

## Refrigeration feature

By LAURA DURHAM

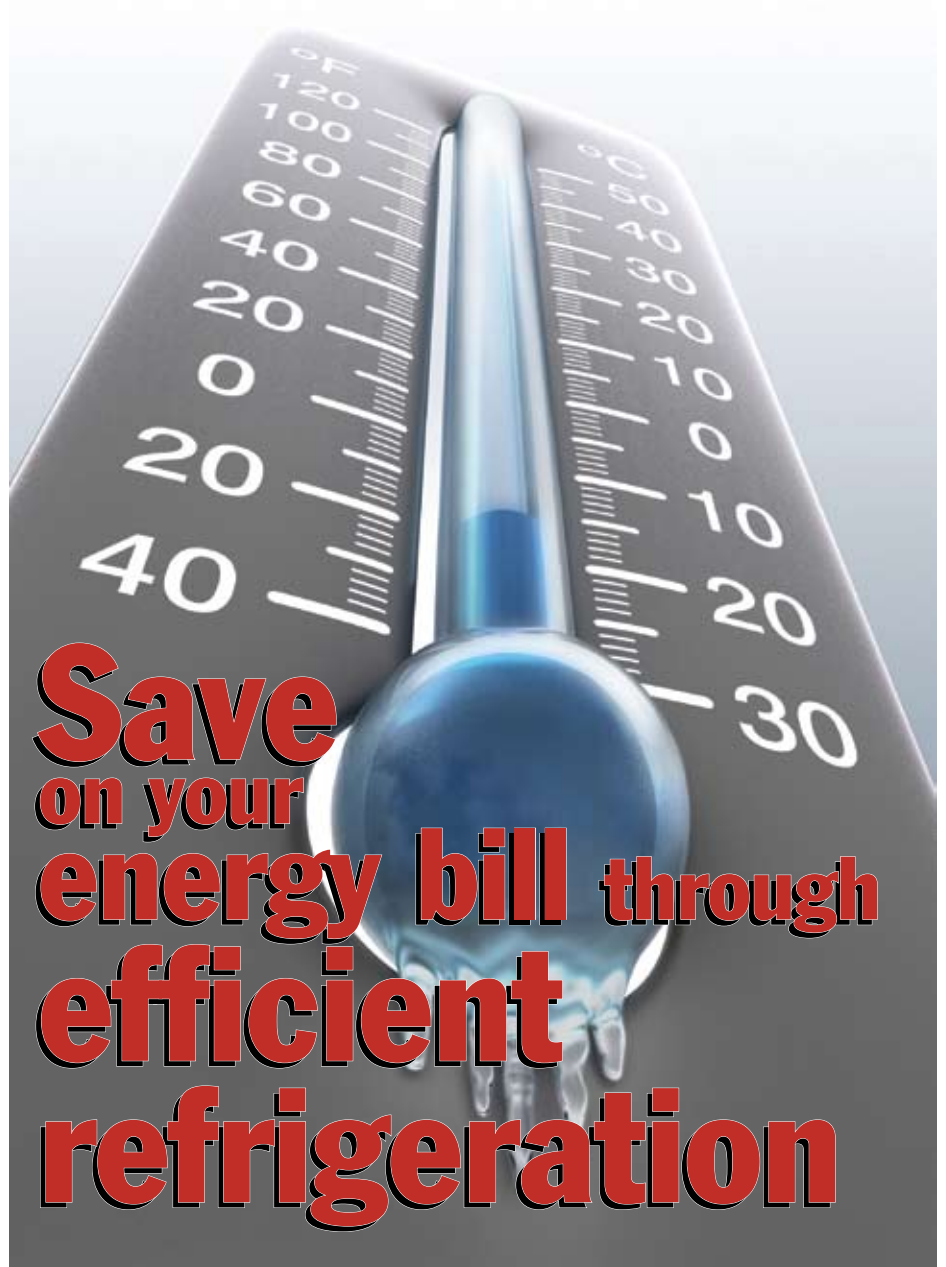
The biggest contributor to a retailer's energy bill is refrigeration. Up to 50%, says Roy Singh, technical and development director at Fridge Factory. With the annual electricity tariff hike coming into effect in July, bills are going up and belts will have to tighten again. For wholesalers, particularly those that deal with frozen products, having an efficient refrigeration system is absolutely key to reducing electricity costs and of course, streamlining their supply chain operation. *Wholesale Business* spoke to various players – from both the retail and supplier side – to see how refrigeration can be made more efficient.

