COOL INSIGHTS

Spotlight on sustainable retail & wholesale refrigeration

By Ann Baker Keulemans

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For FMCG retailers and wholesalers, refrigeration is a predominant topic in business discussions. In-store refrigeration is vital – it ensures food safety and shelf life, affects accessibility and display, and is an integral part of the customer experience. It is also a complex and overarching category covering hardware, display units, freezers and coolers, cooling systems, data collection (IoT), maintenance, lighting, and case technology.

In addition to this, as refrigeration costs soar and the impact of commercial refrigeration on the environment draws closer scrutiny, sustainability has become a watchword for the industry. But just how can retailers and wholesalers move into the future? With such a massive category, just knowing where to start can be a stumbling block. Happily, this intriguing topic blends innovation and technology with common sense, practical progression, and smart business decisions.

Plug in, play on: Sustainability and energy efficiency for in-store refrigeration

Multilayer Trading 867 has an ethos of sustainability, responsibility, and energy efficiency. As importers of specialised self-contained commercial supermarket refrigeration solutions, they have ensured that their solutions are green. They say, "In a globalised world of constant change, we believe it is important to act sustainably and with a view to the future. It is our duty to set standards which the following generations can build upon – concerning environmental aspects as well as the ability to finance our future."

The company specialises in plug-in solutions that, thanks to the complete integration of all the refrigeration components, require no additional installation costs. It's a convenient solution that significantly reduces the cost of developing or refurbishing a refrigeration system.

The company's commitment to continued research and development has resulted in several innovations that improve sustainability in terms of both performance and longevity, as well as environmentally friendly applications. Variable speed compressors avoid peak loads and help reduce running costs, and propane R290, a natural refrigerant, is eco-friendly while also improving the efficiency of the cabinet. Semi-automatic defrost means that any excessive build-up of ice in a cabinet, which can increase energy use and would typically require labour for defrosting, can be avoided.

Monitoring and predictive maintenance for in-store refrigeration

Integrating a monitoring system into your refrigeration solution is invaluable. With the advancements in technology and the addition of machine learning and artificial intelligence (AI), monitoring your system has become easy and seamless. However, monitoring energy consumption,

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temperature, and efficiency is just the tip of the iceberg. Many systems can monitor everything, through to the amount of stock within the refrigerator, chiller, or freezer, and even track stock as it moves in or out of the unit.

The importance here is the monitoring of energy usage, fluctuations in temperature, and any changes to the efficiency of the system. By leveraging data collection and analysis with machine learning and AI, retailers and wholesalers can move beyond reactive and even preventative maintenance that runs on a schedule, and into predictive maintenance, based on real-time conditions. The positive impact this sort of monitoring and maintenance has on efficiency and sustainability cannot be overlooked.

Detailed monitoring systems such as those provided by Multilayer Trading, which uses the Carel Boss system, offers real-time monitoring of the refrigeration's parameters, aids the troubleshooting process, issues immediate alerts when problems occur, and decreases downtime.

Explore the benefits of waste heat recovery for your refrigeration solution

Sustainable commercial refrigeration practices go far beyond cooling. Modern waste heat recovery systems allow retailers and wholesalers to repurpose excess heat generated during the refrigeration process and use it for operations such as heating.

The benefits of waste heat recovery are many, says the Australian Department of Climate Change, Energy, the Environment and Water.

"In chillers, heat from the refrigeration process is expelled via air-cooled condensers or cooling towers. Modern chillers, in particular those using ammonia or CO_2 refrigerant offer significant potential to recover wasted heat at useful temperature levels (greater than 50°C). This recovered heat can be used to offset the consumption of other operations, such as heating water."

Waste heat recovery is a valuable energy source, can improve your bottom line and reduce carbon emissions while improving your sustainability rating. Multilayer Trading is just one of the green-minded manufacturers advancing sustainable solutions by investing in this type of technology. They say ...

