NET ZERO NEWS

Resource Data Management

ANALYSIS

Fuel Retailers and the Move Away from Fuel

Efficient Refrigeration Technology Helps Fuel Retailers Reduce Emissions

SOLUTIONS

DMTouch & miniDM Refrigeration Energy-Saving Options

INTERVIEW

Reducing Embodied Carbon with Open Protocol Strategies

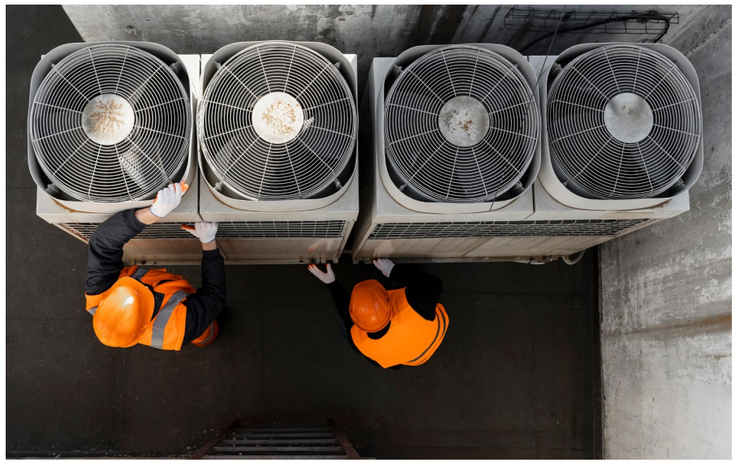
NOVEMBER

FOREWORD

With the switch to electric vehicles accelerating worldwide, petrol forecourts and convenience stores are looking at a loss in revenue. But the industry is showing resilience: new business models including expansions of food retail and foodservice offerings are already successful and are showing the way to what might be possible in the future.

But there is another challenge that fuel retailers are facing worldwide: reducing their carbon footprint to net zero. How can businesses whose expansions are relying on energy-intensive technology reach net zero in time to prevent the worst consequences of climate change?

In this edition of Net Zero News, we will discuss current and future challenges of the fuel retail industry, provide solutions for those challenges, and present industry news and research from around the world.



CONTENTS

Resource Data Management

NEWS

EU'S MAIN TRANSPORT CORRIDORS TO BE COVERED WITH EV CHARGERS

A new EU law has been passed that requires fast EV charging stations of at least 150kW to be installed every 60km (37 miles) along the EU's main transport corridor, the trans-European transport (TEN-T) network, by 2025. The goal is for EV owners to be able to travel across Europe without recharging worries to speed up EV uptake and reduce the EU's carbon emissions.

Governments are expected to provide public on-street recharging capabilities in cities and at stations along the TEN-T. "We are optimistic that in the near future citizens will be able to charge their electric cars as easily as they [can refuel their cars] today in traditional petrol stations," said Raquel Sanchez Jimenez, Spain's Minister of Transport.

The new law also requires recharging stations for HGVs every 60 km (37 miles) along the TEN-T core network and every 100 km (62 miles) on the larger TEN-T comprehensive network from 2025 onwards.