### Options available

Many retail operations have old, outdated equipment that may work fine, but is guzzling electricity. Of course, replacing this equipment is a costly affair and not an option available to many, particularly for the smaller independents. "It is not an option either economically or environmentally to immediately replace all refrigeration equipment within an operation," says Singh. However, if replacement is an option he suggests that hydrocarbon models be substituted for the electricity consuming HCFC refrigerators.

Hydrocarbon refrigerants (used predominantly in Europe which uses 220v electricity, like South Africa) can offer savings of up to 15%, says Singh. He explains why: "The refrigerant begins working at a lower temperature, so the components do not have to work as long or as hard to achieve and maintain the required temperatures. Additional benefits include reduced maintenance costs as a direct result of the extended life span provided by the increased efficiency of the refrigerant the compressor."

It is interesting to note that Namibia has banned the importation of all products



## A game plan to cope with price hikes

containing HCFCs as from 1 January 2012. They are following the example of Europe and more recently, Australia.

### Efficient warehouse storage

The aim of every warehouse is to stock as many pallets as possible and be able to identify and move them out quickly. And mobile racking is the most efficient system to achieve this, says James Cunningham, MD of Barpro Storage SA. For ambient products, the speed of moving a pallet from loading bay to warehouse storage is not as time-constrained as those warehouses that deal with frozen products. Speed and efficiency is key for the frozen market, such as protein products like IQF chicken. "In order to get good prices from producers, a warehouse needs to be able to buy significant quantities – and therefore be able to move and store these quantities of product

effectively," he adds. Of course, market prices are difficult to predict but wholesalers need to be able to cater for large quantities correctly stored in their cold rooms.

With a mobile racking system, the racking superstructure is fitted onto electrically powered bases with wheels and the bases run on rails that are embedded into the concrete floor. The wholesaler can customise the layout of the system according to his specific needs. According to Cunningham, a warehouse laid out with mobile racks can store up to 80% more pallet loads.

A good management system then needs to be put in place to ensure warehouse efficiency. Rather than a paper driven system – which takes time to process – a real time system means that once a pallet is moved, the space is cleared immediately on the system and available for replacement.

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### The cost of electricity

Electricity in South Africa has been cheap up to now and that has led to a lot of wastage. But now the increase in tariffs has forced industry to look at the efficiency of the systems in place. "It requires a change of mindset, people need to pay more now in order to save later," Cunningham says.

### Cooperation needed

In order to improve cold store efficiency, there needs to be better cooperation and collaboration between every section of the chain. "Too many cash & carry groups don't fully realise the benefits of a centralised distribution centre (DC) system," says Cunningham. The reduction of space requirements, time wasted, staff and merchandise handling costs surely make it the only viable option. "For example, instead of thinking about expanding in width, why don't wholesalers just raise the roof and double their stock handling capability? Introduce mobile racking and this doubles again," he says.

"I estimate that if these measures are implemented, the average cold store could potentially save 30-40%," he adds.



*When choosing a refrigerant, various factors come into play: efficiency, impact on the environment and cost. For F. Dawood, ammonia is their chosen refrigerant for the time being.*



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## REFRIGERATION CASE STUDY:

# F. DAWOOD & SON

**Electricity hikes and rising fuel costs are the biggest hurdles faced by all retailers, particularly wholesale operations like F. Dawood & Son, which operates a poultry distribution centre in Boksburg.**

F. Dawood & Son is a family operation, stemming from a 1947 retail butchery. Now in its fourth generation, the business deals solely in frozen products – chicken, fish, further processed products and frozen vegetables – distributing to the likes of Spar, Pick n Pay Family stores, smaller retail outlets and their own wholesale to the public stores across the country.

For MD, Iqbal Faki, an efficient refrigeration system is crucial for the bottom line. This has been achieved by introducing mobile racking to their cold rooms; reducing energy waste with limited door entry and a strong management system.