> "With the implementation of a waste heat system, all previous preconceptions of self-contained refrigeration are changed, resulting in an achievable solution that is environmentally friendly and energy-efficient, no matter what the store environment is."

The supermarket Super Brugsen in Augustenborg on Als, Southern Denmark, recycles 95 percent of the excess heat generated from the refrigeration system. www.danfoss.com/

Future proofing in-store refrigeration with natural refrigerants

One thing is clear – when it comes to refrigerants, it's time to go natural. Thomas Trevisan, writing for Natural Refrigerants Cooling & Heating Marketplace, says, "The European Union's revised F-gas Regulation, which mandates a complete phase-out of the consumption of HFCs across the bloc by 2050, as well as specific phase-out dates for the use of HFCs and HFOs in some heating and cooling equipment, has been published in the Official Journal of the EU and will be legally enforceable as of March 11 [2024]."

Space Engineering Services says, "Traditional systems using HFO/HFC refrigerant blends are no longer a viable option for the long term. In 2020, HFCs with Global Warming Potentials (GWP) greater than 2 500 will be banned in new systems. Further F-gas bans will occur between 2022 and 2025, and in 2030, all HFCs (even those considered 'greener') will exceed GWP and carbon restrictions. The answer is to use natural refrigerants."

Natural refrigerants don't deplete the ozone, have a much lower impact on the environment than traditional refrigerants, and will ensure that your business remains compliant as well as accountable in the long term. They're also notably more cost-effective and sustainable, safer, keep equipment running efficiently, and are unlikely to be affected by unpredictable price rises.

In a recent blog that focused on the impact on the environment of commercial refrigeration, UK-based Ancaster Food Equipment says ...

Natural refrigerants, as the name suggests, are naturally occurring substances that are used as coolants in different refrigeration systems like freezers, air conditioning systems, HVAC systems. Ammonia, carbon dioxide, propane, and isobutane are some of the most commonly used natural refrigerants.
Allied Market Research. Linkedin

> "Refrigerants are the lifeblood of commercial refrigeration systems, enabling the cooling process that keeps perishable goods at safe temperatures. However, the environmental impact of these substances can be profound."

"Traditional refrigerants, such as chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs), have been phased out under international agreements due to their high ozone-depleting potential.

"Their successors, hydrofluorocarbons (HFCs), while not harmful to the ozone layer, are potent greenhouse gases with a global warming potential thousands of times greater than carbon dioxide (CO_2). The release of these gases into the atmosphere, whether through leaks, servicing, or disposal of refrigeration equipment, contributes significantly to global warming.

> "The move towards more environmentally friendly refrigerants is a key focus in reducing the impact of commercial refrigeration. Natural refrigerants, such as CO_2, ammonia (NH3), and hydrocarbons (propane and isobutane), are gaining popularity due to their lower environmental impact."

"These substances have significantly lower global warming potential and do not deplete the ozone layer." While the challenges of transitioning to greener gases are not insignificant – system compatibility, safety when dealing with flammable refrigerants, and of course the cost of transitioning – the benefits are significant. It's also an essential step towards sustainability, one that several major local retailers and wholesalers have already recognised.

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Why sustainability makes good business sense

Ancaster Food Equipment says, "For businesses that rely heavily on refrigeration – such as those in the food, beverage, and pharmaceutical industries – the push towards greener practices is not just about regulatory compliance or environmental stewardship; it also aligns with strategic business advantages." The company lists the benefits ...

- Reduced operating costs and lower energy consumption
- Improved brand image and customer loyalty as sustainability efforts resonate strongly with environmentally conscious consumers
- Enhanced regulatory compliance
- Increased energy efficiency and sustainability
- Competitive advantage in the market

When to retrofit and when to invest in a new refrigeration system

An inescapable fact of embracing sustainability is that your old system will, eventually, have to go. But whether you bite the bullet and invest in an entirely new system or ease your way into the future with some savvy retrofits, is up to you and your budget.

