

The Problem with Air Conditioning in 2017: Issues with Success

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The refrigeration and air conditioning industry is large, ubiquitous and important. By itself, it represents more than 2% of Australia's GDP. Further, it supports fundamentally important economic and social activity in the food, medical, manufacturing and communications sectors, and others.¹ Further, air-conditioning improves the comfort and health of millions of Australians in all types of buildings and vehicles.

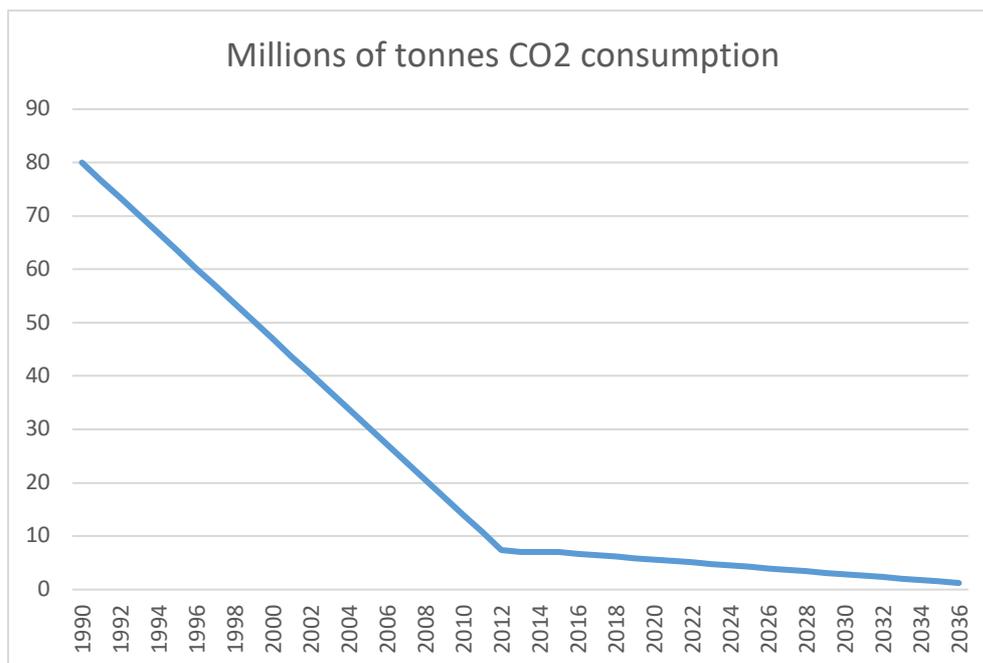
These services have not come without costs, however. These include environmental impacts. Refrigerants used in the 1990s and early 2000s (CFCs transitioning to HCFCs) actively depleted the ozone layer. As a result of their phase out globally, the projections are that the hole in the ozone layer will be closed by 2045 and that the damage done will largely be repaired during this century.

There are other issues associated with refrigeration and air conditioning. They have a significant impact on climate change due to both the global warming potential of refrigerants and the electricity used to power the equipment. Large strides, however have been made in improving both the direct (refrigerant) and indirect (electricity use) emissions from this sector.

As the chart below demonstrates, the consumption (and hence the emissions) of refrigerants has dropped by an order of magnitude between the early 1990s and today. With the passage of amendments to the *Ozone Protection and Synthetic Greenhouse Gas Management Act* in mid 2017 - which enacted a phase down HFCs² from current levels by 85% by 2036 there is a reduction another order of magnitude. Quite simply at a consumption of only about 1.5 million tonnes of CO₂-e in 2036 there is no further improvement possible in reducing emissions from direct emissions. Governments should not focus on refrigerants to drive further abatement as this sector is convincingly covered.

¹ Significantly, in the food sector, emissions associated with refrigeration are dwarfed by the greenhouse gas savings by preserving food. Many foods are very carbon intensive and a recent study by Deloitte found that by increasing the cold food chain for every unit of increased emissions savings of 10 times that amount were generated by avoiding food waste

² HFCs are potent greenhouse gases with global warming potentials ranging from less a few hundred to about 4000.

