

# A comprehensive look at the technology driving sustainable, efficient refrigeration

As technology advances and commercial solutions improve, staying abreast of what's new in the refrigeration industry is less about staying ahead of your competitors and more about creating a better business for the future.

Some of South Africa's leading refrigeration manufacturers and suppliers share their insights and take a closer look at technology shaping the commercial refrigeration landscape. As temperatures rise across the globe, keeping your cool has never been more efficient or sustainable.

## Bespoke solutions

Flexibility is one of the most important aspects of any customised solution. The most sustainable solutions are usually the ones that are fit for purpose. When you are dealing with space or design constraints, being able to make your refrigeration work for you rather than forcing your layout to work for your refrigeration will enable you to optimise your trading and back of house areas.

Supplier of cold storage and refrigeration solutions ArcticStore's bespoke doors and openings are innovative and useful. They offer a range of alternative door types and door locations that include full side opening, the option for multiple single doors in the side, end doors, and electric sliding doors. Bob Sherriffs, ArcticStore Director, says ...



www.petitforestier.com/

**When you are dealing with space or design constraints, being able to make your refrigeration work for you rather than forcing your layout to work for your refrigeration will enable you to optimise your trading and back of house areas.**



Bob Sherriffs

“As a result of varying cold room workplace legislation in different countries, we often need to incorporate internal door openings and even emergency escape hatches.”

Multifunctionality is another attractive aspect of bespoke solutions. Dual temperature zones offer the useful functionality of chilled and freezer zones within the same storage container, designed to meet your specific requirements. This solution is achieved using a secondary internal refrigeration plant that circulates chilled air and that utilises a thermal break to stop cold transfer. Alternative solutions include separate external doors and movable dividing walls with vents and fans.



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The new AK-CC55 case controls deliver energy savings of 6-10% compared to the next best alternative. It relies on acknowledged and advanced Danfoss adaptive superheat algorithms to control refrigerated display cases and cold rooms. For example, the large terminals on the AK-CC55 make it easy to loop the pressure transmitter cable from one controller to the next one.

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- Simplified installation and service with smartphones and large terminals
- Suitable for any store size with Compact, Single Coil, and Multi Coil variants



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## Multifunction and integrated systems

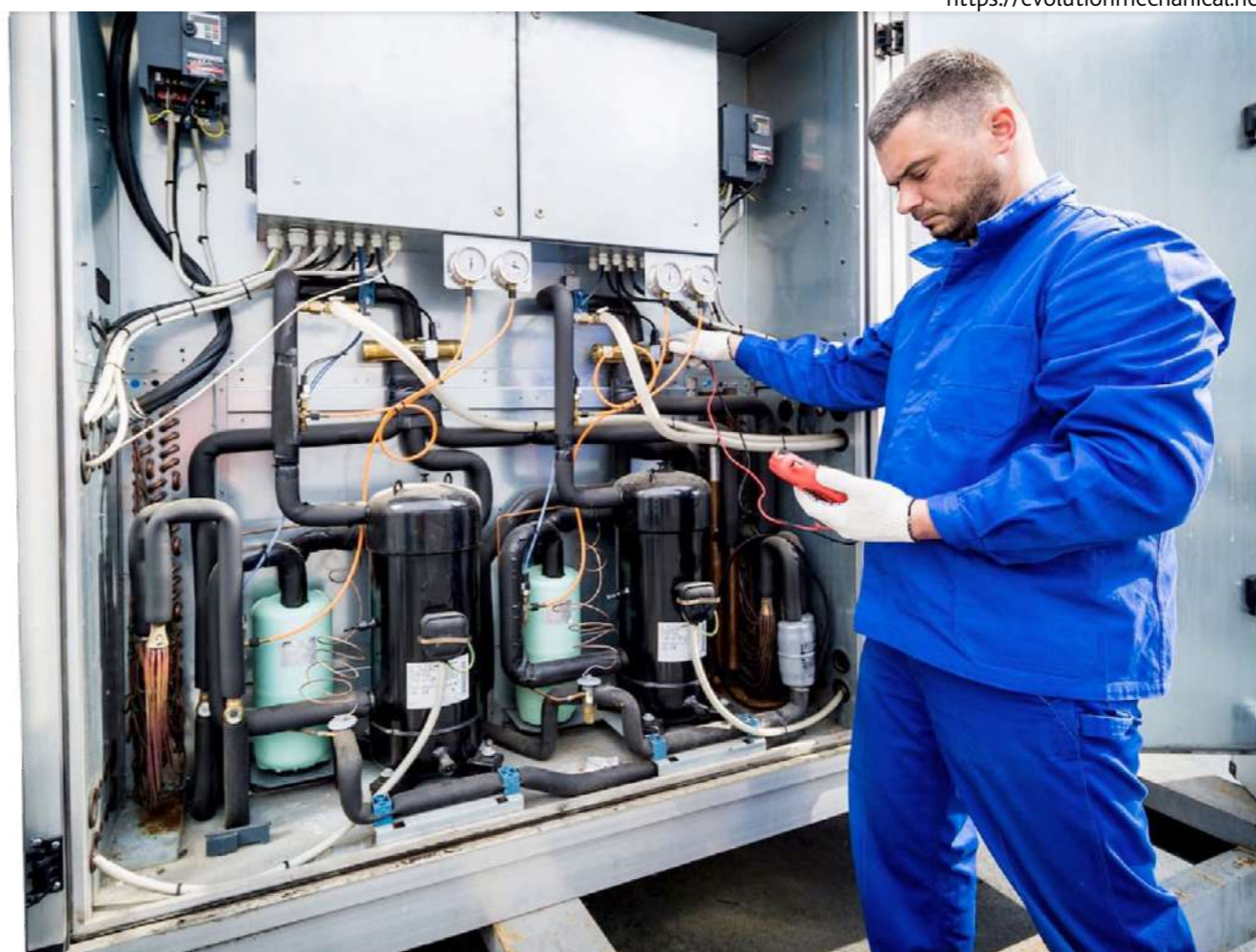
The more you can get out of your refrigeration system, the more value it will have. "Retailers are increasingly looking for refrigeration solutions that offer multifunctionality and can integrate seamlessly into their broader operations," explains Sherriffs. "This includes units that can switch between different temperature ranges, or systems that integrate with retail management software for more streamlined operations. ArcticStore and SuperStore units are designed with this versatility in mind, offering solutions that can be tailored to the specific needs of retailers."