They set up their first plant in Dunswart, Benoni in 1981 and the business has expanded enough to store 4 000 tons of poultry at any one time. "Being focused solely on wholesale has allowed us the opportunity to expand aggressively," says Faki. They've just bought a commercial cold store by the Durban harbour which increases the storage capability of the entire operation by 2 000 tons.

Ammonia is the most cost effective refrigerant "at the moment" says Faki. Of course, as technology advances, so must industrial plants like F. Dawood evolve but as an 'environmentally friendly' and cost-effective option, ammonia is sufficient for the time being.

Another way to improve the efficiency of a cold room is to introduce mobile racking, which F. Dawood did in 1994. With just one aisle of space required, the improved efficiency is a no brainer. "We can store more than twice the product as opposed to static racking," he says.

## Refrigeration operation

The way refrigeration 'works' – removing heat rather than actually cooling, as the layman might assume – means that the less heat entering the cold room (through open doors etc), the better. For that reason, the cold store only has two doors and the entry of heat is further minimised by plastic curtaining. Of course, more sophisticated measures; such as high speed motorised doors are also available. "But curtaining works just fine for us," Faki says.

With a cold room at a temperature between  $-20^{\circ}\text{C}$  and  $-25^{\circ}\text{C}$ , there is the issue of condensation as warm air enters the room. This could negatively affect the mobile racking rails, making them slippery; and even around the cold room doors around which ice crystals could form. Faki suggests heat tapes around the door and built into the rail might reduce the condensation – although the opposing argument is that you'd be essentially adding heat, which then means more energy to remove it.

Regardless of these slight improvements that could be put in place, "in terms of our refrigeration, we run a pretty lean machine," says Faki.

## Light matters

Lighting is another issue for anyone's energy bill but Faki says that the plant will always be their biggest cost, "even if we change all the light bulbs". However, he is planning on switching from energy-saving bulbs to LEDs to reduce every bit they can.

The cost of refrigeration has changed dramatically over the past few years. The plant requires a steady demand of 220 kW/h and Faki notes that an average energy bill that cost him R50 000 two years ago, is now a hefty R120 000. And this is set to increase again with the electricity tariff increases in July.

"Even though the price of chicken hasn't changed significantly over the last five years, we need to grow our turnover – and more importantly our tonnage – to balance out our rising costs of electricity and fuel."



*For MD of F. Dawood, Iqbal Faki, an efficient refrigeration system is crucial for the bottom line. This has been achieved by introducing mobile racking to their cold rooms; reducing energy waste with limited door entry and a strong management system.*

### Steps to save on refrigeration

#### ■ Closed cabinets (Electrical savings of up to 50%, says Singh)

An open cabinet acts as an air-conditioner in a store as the chilled air is directly expelled into the atmosphere. A closed cabinet does not allow the ingress of warm air, and therefore saves a huge quantity of electricity. An open cabinet also absorbs moisture which creates ice-build up which reduces efficiency of the working components.

#### ■ Keep your working components clean

It is very important to ensure that the condenser is kept clean at all times. Regular dusting (monthly) maintains optimum efficient operation of the working components, therefore saving electricity and lengthening the lifespan of the compressor.

#### ■ Maintain the cold chain at all times

Cooling a product that has warmed up is not only a health hazard but wastes electricity in cooling it back down to the required temperature. So, maintain the cold chain at all times.

#### ■ Routine and scheduled maintenance

Check and repair door latches and sales; deep clean refrigeration cases annually to ensure sufficient air movement.

#### ■ Monitor temperatures

Ensure that the temperature cabinets is at the optimal level by checking regularly; and if necessary, adjust the thermostat accordingly.

#### ■ Minimise heat entry

Reduce the number of doors into your cold room (plastic curtains or high speed motorised doors are popular solutions) to minimise the amount of heat entering the room – which then requires the plant to use more energy to remove it. **WB**



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*With a mobile racking system, the racking superstructure is fitted onto electrically powered bases with wheels and the bases run on rails that are embedded into the concrete floor. The wholesaler can customise the layout of the system according to his specific needs. The system more than doubles the load capability of a warehouse. This can be doubled again if the roof is raised.*