

# The cool future

Efficient and reliable refrigeration is at the heart of all foodservice operations. With ever growing pressure on the cost of refrigeration for business operators, commercial kitchen expert Tim Smallwood looks at the options.

**R**efrigeration is vital to your business but often taken for granted, that is, until it stops and you lose all your food.

The failure of the refrigeration system frequently results from lack of maintenance, but often also the choice of equipment that was originally made.

The need for regular maintenance of all machinery equipment rather than waiting for it to break down shouldn't be too hard to understand. But all too often operators who regularly send their motor vehicles in for service fail to see the need for the same attention to their kitchen equipment, the equipment they rely on for their income.

In a refrigeration system maintenance can be as simple as regularly cleaning the coils and fins and checking door gaskets and hardware. But often you'll see refrigerator door hinges which are loose with operators doing nothing to fix them — until the door falls off and damages the cabinet in the process. More involved maintenance which requires the service of a technician includes checking for gas leaks and checking motors and thermostats.

How often and how efficient your refrigerator will be depends on your original selection. Refrigerators can be supplied as custom fabricated one off cabinets or standard cabinets manufactured by reputable compa-

nies which will have been the result of considerable research and development and testing and comply with the MEPS (Minimum Energy Performance Standards). This ensures the refrigerator will perform reliably and efficiently and minimises the risk of food spoilage and loss over the unit's life. The selection of the right refrigerator is important for the whole of life cost of ownership.

The cost of owning refrigeration including power and maintenance represents approximately six to ten per cent of the overall running cost of a commercial kitchen. The difference between the lower cost and the higher cost could represent the actual profit of the foodservice business.

As refrigerators age the need for maintenance to keep them running increases. At the same time the tax on refrigeration gas is also set to increase costs as the new Australian carbon tax takes effect making it more important to take steps to minimise risks and maximise efficiency when selecting refrigeration equipment.

When refrigeration gas came under the Montreal Protocol for the elimination of ozone depleting gases (ODP) traditional refrigerant gases which had high ODP rating were replaced with newer gases with zero ODP rating so as to comply. The problem is that these new gases, while they have zero ODP rating, have a high Global Warming

**'The cost of refrigeration including power and maintenance represents about six to ten per cent of the running cost of a commercial kitchen.'**

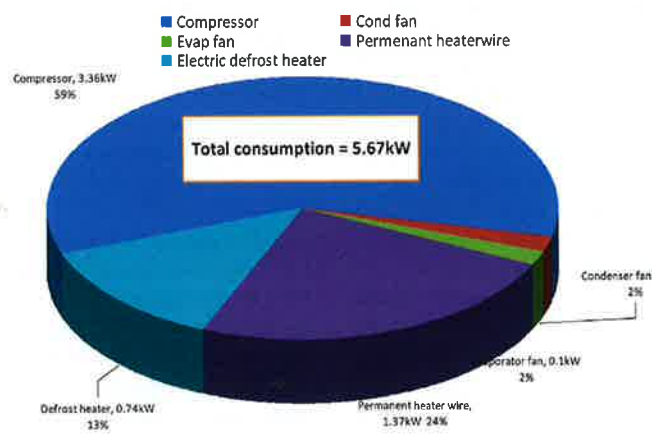
Potential (GWP). In other words one kilogram of 134a HFC refrigerant that's used in nearly all commercial refrigerators has the equivalent of 1300 kilograms of CO<sub>2</sub>.

The effect on the cost of gas in Europe under the carbon trading scheme was an increase of 40 per cent in 2010. And the cost continues to increase. The solution for owners and operators is to either replace the gas altogether or to minimise the use of the gas through the operation of more efficient equipment and systems.

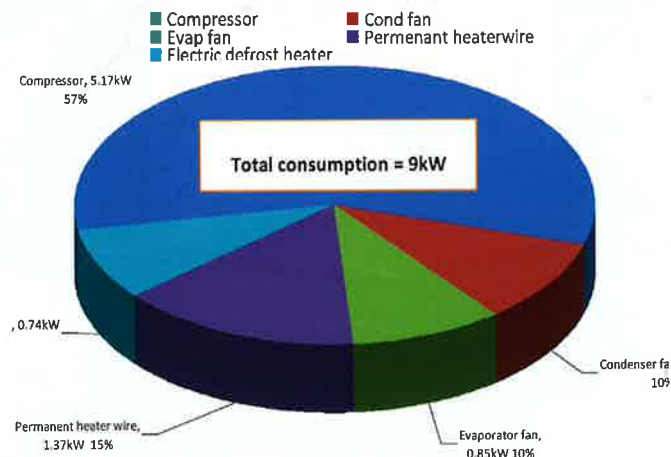
## Self contained systems

Commercial kitchen refrigeration can be installed in two configurations: individual self contained cabinets and a number of cabinets and cold rooms connected to a remote refrigeration system.