Rafael Leitão, Head of Marketing at Portugal-based refrigeration giant, FRICON, says, "When deciding whether to retrofit an existing system or install a new one, there are several considerations. For many, retrofitting is seen as a quicker and more economical way to extend the life of refrigeration equipment and get the most out of their investment. Choosing this approach can provide some immediate benefits.

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"On the other hand, investing in a new system can provide a number of more significant benefits. In general, new equipment incorporates components that increase energy efficiency, have a positive impact on operating costs, have a more modern design, and can provide a short- to medium-term return on investment.

"A new system also tends to be more reliable and have a longer service life than an older system. This means less downtime due to failures and repairs, which can have a positive impact on operations. Newer systems can also be customised and configured to meet the specific needs of the business, providing greater flexibility and a better in-store experience.

"Finally, a new refrigeration system may offer technological features such as remote control and integration with management systems, which can further improve management and operational efficiency and simplify maintenance. Although the initial investment may be higher, the short- to medium-term benefits of a new refrigeration system usually out-weigh the additional cost."

Three indicators that it's time for a refrigeration upgrade www.fricon.pt/

In the dynamic food retail landscape, staying ahead of the curve is key to ensuring the best results. Refrigeration solutions play an important role in this, and recognising the signs that a system needs to be updated is critical to maintaining operational excellence and avoiding potential disruptions.

1. Energy consumption

Energy efficiency is as much about ensuring the lowest operating costs as it is about meeting energy standards and corporate sustainability goals. If your current system is consuming more energy than it should or is hindering your ability to meet your energy goals, it's time to consider replacing it. The latest systems incorporate technologies that significantly reduce energy consumption.

2. Maintenance costs

Rising maintenance and repair costs indicate that the system is becoming less reliable and more prone to breakdowns, impacting business operations. The cost of maintenance and associated constraints can sometimes outweigh the cost of purchasing a new, modern system with a warranty.

3. Performance and technology issues

Fluctuations in temperature or voltage in refrigeration equipment can be two further signs that your system is worn out and in need of replacement. It is critical to keep the equipment operating at optimal levels consistently to maintain the integrity of the food inside.

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Innovation as the driver of sustainability in in-store refrigeration

Adapting to current challenges, looking to the future and presenting innovative solutions are essential qualities for a refrigeration service provider, says Leitão.

One such example is FRICON, as they continually adapt to market needs, which can be seen in the launch of their UPD FV Vertical Display Cabinet in 2023, during the largest international retail trade fair, EuroShop in Germany.

Leitão explains, "This new model [already available in three versions (140, 210 and 250), demonstrates our commitment to technological progress." Benefits include quick and easy installation, low maintenance, high performance and low energy consumption.

Water-cooled exchangers

Green cooling solutions, including hydrocarbon, CO_2, or heat recovery-based systems, are integral to sustainability. As energy costs have a monthly impact on operating costs, investing in efficient solutions and systems can significantly reduce these costs, and increase competitiveness. One such solution is a waterloop system, such as FRICON's condensing refrigeration system [launched in its supermarket range] that uses water-cooled exchangers instead of an air-cooled condenser, resulting in benefits such as reduced heat emission to the store, reduced need for air conditioning, reuse of heat-to-heat sanitary water systems and reduced overall energy consumption,"says Leitão.

"At FRICON, we strongly believe that R290 and plug-in based solutions are the answer to maintaining a healthy and flexible business in food retailing."

Lowering reliance on energy-intensive systems

Phase Change Material (PCM) coolers use materials that absorb and release thermal energy during the process of melting and solidifying at specific temperatures. These coolers are highly efficient in thermal energy storage, making them useful for maintaining desired temperature conditions over extended periods. PCMs can be integrated into building materials like walls or ceilings, or used in standalone cooling systems. This technology is especially advantageous in balancing energy loads, reducing peak time energy demands, and enhancing overall energy efficiency in cooling systems. https://be-cis.com/renewable-energy-cooling-innovations/