Source: ***https://tinyurl.com/ycy65ysw***

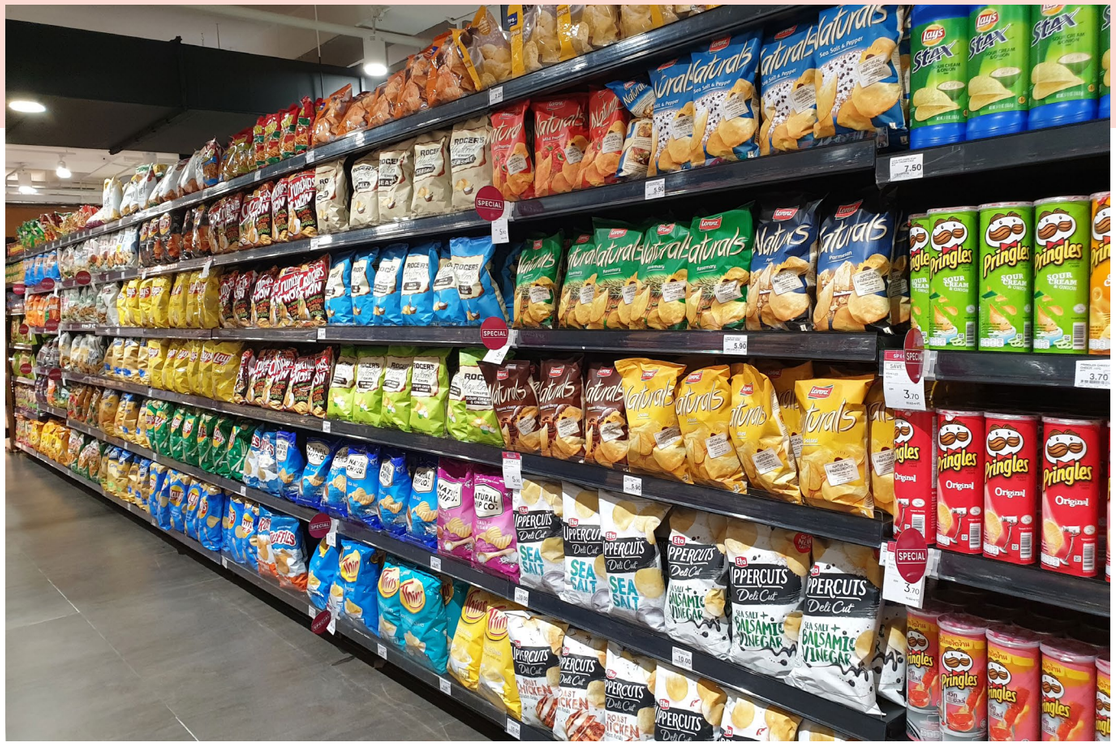
EV GROWTH IN ASIAN MARKETS

Over the course of only a decade, the market share of electric two-wheelers and cars in China has grown from 0.5% to 20% and from 1% to 15% respectively. The growth is due to the government's push for sustainable transportation, supported by incentives, charging infrastructure investments, and a commitment to cutting carbon emissions.

In Vietnam, the market share of electric two-wheelers has increased from 1.5% to 10%. Indonesia is now set to follow the trend of EV adoption set by China and Vietnam. Currently, electric motorcycles only account for 0.2% of Indonesia's two-wheeler market, but studies predict that this figure can change to more than 10% within the next five years. While the adoption rate of EVs is still quite low in Indonesia, investments and market conditions are setting the stage for a significant expansion.

In Malaysia, the uptake of EVs is a little slower due to differences in infrastructure and the lowest petrol prices in the region. New measures to spur EV growth, including tax exemptions for domestic and imported EVs.

Sources: ***https://tinyurl.com/ynbz4ezf***



FOODSERVICE OFFERS SPUR IN-STORE GROWTH OF U.S. C-STORES

In 2022, U.S. convenience store (c-store) sales reached a record high of $814 billion, an increase of almost 23% year over year, according to the 2023 Convenience Store News Industry Report. The industry's fuel revenue rose by 33%, however, this was driven by higher prices as fuel volumes only grew by 1.6% for the year.

A new high was also recorded for in-store sales which increased by 7% compared to 2021. Higher prices due to inflation contributed to this rise in sales, but a 1.5% increase in the industry's store count also positively impacted this figure. Overall, industry gross profits increased 3.3% in 2022, not quite reaching the 5% increase of 2021.

The report also noted that a growing number of c-store operators are enhancing their in-store offers to attract customers to their stores even if they do not need to buy fuel. Sales seem to match this effort, as the growth for in-store profits was higher than fuel gross profits which was due to the impact of the foodservice offerings.

Foodservice offers are integral to c-stores' efforts to increase customer visits without fuel purchases. Looking at sales figures, this strategy seems to be paying out: while in-store merchandise sales rose by 4% in 2022, foodservice sales increased by 19.5%.