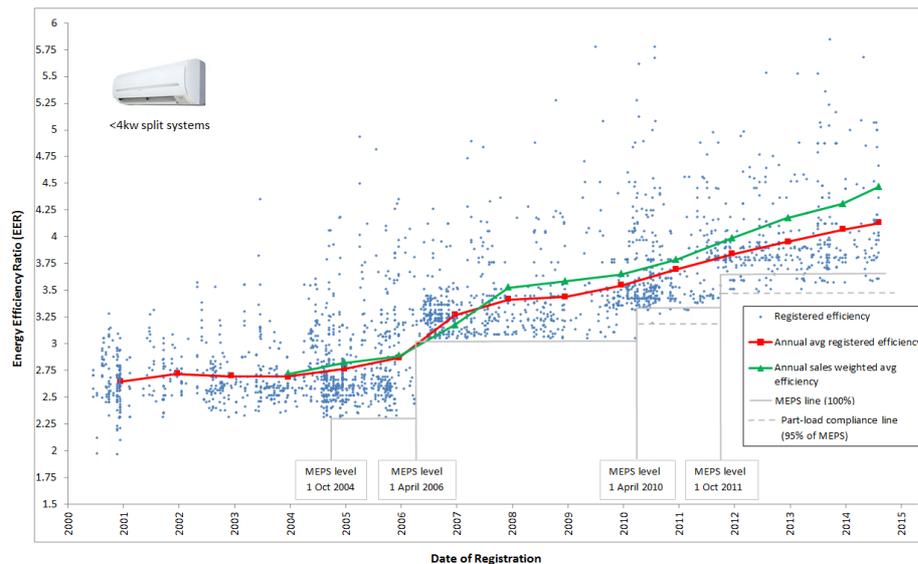


The main focus for improving the environment efficiency of the sector lies in energy. The cooling sector currently used about 20 to 22% of Australia’s electricity and is responsible for about 12% of Australia’s total greenhouse gas emissions. The need to reduce this number is fundamental if Australia is to meet our global targets and to limit climate change to an increase of 2 degrees above pre-industrial levels.

The story of energy efficiency of products at point of sale follows a similar path to refrigerant phasedown, however. As the chart below illustrates, efficiency in air conditioning has been significantly improved, with a 60% increase over the last two decade alone. The challenge with this, as stated in the recent (March 2016) Regulatory Impact Statement on air conditioners, is that further improvement is difficult. The low hanging fruit has been plucked already and further gains will be smaller and more expensive.³ While policymakers would be correct in looking at cooling to find more emission reductions, point of sale does not necessarily offer an economically viable solution.⁴

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The delivered energy efficiency of air conditioning and refrigeration, however, are not analogous to other sectors. The efficiency delivered for most whitegoods/sectors is what is promised at point of sale. The difference is for most refrigeration and air conditioning equipment is that appropriate sizing, proficient installation is critical for delivery of the promised efficiency. Further regular maintenance underpins the continued achievement of promised performance levels.

Data on this topic is sparse, but suggests that the opportunities available at post point of sale issues of installation and maintenance offers significant potential. In looking at heat pumps (a very similar technology) the US Department of Energy concluded that improper installation led to an energy penalty of 40%. Additionally, industry advice is that about 20% of equipment are poorly installed. Even if these numbers are halved, the potential energy wastage and associated greenhouse gas emissions is significant. This does not even include the benefits possible from improved sizing of equipment and regular repairs and maintenance.

The potential benefit from Government intervention in ensuring that the right equipment is chosen for the job and it is installed well is massive. Using the figure described in the paragraph above, and assuming 20% of Australia's energy emissions are from cooling, the total potential benefit is 1.6% of Australia's energy emissions. Obviously, not all of these emissions can be eliminated, but even reducing this level of wasted emissions by a fraction still leads to significant reductions in emissions while simultaneously saving consumers money by reducing their energy costs and energy providers by reducing demand, particularly at peak times.

In conclusion, the air conditioning and refrigeration sector has been at the forefront in reducing its environmental costs by changing refrigerants and improving energy efficiency. More can be achieved, however, by working on practical measures to ensure consumers get full value from the equipment they purchase. Refrigerants Australia does have practical policy proposals about how this can be achieved and would be delighted to provide details on these whenever useful.