Absorption cooling technology employs a heat source, often from renewable energies like solar power or industrial waste heat, to drive a thermochemical absorption process for cooling. This method is particularly suitable for large-scale applications such as commercial buildings and industrial plants. Absorption cooling provides a greener alternative to conventional cooling methods, significantly lowering reliance on energy-intensive systems. It signifies a notable progression in sustainable energy use, especially in contexts requiring extensive cooling capacities. https://be-cis.com/renewable-energy-cooling-innovations/

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The future of cooling

There are many new innovations in cooling technologies that are aimed at achieving environmental sustainability, according to BECIS, a leading Energy as a Service (EaaS) provider. Some are still in their early stages, but significant research and development is being invested into efficient, cost-effective alternatives to conventional and new cooling systems.

One of these is electrocaloric refrigeration, an innovative cooling technology that uses what is called the electrocaloric effect, where certain materials change temperature in response to an applied electric field.

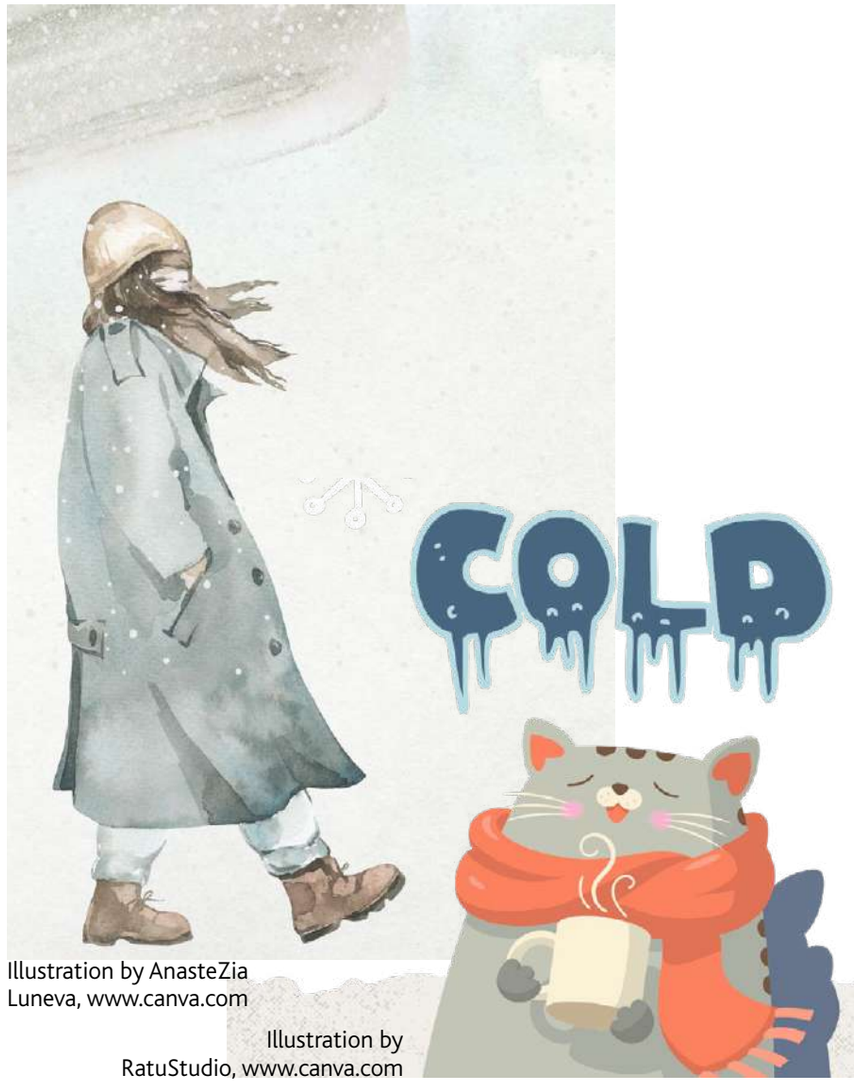
"This technology is gaining attention for its potential to create highly efficient and environmentally friendly cooling systems. Unlike traditional cooling methods, electrocaloric refrigeration does not rely on refrigerants and can be more energy efficient. It's particularly promising for small-scale applications like electronics cooling, offering a compact and noiseless solution. The development of this technology could lead to significant advancements in the way we approach refrigeration in various sectors," says BECIS in their blog '*12 Innovations for Cooling Solutions in Renewable Energy Systems*'.