Sources: ***https://tinyurl.com/ymyb7fw3***

SUSTAINABLE EXPANSION OF PETROL FORECOURTS AND C-STORES

Fuel retailers are facing two distinct challenges: the phase-out of petrol and diesel cars and the corresponding loss in revenue from not selling fuel, as well as transforming their businesses into net zero operations. Luckily, a single strategy, sustainable retrofits that allow sustainable expansions, will tackle both challenges at the same time.

FUEL RETAILERS AND THE MOVE AWAY FROM FUEL

If EV charging becomes ubiquitous, "it is a death sentence for many of the 8,380 petrol stations in the UK." That's according to a BBC article. The article also briefly touches on other opportunities available for the fore-courts to stay in business but doubt about whether they will achieve to do so is part of the article.

But fuel retailers, not just across the UK but in the US and Asia too, have already been successfully expanding their businesses for over a decade. One forecourt chain recently highlighted that half of its customers across the UK don't even buy fuel.

During the pandemic, when car journeys and the related demand for fuel suddenly decreased, forecourts and convenience stores (c-stores) not just maintained but even elevated their position in communities selling other goods and services. While fuel sales fell by 15%, basket size increased by 30-35%. Consumers have started to visit forecourts and c-stores for their expanded food retail products, but also for their coffee and hot food offerings. Visits have increased to take advantage of the freshly prepared coffee by on-site baristas and of high-quality hot foods.

The same trend is noticeable in the US where kiosk stores, those that sell only fuel and maybe minimal food, continue to decline as customers seek out stores with a wider food and beverage offering. In 2022, in-store sales contributed more to the gross profits of US c-stores than fuel sales did, and foodservice sales increased by 19.5%. Petrol forecourts and c-stores are now part of the communi-ties for the other services they offer.

This trend is forecasted to continue. McK-insey's Global Oil Outlook to 2040 expects non-fuel retail to offset declines in fuel sales and predicts that the global forecourt value pool will rise from USD 22 billion in 2019 to USD 30 billion in 2030. EV charging, currently accounting for less than USD 0.1 billion, is expected to reach USD 20 billion by 2030.

These trends and figures are in stark contrast to the disappearing forecourt prediction. Fuel retailers are not just here to stay but there is also scope for future expansions. And with this expansion, especially one that includes an increased offering of refrigerated and hot food, energy-efficient technology will be key to ensure that businesses achieve net zero.

Sources: https://tinyurl.com/2p7huvxv
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EFFICIENT REFRIGERATION TECHNOLOGY HELPS FUEL RETAILERS REDUCE EMISSIONS

Offering a larger chilled foods selection is a key part of the shifting business model within in the changing petrol forecourt and c-store industry. Efficient refrigeration controls and technology can help reduce the system's energy demand to a minimum to ensure businesses are still on track to reaching net zero.

One way to increase the sustainability of a business is to invest in new technology. This can be in form of clean energy technology such as solar panels or heat pumps. Another option is to invest in new refrigeration technology and adding doors to chillers which can decrease energy consumption. Using natural refrigerants such as CO_2 or ammonia can dramatically reduce the system's environmental impact.

But purchasing and installing new technology can be expensive and it can increase a business's embodied carbon footprint if current, well-functioning equipment is decommissioned and sent to landfills prematurely.

Instead, there are ways to make the existing HVAC and refrigeration system more efficient and ensure that expansions are sustainable.

It all starts with data analysis. Before any changes are made, it is essential to capture and analyse operating data to understand the inefficiencies and scope for improvement. If PLC software is already in place to control the HVACR infrastructure, it can be updated to include the lessons learnt from the data analysis. If a new PLC strategy is introduced, it can be created to be as efficient as possible from the beginning.

> "Many forecourt businesses have benefitted from a well-tailored PLC strategy," Adrian Westrup, Head of Sales UK & EMEA at Resource Data Management (RDM), commented. "Controlling heating and air conditioning via a PLC strategy instead of relying on manual control has delivered huge energy savings for businesses.