Taking innovative design a step further, ArcticStore's SuperStore solution is a unique concept that allows users to connect refrigerated containers together like building blocks to form a single open plan cold store. Sherriffs says, "With interchangeable side and back walls that allow for seamless expansion of the cold storage facility to suit specific needs, South African retailers can optimise working capital."

## Preventative and predictive maintenance

Making an investment in preventative and predictive maintenance is vital for long-term refrigeration sustainability. These measures include frequent check-ups and the utilisation of advanced sensors and IoT technology to continuously track system functioning.

These technologies have the capability to identify potential issues before they escalate, resulting in reduced downtime, prolonged equipment longevity,



and sustained peak efficiency. This is where technology truly proves its worth.

Through the use of data analytics and machine learning, predictive maintenance can anticipate and prevent potential failures and maintenance requirements. This proactive method not only increases reliability but also decreases the environmental consequences caused by unforeseen repairs and part replacements.

"Best Practices: Best-in-class industrial players prioritise assets, establish partnerships, invest in model improvements and integrate PdM (predictive maintenance) into their digital maintenance ecosystem." Says McKinsey and Co.

**Investing in preventative and predictive maintenance is crucial for sustainable refrigeration. These practices involve regular inspections and the use of advanced sensors and IoT technology to monitor system performance in real time.**

## Innovative technology for maximum efficiency

When it comes to monitoring commercial refrigeration, Eurocool, a trusted local HVAC and refrigeration wholesaler, chose the Danfoss AK-CC55 Connect wireless tool as a standout solution. An industry first, it is a frontline tool for predictive and preventative maintenance, troubleshooting, and monitoring. Wireless connection to the AK-CC55 Connect service app on a smartphone or tablet supported by iOS or Android operating systems allows for configuration and testing in a user-friendly, intuitive way.





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# Keep cargo cool and costs low with MOBIUS solar powered refrigeration

For logistics companies, balancing operational efficiency with eco-friendly practices is often a challenge. Mobius Energy Technologies steps in to offer a revolutionary solution that not only keeps cargo at the perfect temperature but also significantly reduces carbon footprints whilst saving costs.

## The Future of Cold Chain Transportation

Mobius has developed a cutting-edge solar-powered refrigeration system designed specifically for trucks and trailers. This technology integrates world-leading advancements in lithium batteries, inverters, and Solar PV, providing a sustainable alternative to traditional diesel-powered refrigeration units. With fuel savings up to 15,000 litres per vehicle per year, Mobius is helping businesses transition to greener operations without sacrificing performance.