Another cooling innovation, according to Physics World, is "a new refrigeration method called 'ionocaloric cooling' that could one day replace traditional systems based on vapour compression, reducing the need for gases that harm the Earth's atmosphere and contribute to climate change.

"The method, developed by researchers Drew Lilley and Ravi Prasher at the Lawrence Berkeley National Laboratory in the US, takes advantage of the ways that energy is stored or released when a material changes phase."

Very simply put, it works by adding 'salt' (iodine and sodium, mixed with ethylene carbonate) to a solid, which makes the solid use its own heat to turn to liquid.

Still in the research phase, these not-so-futuristic methods of cooling are considered environmentally benign and may have the potential to offer alternative, effective, sustainable, and environmentally friendly solutions. It's a good indication of just how far innovation will take the future of sustainable refrigeration. **SR**



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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 | www.wilkinsrossglobal.com

BMS Empowering your savings. Ensuring your control.

In the competitive realm of cost-saving solutions, maintaining control over your environment is paramount. In an industry where operational efficiency and cost management are crucial, ROCS stands out with its innovative Building Management System (BMS), designed to empower savings and ensure robust control. Through a combination of technical expertise and practical field experience, ROCS guarantees substantial savings for retailers, enhancing their Return on Investment (ROI) through meticulous site audits and strategic management.

The fundamental premise of effective cost and asset management is measurement. Without precise monitoring and control, achieving optimal efficiency becomes a challenging task. ROCS addresses this by providing comprehensive solutions that enable businesses to take charge of their savings actively. By leveraging our advanced BMS, retailers can oversee and manage their mechanical, electrical, and electromechanical systems with precision, leading to significant cost reductions and operational improvements.

What is BMS?

A Building Management System (BMS) is a sophisticated control system used to monitor and manage a facility's mechanical, electrical, and electromechanical services. This includes everything from lighting and HVAC systems to security and energy management systems. In the retail sector, the ability to control and monitor various store areas is crucial for maintaining efficiency and reducing costs.

What we Control and Monitor

In the retail environment, ROCS' BMS extends its control and monitoring capabilities to key areas of the store, including refrigeration, bakery, butchery, Home Meal Replacement (HMR), air conditioners, and generators. Each of these areas represents significant operational costs and, therefore, substantial opportunities for savings. By ensuring that these systems operate efficiently and only, when necessary, our BMS helps retailers minimise waste and maximise their resources.

What do we wish to achieve?

The primary goal of ROCS is to drive savings through intelligent management of energy consumption and resource usage. Specifically, we aim to reduce costs related to KVA (kilovolt-amperes), KW (kilowatts), and diesel. Our system enables retailers to manage their energy load during peak hours, schedule equipment startup and shutdowns effectively, and maintain optimal energy usage levels. By setting a maximum KVA and systematically reducing it through a prioritised shutdown list, we help businesses achieve significant energy savings.

Key benefits

The benefits of implementing ROCS' BMS are multifaceted and substantial. Foremost among them is the potential for immense savings on energy costs. By optimising energy usage and reducing waste, retailers can lower their operational expenses significantly. Furthermore, the system's remote controllability means that store managers can monitor and adjust their systems from anywhere, ensuring constant control and responsiveness.

Another critical benefit is the enhanced reliability and performance of essential store systems. By monitoring and maintaining equipment such as refrigeration units and air conditioners, our BMS helps prevent costly breakdowns and ensures that these systems operate at peak efficiency. This not only saves money on repairs and replacements but also minimises downtime, which can be particularly costly in a retail environment.