> "Controlling heating and air conditioning can be adopted by businesses across industries but we have also developed strategies specifically for refrigeration in the forecourt industry. For one client who

ANALYSIS

offers chilled alcoholic beverages, we developed a strategy that helps them save energy by incorporating the specific sales aspects of the product.

"That means that in the morning when there will be little to no sales of these products, only the lights of the alcoholic display case are turned on but not the refrigeration. Turning the lights on will present a visual cue to customers in the store that the store is operating, but the refrigeration is not needed until later in the morning when customers will first start to purchase alcoholic beverages. The refrigeration system is switched off and on again later in the day, making use of the ability of a refrigerated cabinet with doors to keep temperatures cool for some time.

"This type of strategy would also work well in regions where laws prohibit the sale of alcohol during specific times of the day such as in Scotland or various US states."

When developing a PLC strategy, it all comes down to recognising areas of opportunity in individual circumstances to reduce equipment operating times by looking at the requirements for individual components of the HVAC system, rather than tying everything into a wider strategy that overlooks specific requirements and thereby wastes energy.

Another advantage of data capture, specifically on the performance of HVACR equipment, is proactive maintenance.

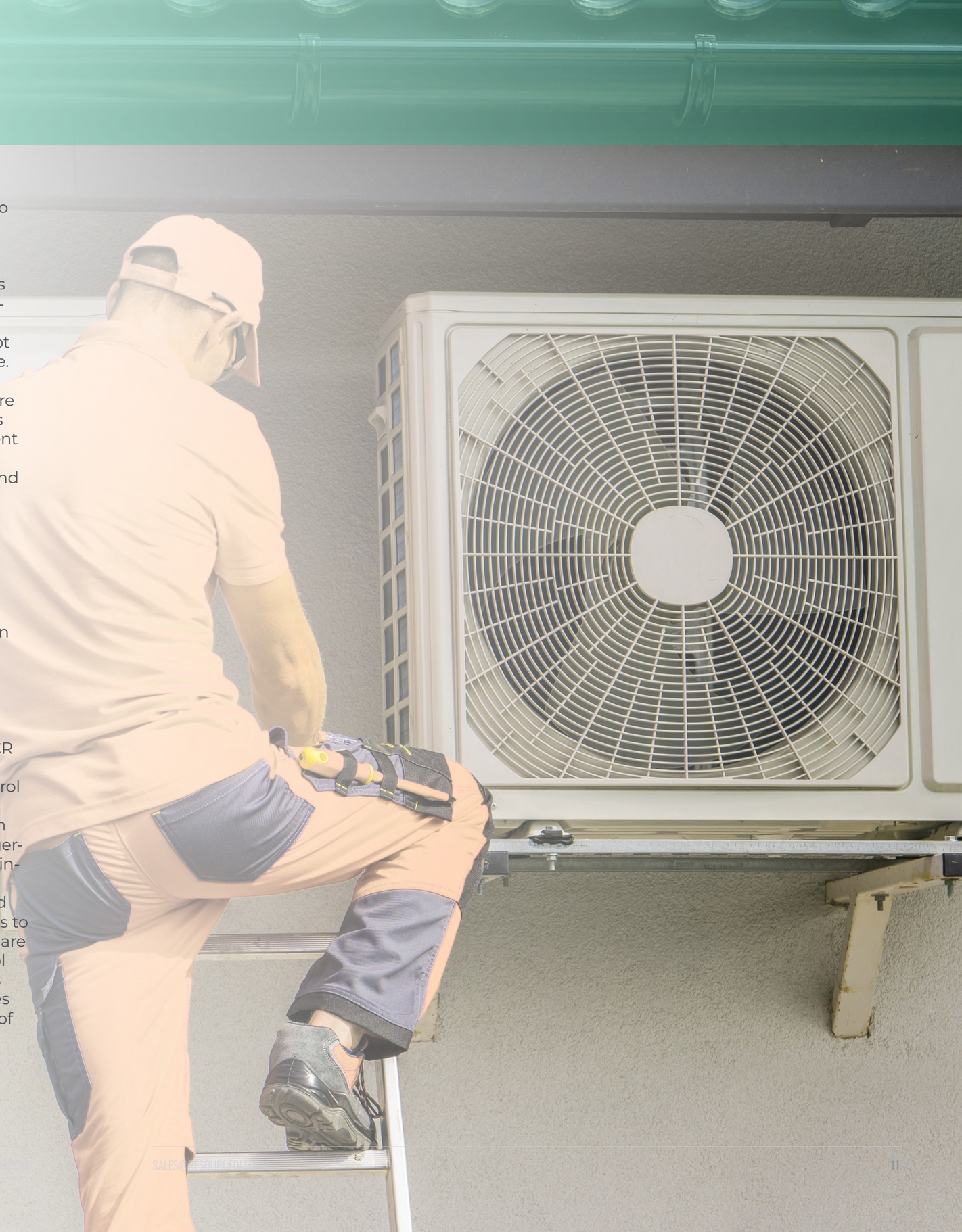
"Adopting a proactive approach to service and maintenance rather than a reactive one will keep HVACR equipment operating as efficiently as possible," Mr Westrup continued. "Monitoring the health of HVACR equipment and fixing issues before they become serious is essential to ensure that equipment lifespans are extended for as long as possible to reduce waste and keep replacement costs low."

