting indoor air quality and human health.

The increased risk of natural disasters such as bushfires and floods also affects the HVAC&R industry. Larger HVAC systems – and even residential air conditioners – deliver essential air filtration during bushfire smoke events, providing a safe haven that is especially important for people with health conditions. Adequate ventilation is also a key factor in preventing residential mould growth, which is likely to increase as floods become more frequent and severe.

Question 5: What additional information and evidence should the commission consider when assessing progress towards NSW's targets for reducing net greenhouse gas emissions?

We note that the consultation paper focuses on direct emissions. As the electricity and energy sector decarbonises, Scope 2 emissions from the built environment and other sectors will certainly decrease. Nevertheless, fully renewable energy does not eliminate all the environmental impacts of the electricity supply system, and we should strive to improve energy performance. In the built environment this includes lifting energy efficiency, managing peak demand, and grid interactivity.

Question 9: What are likely to prove the most effective approaches to accelerate rapid decarbonisation across freight and passenger transport?

We note that refrigerants have been highlighted as an issue in the built environment, but not in the transport sector. According to the latest *Cold Hard Facts* report, mobile air conditioning systems (such as those in freight and passenger transport vehicles) contain 20% of the total bank of refrigerants in Australia and contribute 20% of the direct emissions from these systems. Loss of refrigerant at vehicle end of life is also an issue.

Additionally, as mobile air conditioning systems move from using R134a (with a 20-year GWP of 1,430, according to the IPCC fourth assessment report) to R1234yf (with a GWP of less than 1), the direct

emissions from this sector will decrease, but other breakdown products, such as PFAS (in the form of trifluoracetic acid, or TFA) will increase, causing other environmental impacts.

Question 19: What additional measures could accelerate electrification and increase energy efficiency of new and existing buildings?

Incentive systems in NSW such as the Energy Savings Scheme (ESS) and Peak Demand Reduction Scheme (PDRS) play a vital role in accelerating electrification and increasing the energy efficiency of buildings.

Recently, low surrender rates and fixed emissions factors have led to a surplus of certificates under the ESS, and a significant drop in their value, reducing the incentives available for the installation of electric, energy-efficiency equipment such as reverse-cycle air conditioners. The schemes are also weakened by operators who exploit loopholes to install substandard equipment and generate certificates beyond the energy efficiency benefits they provide.

AIRAH recommends a review of the scheme to better align certificate creation with demand, and to bar unscrupulous installers. The NSW government could also review IPART's audit scheme to provide stronger oversight of the quality of installations and installers.

A more effective occupational licensing framework for refrigeration and air conditioning technicians would support better design, installation and maintenance of HVAC&R systems, improving the energy efficiency of new and existing buildings.

AIRAH has been working with the NSW government to establish a new framework for mechanical services occupations, and we look forward to this being put in place as part of the building reforms being undertaken by Building Commission NSW.

Expanding the registration of professional engineers to all building classes would also ensure that commercial HVAC systems are designed by suitably qualified and experienced engineers. This will contribute to improving the performance of buildings and reducing emissions.

Question 21: What approaches could NSW consider to eliminate refrigerants with a GWP >10 from buildings?

AIRAH is pleased to note that the NSW Net Zero Commission has identified refrigerants as a major source of emissions in the built environment and is seeking input on ways to address this issue. This is an often-overlooked issue in the net zero transition, and one that AIRAH believes must be addressed using a holistic approach.

We would suggest reframing this question from "eliminating" refrigerants with a GWP >10 to "phasing out" such refrigerants. This is because the vast majority of existing building HVAC systems – including many new and highly efficient systems – currently use synthetic refrigerants with high GWPs.

Unfortunately, it is not practical, possible, or even advisable to immediately replace all these refrigerants with low-GWP alternatives. The transition away from such refrigerants will take decades and requires a clear policy roadmap similar to that of the European Union, which will phase out fluorinated gases by 2050. AIRAH supports the Australian government's HFC phase-down, in line with the Kigali Amendment to the Montreal Protocol, but also acknowledges that further action is required to support the refrigerant transition.

GWP is not the only environmental factor that must be considered when selecting refrigerants; many synthetic refrigerants degrade into substances that can have harmful effects on both human health and the environment. One of these substances is trifluoroacetic acid (TFA), a type of PFAS or "forever chemical" that is causing widespread concern.

With all this in mind, AIRAH is fully supportive of efforts to accelerate the uptake of refrigerants with minimal environmental impact in building HVAC systems. The technology now exists to use natural refrigerants such as carbon dioxide (GWP = 1) and hydrocarbons including propane (GWP = 3) safely and efficiently in building HVAC systems. This is an area of rapid growth in the Australian industry.

To accelerate the transition, we recommend support for companies using alternative refrigerants and approaches in major projects, as well as increased investment in natural refrigerant training for HVAC&R technicians.

During this transition, by far the most important step we can take to lower emissions from refrigerants in the built environment is to reduce refrigerant leakage rates in HVAC&R systems. According to the recently published *Cold Hard Facts 4* report, refrigerant leaks across Australia in 2022 were directly responsible for 6.9 megatons of CO_2e emissions, with further indirect emissions coming through increased energy consumption from leaky units. The same report finds that annual refrigerant leak rates can be as high as 15% in certain systems.

Better maintenance of HVAC&R systems can help reduce these leaks. AIRAH recommends that the NSW government introduce mandatory maintenance regimes for systems with significant charge sizes, better tracking of refrigerant inventories, as well as strengthening compliance, monitoring and enforcement.

Another huge source of refrigerant emissions is the incorrect disposal of HVAC&R systems at end of life. Strengthening regulation and enforcement in this area could significantly reduce emissions.

Question 22: What should be included in a monitoring framework for NSW in the context of the transition to net zero, including any specific metrics and indicators?

As noted above, AIRAH encourages the commission to consider how to improve the maintenance and monitoring of HVAC&R systems. As the phase-down of fluorinated refrigerants takes place over several decades, effectively reducing refrigerant leakage will be the best way to reduce emissions from this sector.

Question 23: The adaptation objective is for NSW to be more resilient to a changing climate. The Act allows for regulations to further define the adaptation objective. What does a more resilient NSW look like to you?

The NSW government's climate change projections (NARCliM) indicate that NSW can expect more frequent and more intense bushfires in the future. With this in mind, it is important to support residents, landowners, and building managers in responding to air quality hazards such as bushfire smoke, hazard reduction burns, and dust storms.

AIRAH recently completed a piece of work with the NSW Air Policy Team – now located within the EPA – to assess whether ASHRAE Guideline 44-2024: Protecting Building Occupants from Smoke During Wildfire and Prescribed Burn Events could be localised and applied in NSW. The review indicated that there would be value in producing advice based on ASHRAE 44.

Question 27: What initiatives should the commission consider in assessing NSW's preparation and responses to extreme heat and humidity events in NSW?

HVAC&R equipment saves lives during extreme heat and humidity events. AIRAH urges the commission to consider how to improve equitable access to cool spaces during such events to protect the most vulnerable members of the community from extreme heat and humidity. This is also the case for events like bushfires, where smoke can make the air unhealthy to breathe, especially for those with underlying health conditions. It is important that everyone can access cool, safely ventilated spaces during such events.

As identified in the consultation paper, energy use triples on days when the temperature exceeds 35°C, in large part due to the electricity consumption of cooling equipment. Managing the power grid during these times becomes extremely important – if it collapses, the most vulnerable members of society will suffer. AIRAH encourages the commission to consider how smart grid management and promoting the uptake of energy-efficient appliances – including HVAC&R equipment – can help reduce energy consumption during times of peak demand.