## Real Savings, Real Results

Switching to Mobius isn't just about going green – it's also about financial savings. Clients have reported up to a 60% reduction in total vehicle fuel consumption, with payback periods as short as 2 years. Additionally, businesses could qualify for a tax rebate on 125% of the capital value of the units, making the investment even more rewarding.

## Proven Technology, Reliable Performance

We have proven reliability with over 100,000 hours of operational time across South Africa's toughest conditions. The company's real-time telematics system provides over 100 critical data points, allowing fleet managers to monitor key metrics via an easy-to-use portal.



## Seamless Integration, Unmatched Flexibility

Downtime concerns are mitigated with Mobius's non-invasive design. The system is engineered to work independently from a vehicle's operations. The diesel engine in the Thermo-King unit serves as a backup, providing assurance that cargo will remain cool under all circumstances.

The Solar Electric refrigeration unit is compatible with the full range of Thermo-King refrigeration units. Its modular design allows components like batteries and electronic parts to be swapped out as needed, keeping maintenance costs low.

## Join the Green Revolution

Mobius Energy is dedicated to assisting clients to decarbonise their fleets. Businesses interested in making the switch can contact

**Mobius Energy Technologies** or **Transport Cooling Africa**

to learn how to start saving fuel and cut emissions with their innovative solutions.



**Contact:**  
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software that leverages GSM technology, allows customers to monitor and manage their refrigeration units from anywhere, providing real-time access to critical information such as temperature, humidity, energy, system performance and alarm alerts. This technology enhances operational efficiency by enabling instant alerts for any anomalies, ensuring that issues are addressed before they escalate.”

The advancement of monitoring and control plays a crucial role in contemporary

Real-time operating conditions can be monitored without interrupting the system, which is a must for today’s retailers and wholesalers already battling disrupted power supplies and consumers with little to no patience for delays or interrupted shopping experiences.

When paired with the Danfoss AK-CC 550 Service, a complete refrigeration appliance control that offers ultimate flexibility and adaptability, the Danfoss AK-CC55 Connect wireless tool ensures maximum efficiency and sustainability. With the ability to optimise energy usage, it certainly makes retail or wholesale refrigeration a little easier to manage.

Sherriffs says that ArcticStore has also embraced innovative design and state-of-the-art technology for their remote monitoring solution. “One of the most significant advancements in refrigeration technology is the integration of remote monitoring systems. ArcticStore Smart Arctic, our proprietary



refrigeration solutions. With the need for sustainability, better systems for monitoring and control are essential.

The use of remote monitoring and automated control allows retailers to adjust their refrigeration settings efficiently, ensuring consistent temperatures and minimising energy consumption. These technologies aid in meeting food safety regulations by maintaining accurate temperature control.

## Sustainability in refrigeration systems for local retailers

Sustainability is becoming more and more crucial, due to the pressing demand for energy efficiency, decreased emissions, and better management throughout the system’s lifespan. It is imperative for local retailers to understand the wide range of advantages and technologies associated with sustainable refrigeration systems when contemplating investments.

### The value of investing in sustainable refrigeration solutions

Investing in sustainable refrigeration systems can bring a range of advantages for local retailers. Not only do reduced energy costs have a positive impact on the bottom line, but also improved reliability and longer equipment lifespans can minimise operational disruptions and replacement expenses. Showcasing a dedication to sustainability has the potential to bolster brand reputation, attract environmentally conscious customers, and make one eligible for green certifications and incentives.

Options, such as energy-efficient technologies and environmentally-friendly refrigerants, along with advanced maintenance and monitoring systems are viable solutions. These investments present retailers with both economic and environmental benefits, in line with the larger goal of reducing emissions and promoting responsible resource consumption.





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## Energy savings and reduced emissions

An essential concept is promoting both energy efficiency and decreased emissions. Sustainable refrigeration systems offer a significant benefit in terms of potential energy savings. With advancements in technology, modern refrigeration units are now built to be highly energy-efficient, utilising features like variable speed compressors and improved insulation.

These enhancements can result in significant decreases in energy usage, ultimately cutting operational expenses and reducing carbon footprints. Sustainable refrigeration options often utilise environmentally friendly refrigerants with lower Global Warming Potential (GWP), leading to a shift away from conventional refrigerants such as R22, which is chlorodifluoromethane or Freon-22, it is a refrigerant that has been phased out due to its harmful impact on the ozone layer.