Self contained refrigeration cabinets are now available using refrigerant grade propane R290 (CH<sub>3</sub>CH<sub>2</sub>CH<sub>3</sub>) which has a zero GWP rating. Although this refrigerant is a hydrocarbon and therefore flammable most cabinets will use less than 150 grams of the gas and so the risk in the event of a leak is practically eliminated. It should be noted that the majority of domestic refrigerators on the Australian market are approved for use using hydrocarbon gas. Because of



1 R290 gas replacement.



2 R404a gas currently used.



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## refrigeration



A Williams Refrigeration glycol installation.

the improved efficiency of refrigerators using R290, operators will find lower energy costs of up to 25 per cent and faster temperature reduction as well as longer compressor life and reduced maintenance costs. (You can see a comparison between a typical freezer cabinet using R404a HFC (hydrofluorocarbon) gas versus R290 (hydrocarbon) gas in the charts on the previous page).

### Remote refrigeration systems

In most large and medium sized commercial kitchens instead of each refrigerator having individual compressors all the cabinets and cold rooms are connected to a remote refrigeration system. This can comprise a number of refrigerators powered by a single compressor or, in the case of multiple remote compressors, all the cabinets and cold rooms are connected to a rack comprising a number of compressors combined into a single remote system. This is considerably more efficient than the use of individual remote compressors but has the potential risk of all refrigerators failing in the event that the compressor rack fails or the system develops a leak.

All these remote refrigeration systems use the HFC gases which are pumped under pressure around the building with every joint and bend a risk point for a costly leak. The cost will be in food loss and finally in the cost of re-gassing the system with expensive HFC refrigerant gas.

The alternative to a remote refrigeration system is to replace the hydrofluorocarbon gas with an alternative means of refrigeration. This can be achieved using alternative gases. Unfortunately most of the applicable gases are unsuitable for use in commer-

cial applications as well as having the potential problem of leaks when pumping compressed gas through a building.

An option is to use a secondary refrigeration system which uses glycol, a food safe fluid with a low freezing point that can be pumped around a building to refrigerators and cold rooms at minus 80C to minus 100C. The fluid system is not pressurised and is therefore not prone to leaks which shut the system down. There will be a small primary refrigeration system which has a small charge which can be a non HFC gas and provides the refrigeration to a heat exchanger to reduce the temperature of the glycol secondary refrigerant. Glycol secondary refrigeration systems are being used in Australia in supermarkets and have been installed in both large and small commercial kitchens over the past five years and overseas for longer.

In addition to resolving the GWP potential and the potential cost of replacement gas, glycol secondary refrigeration systems have been found to lower energy cost by up to 25 per cent and also improve the storage condition of refrigerated food because it doesn't have a drying effect like a conventional refrigeration system. The benefit of a secondary refrigeration system is reduced risk; reduced energy cost; reduced maintenance cost and improved food quality.

*Tim Smallwood has more than 35 years experience as a designer and advisor to the foodservice and hospitality industry and has provided catering design and operating systems development advisory services to a wide range of operators in Australia, Asia and the Middle East. He can be contacted at [ts@fcaonline.com](mailto:ts@fcaonline.com)*



# What's new?

Break through refrigerated drawer technology, the latest in cook chill equipment and innovation in cool room systems are amongst the new equipment products on the refrigeration shelf.

## Adande Refrigerated Drawers

The Adande Refrigerated Drawer equipment was hailed by judges in this year's Fine Food Australia Best New Hospitality Equipment award who said it was taking refrigeration technology and "turning it on its head".

Now being used in Australia by top chefs including Adriano Zumbo and Garagiste's Luke Burgess, the equipment was originally developed by two design engineers to meet the demands of chefs working on North Sea oil rigs for fridges and freezers that would hold temperature in high use situations. The unique design ensures that when the drawers are opened cold air is retained because it's forced down onto the food, rather than escaping. Even during prolonged openings the drawers are able to maintain their temperatures. Another advantage is the option for the drawers to be set at different precise temperatures to suit the contents from -22C to up to 15C.

Garagiste's Burgess, who took delivery of his two drawer Adande unit in November, said it had met his needs for refrigerated drawers that could precisely maintain the required temperatures in a kitchen as busy as his. "I'd been trying to find the perfect solution for underbench refrigeration and freezer in one," he said. "This ticked all the boxes and has had a big impact on the efficiency of our kitchen," he said. Contact: Stoddart



## Cook chill from Irinox

The latest new offering from Irinox is a unit that allows operators to blast chill, freeze and slow cook — all in the one cabinet. The new energy efficient Irinox Multifresh Plus unit features the new Low Temperature Cooking function that has a range of benefits to operators wanting to cook and chill food. By eliminating the need to handle food between functions it reduces the chances of any cross contamination of the food being prepared, at the same time allowing your kitchen to operate more efficiently. Available in a range of sizes, it's able to cook food at temperatures of up to 70C and then chill the food down to 3C. Or if required the blast freezing option can chill the product down to -18C. Plus it can work as a holding cabinet allowing operators to hold the cooked products until service time without damaging. Contact: Skope



## MISA Modular Cool Room system

Now available in the Australian market is the MISA Modular Cool and Freezer Room System that offers the advantage of very fast construction of an energy efficient cool or freezer room to suit a range of size requirements. MISA's "fast fit" Camlock system requires no sealants so rooms can be easily assembled and disassembled. Two people can assemble a typical room in 2.5 hours. It's made from 100mm polyurethane panels that delivers increased energy efficiency for operators. Contact: Skope Refrigeration



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