Another aspect where businesses can increase efficiency and save operating costs are upgrades and retrofits. If any HVACR controllers or units in the system need to be replaced, some manufacturers might stipulate that the wider control system or other HVACR units need to be replaced as part of the upgrade.

However, this is not always necessary. If other controllers or units are still functioning as required, it is not necessary to replace those. Replacing the infrastructure only as needed is more cost-effective and ensures well-functioning equipment is kept out of landfills and instead is used until the end of its life.

To be able to replace individual HVACR controllers as needed, it is essential to choose those that are based on open protocol communication. These can be included in the HVACR strategy where they can communicate with the existing controllers.

When updating the HVACR controls system, ensuring that the refrigeration control and monitoring system is as efficient as possible can bring huge savings. Refrigeration systems are energy-intensive, which, due to the smaller size of c-stores and petrol forecourts translates to a high energy use per square meter/foot. Various control and monitoring strategies are available for businesses to reduce the energy use of their refrigeration system.



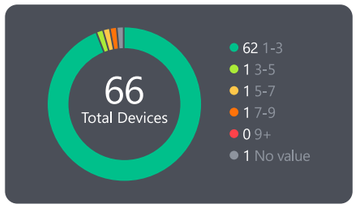
SOLUTIONS

DMTOUCH & MINIDM REFRIGERATION ENERGY-SAVING OPTIONS

Resource Data Management (RDM) is a strong proponent of achieving energy savings through our controllers' software features and our system architecture. We have developed six core energy-saving software features for refrigeration temperature control applications that have delivered savings for our customers for years. These features can be enabled on either of RDM's control systems front-end: miniDM or DMTouch.

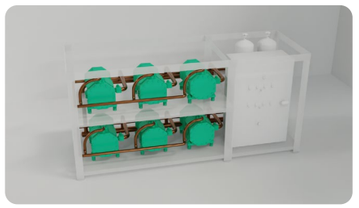
ANALYSIS

ENERGY-SAVING SOFTWARE FEATURES



TEMPERATURE PERFORMANCE INDICATOR (TPI)

This feature monitors the performance of a refrigeration case or coldroom based on several variables such as temperature alarms. It allocates a Temperature Performance Indicator (TPI) score which highlights poorly performing equipment, providing a predictive maintenance solution, helping users to easily identify faults before they become a costly issue.