The newest refrigeration technology, known as distributed water-loop systems, is being implemented worldwide to reduce energy consumption. Instead of relying on large compressors, each equipment section in supermarkets is connected to its own smaller compressor that only operates when necessary. As a result, the energy demands are significantly lowered compared to traditional refrigeration systems.

The compressors are cooled by a commonly used cooling line, which utilises a liquid cooling agent for heat transfer. The liquid is then transported to an external cooling tower and once cooled, it circulates back to the different compressors. This method of cooling minimises the energy consumption of the compressors during operation.

## Top 3 insights from ArcticStore

Bob Sherriffs, Director, ArcticStore

### Flexible and scalable cold storage solutions

Why buy it if you can rent? The South African retail sector is marked by fluctuating demand, especially during peak seasons. ArcticStore offers rental units for flexible and scalable refrigeration solutions that allow retailers to expand or contract their storage capacity as required through seasonal or geographic demand, without locking working capital into expensive permanent infrastructure. This adaptability is crucial for managing seasonal inventory efficiently and cost-effectively. Leading UK retailer Tesco utilises ArcticStore refrigerated containers for seasonal and geographic demand.

### Energy efficiency as a competitive advantage

If you can measure it, you can manage it. With rising energy costs and a growing emphasis on sustainability, energy efficiency in refrigeration is no longer optional – it's a competitive necessity. It is vital that retailers are empowered to track energy usage and cost per kWh. ArcticStore units are equipped with advanced refrigeration systems, such as the Thermo-King Magnum Plus, that operate using significantly lower energy than older units, with up to 65% savings on previous generation models. This not only reduces operational costs but also supports retailers' sustainability goals.

### Enhancing cold chain integrity

Maintaining cold chain integrity is critical in the retail and FMCG sectors, particularly for perishables. For ArcticStore, it's as much about peace of mind as it is about cost and value. We offer robust, tried and tested technology with national support available 24/7. Our cold chain solutions are maintained by precise live telematic temperature control and insulation, ensuring that products remain within optimal temperature ranges from storage to point of sale. This reduces spoilage, minimises food waste, enhances product quality, and directly impacts consumer satisfaction and brand loyalty.



# We'll keep it cool for Braai Day with our Close the Case Glass Doors



Our Insulated Glass Doors revolutionize energy efficiency, setting the standard for supermarkets and retailers. Renowned for their quality and durability, they are the top choice for chiller and freezer applications, engineered for optimal performance in high-traffic environments.







## Insulation for commercial refrigeration

In commercial refrigeration, insulation is a vital component that is all too often overlooked. Whether worn or damaged insulation is being ignored, or cheaper but less efficient options are being chosen to cut costs, the effect is the same: reduced efficiency and less sustainability. What feels like a small problem can have a serious impact on your business over time. Added to this is the need for retailers and wholesalers to invest in environmentally friendly solutions as local and international legislation catches up with the science behind climate change.

As is often the case, need is the driver and motivation for innovative thinking. Capitalising on this, local and international manufacturers and supplier, use CFC-free polyurethane insulation in their commercial refrigerators.

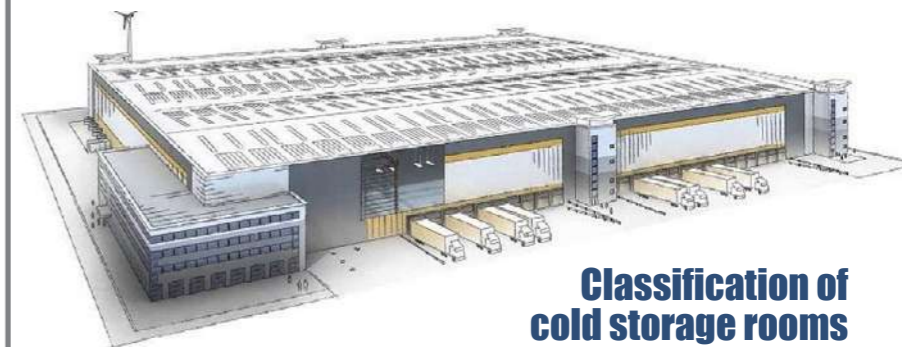
Effectively reducing the amount of energy each refrigerator expends to keep its contents cold, the right kind of insulation can make a significant difference to running costs.