In conclusion, ROCS' Building Management System offers a comprehensive solution for retailers seeking to take control of their operational costs and improve their ROI. By leveraging advanced monitoring and control technologies, we provide a platform for significant energy savings and enhanced system reliability. With ROCS, businesses can achieve greater efficiency, reduce their environmental impact, and ensure the optimal performance of their critical infrastructure. Choose ROCS and take charge of your savings today, empowering your business with the tools needed for long-term success and sustainability.

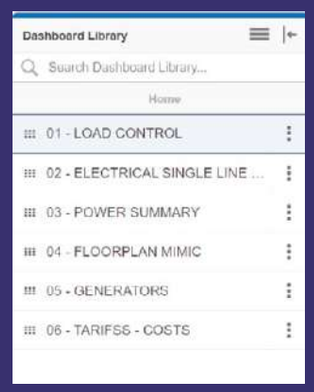
R.O.C.S

What is BMS?

A building management system (BMS) is a control system that can be used to monitor and manage the mechanical, electrical and electromechanical services in a facility.

What we control and monitor

In the realm of retail we control and monitor areas of the store such as: Refrigeration, Bakery, Butchery, HMR, Air conditioners, Generators.

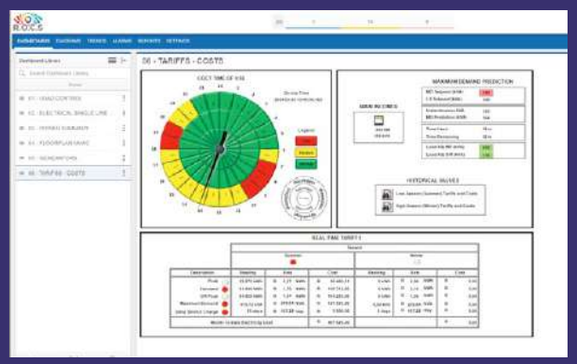


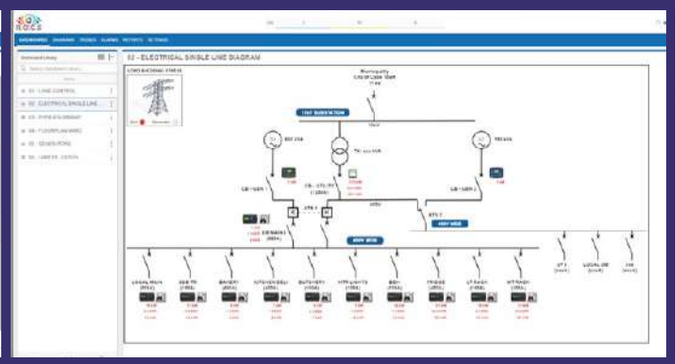
What do we wish to achieve

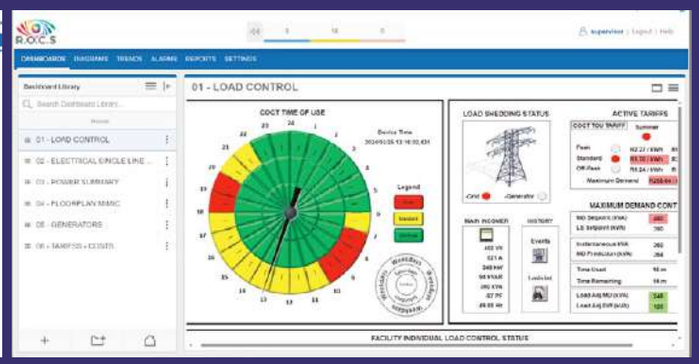
Savings via saving on KVA, KW and Diesel usage.

Manage KW by managing load in peak hours and scheduling start up and shut downs.

Manage KVA by having a set point maximum KVA and shutting down systematically via a priority list to reduce KVA when set point is reached.







Main benefits are immense savings and remote controllability.

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+27 (0)83 290 2565
+27 (0)76 529 9285

michael@rocsafrica.co.za
josh@rocsafrica.co.za