PACK (RACK) OPTIMISATION

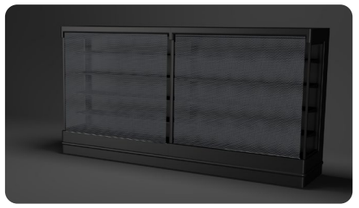
The Pack/Rack Optimisation feature leads to a 10-30% reduction in energy use while delivering the same temperature control. Pack/rack optimisation enables the target pressure of a pack/rack controller to be adjusted in response to the average valve openings of the evaporators. If the evaporators are satisfied, the pack suction pressure setpoint floats up to improve system efficiency, resulting in decreased energy usage of pack compressors.

CONDENSER TD (TEMPERATURE DIFFERENTIAL)

The Condenser TD feature monitors the efficiency of condenser units. Three probes are fitted to the condenser to measure liquid return, discharge, and ambient air temperature. The front-end system will report three escalation levels of alarm, providing early notification of a condenser performing inefficiently.

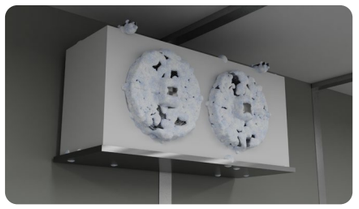
NETWORK TRIM (ANTI-SWEAT) CONTROL

Using the Network Trim feature can lead to 30-50% reduction in trim heater load power. The feature instructs the cabinet/case controllers to adjust their trim heater output levels according to humidity and temperature conditions. The trim heaters will prevent condensation using optimal power and will constantly adjust to changing atmospheric conditions. The trim heater output can also be automatically reduced at night time when the facility is unoccupied. Even by simply reducing the maximum output to 70%, energy consumption is instantly reduced by 30%.



NIGHT BLINDS CHECK

Night blinds installed on an open-air refrigerated cabinet/case, when deployed after store trading hours, can reduce the power requirement of the cabinet/case by up to 40%. DMTouch or miniDM can ascertain if the night blinds have been used and generate an alarm if they have not. Both front-end systems can also produce a report detailing night blind use for the store.



DEFROST WARNING

The Defrost Warning feature alerts users if consecutive defrost cycles terminate on time setpoint instead of the temperature limit. If a defrost cycle terminates based on time limit, then the evaporator may not have cleared all the ice which will affect efficiency and increase energy use. A defrost limit can also be configured. This will produce an alarm if an evaporator has more than the pre-set amount of defrost cycles per day, highlighting potential energy waste.

DMTOUCH AND MINIDM

Find out more about DMTouch and miniDM, RDM's control and monitoring systems front-end that both feature the same innovative refrigeration efficiency control options: resourcedm.com/products/control-system-front-end-dm-touch-minidm/

INTERVIEW

Christopher Edwards
As a Technical Applications Specialist at Resource Data Management (RDM), Mr Edwards has delivered many projects over the years that reduce businesses' embodied carbon.

REDUCING EMBODIED CARBON WITH OPEN PROTOCOL STRATEGIES

If a single component of an HVACR system that uses proprietary protocols fails, other units within the system, units that are still functioning perfectly well, often need to be replaced as well. In this interview, Chris Edwards, Technical Application Specialist at Resource Data Management (RDM), discusses how an alternative approach allows replacing only the failing component, reducing embodied carbon in the process.

Sustainable retrofits are an important part of the net zero journey. They can be sustainable in two aspects: producing a more efficient system that reduces operational carbon emissions, and prolonging the equipment lifespan to reduce embodied carbon.

Unfortunately, increasing the lifespan of equipment is often not easy for businesses. If a single component of an HVACR system fails, businesses are often given the bad news by manufacturers that other units within the system, units that are still functioning perfectly fine, need to be replaced as well to fix the problem. Why do units that are perfectly fine need to be replaced?

There is no logical answer to this question. That's why, at RDM, things are done differently.

If a single component of an HVACR system fails, RDM replace this single component and leave other, well-functioning units in peace. This goes back to one of the founding principles of RDM: reducing waste and preserving valuable resources.