Polyurethane insulation is robust, effective in confined spaces, affordable and light-weight, effective as an air sealant, and also fire resistant. The insulation also eliminates thermal bridging and minimizes moisture buildup. All of these

feature's help minimise heating and cooling costs, creating a cost-effective working environment.

Premium equipment can impact environmental and business sustainability. Under normal wear and tear, durability of more than 25 years for polyurethane used for insulation of refrigerators can be achieved. Polyurethane insulation reduces food waste and extends the life of perishable goods.

Rigid polyurethane foams maintain the inside temperature of the refrigerator, and thus reduce the consumed energy and provide high efficiency, thanks to their insulation capability due to their low thermal conductivity. With refrigerators and freezers consuming the largest amount of electricity costs in commercial applications (on average 40%), energy-efficient refrigerators will save a lot of money.



## Classification of cold storage rooms

Cold storage is usually divided into three types based on target room temperature: high temperature, medium & low temperature and ultra-low temperature. Different products require different room temperatures.

### High temperature cold storage

The high-temperature cold storage is what we call the refrigerated and fresh-keeping cold storage, the temperature is usually above 0°C, mostly used to store fruits and vegetables, eggs, medicinal materials, wood preservation, dryness, etc. The temperature is usually around 0°C, and the air cooler is used for air cooling.

### Medium and low temperature cold storage

The medium and low temperature cold storage is the high temperature freezing cold storage, with the temperature usually within -18. It is mainly used to store meat, water products and products suitable for this temperature scale.

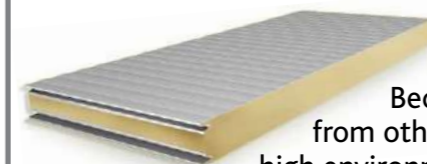
### Low temperature cold storage

Low-temperature cold storage, usually the storage temperature is about -20°C to 30°C, and the food is frozen by air coolers or special freezing equipment.

### Ultra-low temperature cold storage

Ultra-low temperature cold storage, cold storage  $\leq -30^{\circ}\text{C}$ , is mainly used for quick-frozen food, industrial experiments, medical and other special uses. Compared with the above three types, the applications on the market need to be slightly smaller.

Medium-temperature cold storage usually uses 100mm thick cold storage board, and low-temperature storage and frozen storage usually use 120mm or 150mm thick storage board. The foaming density of cold storage board is 38KG-40KG/cubic meter per cubic meter according to national standards.



The selection of cold storage boards is very important. Because cold storage is different from other warehouses, cold storage has high environmental requirements such as temperature and humidity. Therefore, when choosing the cold storage panels, attention should be paid to the raw materials and heat preservation strength of the board. Choosing the right board can protect the cold storage very well.

[www.coldmax.com/info/classification-of-cold-storage-room-51273671.html](http://www.coldmax.com/info/classification-of-cold-storage-room-51273671.html)



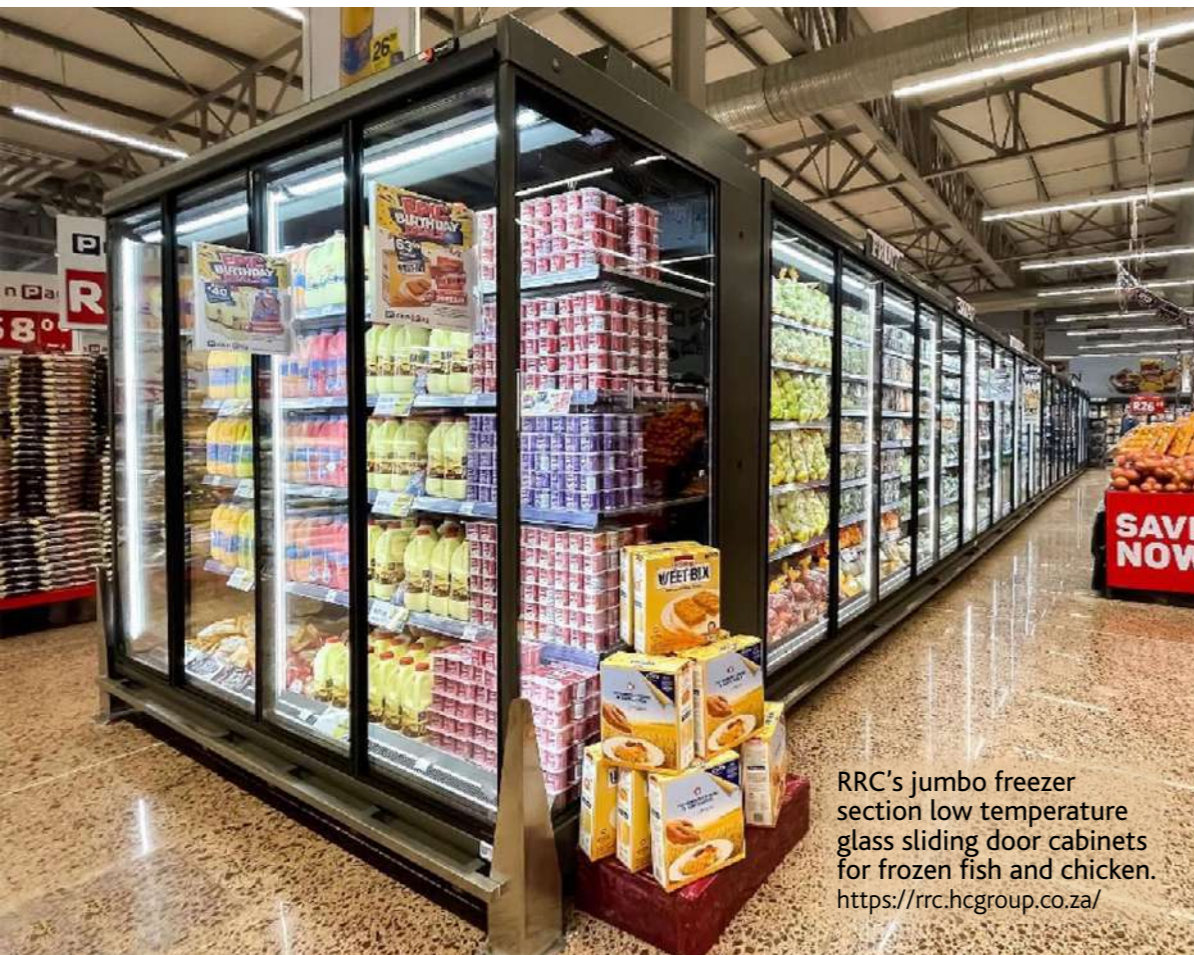


## Closed display cases for maximum energy efficiency

The refrigeration industry has long understood the value of closing the refrigeration display case. Open refrigerator and chiller systems are visually appealing and create a sense of accessibility for shoppers – just reach in and grab what you want! The reality is, however, that these systems can and do impact energy consumption and can contribute to food spoilage and waste. In a country where load shedding is a reality, and the power supply is uncertain and unstable, open display cases are an undeniable risk.

## Manage your sustainability

The sustainability of commercial refrigeration systems relies on a complex set of factors – from the age of the refrigeration unit, the frequency of preventative maintenance, the level of effective monitoring of the system, refrigerants being used, and the inclusion of smart technologies for monitoring and control.



RRC's jumbo freezer section low temperature glass sliding door cabinets for frozen fish and chicken. <https://rrc.hcgroup.co.za/>



Going vertical is the answer for many companies looking to increase storage capacity and implement automation, while maintaining smaller building footprints, temperature-controlled facilities for food processing, distribution and automation. New vertical cold storage facilities typically range from 23m to 41m. They often have special considerations during the design and construction phase, including power requirements, the types of refrigeration and racking systems used, and structural slab and foundation needs. Photo & caption: [www.foodengineeringmag.com/](http://www.foodengineeringmag.com/)

Analyse your existing commercial refrigeration solutions, as older, units should be replaced with newer, eco-friendly models that offer increased efficiency and effectiveness, benefiting you and the environment. Of further importance is to continue preventative maintenance, keeping commercial refrigeration solutions in optimum condition. Faulty gaskets, improper compressors and leaky pipes lead to inefficiency, increased energy cost, and production of harmful gases.

## Lifecycle sustainability

Sustainability in refrigeration extends to the entire lifecycle of the equipment. By using durable, high-quality materials and components, the equipment has a longer lifespan, reducing the need for frequent replacements and minimising environmental consequences.

Recycling programmes at the end of the unit's life also aid in waste reduction and supporting a circular economy. **SR**



**Ann Baker-Keulemans** writes on topics related to business, lifestyle, technology, and health, with extensive knowledge on the SA retail and wholesale landscape. Contact [annbk@wilkinsross.co.za](mailto:annbk@wilkinsross.co.za) | [www.wilkinsrossglobal.com](http://www.wilkinsrossglobal.com)



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