Replacing well-functioning equipment is expensive and creates unnecessary waste, thereby increasing the embodied carbon. It also requires resources to build the redundant replacement unit. Which increases the embodied carbon footprint even further and creates another obstacle on the road to net zero.

Chris Edwards, Technical Applications Specialist at RDM, has worked on many projects that have delivered savings for his clients and reduced their carbon footprint by only replacing equipment if necessary. He discusses how this has worked in practice:

> "Businesses across industries have benefitted from our strategy. Especially because it is possible to replace units at any point in the system, whether that is an air handling unit, a controller managing the heating, or the control system front-end, over the years we have replaced units at any point in the HVAC infrastructure.
>
> "Using this strategy, businesses only need to purchase a replacement when necessary, saving costs and reducing their carbon footprint."

Some facility managers might now ask how we do this. At their facility, they have units from multiple manufacturers in their system and those units are refusing to talk to each other. How would introducing another manufacturer's equipment solve their problem of a single-unit failure without causing problems in the whole system?

There is an answer to this question: RDM's control and monitoring solutions are based on open protocols. This means RDM products can communicate with the existing ones and serve as a translator between the third-party products that are so far not talking to each other. PLC software TDB can then be used to create a control strategy that efficiently manages the HVAC infrastructure.
The result: a well-tailored control and monitoring strategy that encompasses the entire HVACR system and that can be controlled from one central front-end system.
Using an open protocol solution offers another advantage: future-proofing the system.

> "When exploring possible solutions," Mr Edwards explains, "I ask clients to not only consider their requirements for today but also consider the ability to adjust and expand the system in the future without being locked into manufacture-set upgrade paths.
>
> "This is important; even on low-energy sites we have been able to add fantastic improvements in comfort, control, and visibility while still achieving an ROI of less than four years."

Keeping equipment until the end of its lifespan and setting up a control strategy that manages all units, regardless of manufacturer, is one easy step businesses can take to keep costs low and reduce their operational and embodied carbon to help them on the road to net zero.

BATTERY SWAPS – WILL THEY BE THE FUTURE OF EV CHARGING?

Swapping batteries of EVs instead of recharging them is showing a mixed picture across countries. In China, the option to swap out batteries in one minute seems to have spurred on the uptake of electric scooters. Battery-swapping stations that resemble vending machines allow drivers to simply swap out their own batteries in less time than it takes to fill up with petrol.

Pilot programmes are being rolled out in Indonesia, the Philippines, and India, and plans are in progress for a programme in Malaysia. If swapping batteries will be as popular in those countries as it is in China, it will have a significant impact on their emissions. In India, for example, motorcycles and rickshaws account for one-third of fuel consumed on the roads.

In Western countries, where electric scooters are not as prominent, this concept has yet to take off. A few ideas were tested for electric cars but they did not work out in the long run. Other concepts of swapping batteries might work better in the future but there is no indication yet whether they will be adopted.

In the US, industry experts have said that battery swapping will not become the main way of delivering full charge to an EV due to lacking customer faith and previous investments in charging infrastructure, but that it could be a smaller-scale alternative. Some businesses that rely on a fast recharge turnaround time, such as ride-sharing or delivery businesses, would benefit from a battery swapping model.

What would the availability of battery swaps mean for forecourts and c-stores? Many factors of the EV charging future are still uncertain, but whichever direction this goes, forecourts and c-stores are already establishing their businesses in communities with their extended offerings, regardless of which way the EV charging will evolve.

Sources:
https://tinyurl.com/4pjw3zjy
https://tinyurl.com/2rd26uh9

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CONTACT US

RDM Head Office
Glasgow UK
+44 (0) 141 810 2828
sales@resourcedm.com

RDM Asia
Subang Jaya, Malaysia
+603 5022 3188
asiasales@resourcedm.com

RDM USA
New Hope, MN, USA
+1 612 354 3923
usasales@resourcedm.com

Visit **www.resourcedm.com** for more information on RDM solutions.