NET ZERO NEWS

Resource Data Management

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Farmers at the Frontlines against Climate Change

SOLUTIONS
Introducing an Innovative Solution to Increase Refrigeration Efficiency

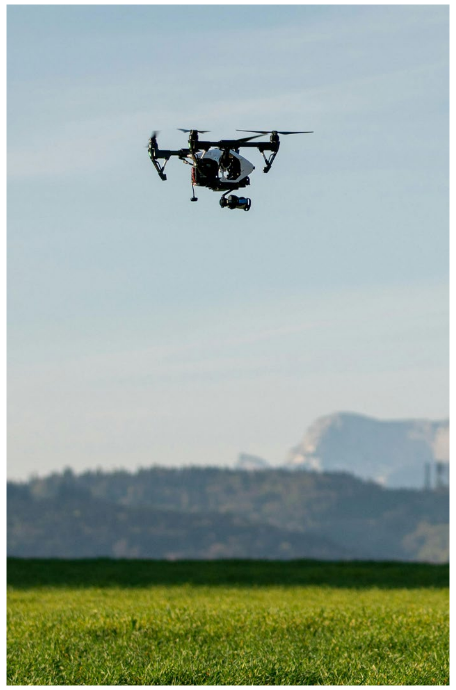
INTERVIEW
Reducing Food Waste & Energy Use with Refrigeration Technology

JULY

FOREWORD

The agricultural industry is witnessing the impact of climate change firsthand. Farmers are trying to protect their businesses and our food supply from the worst of its consequences. During these increasingly challenging times, refrigeration and the cold chain are essential to ensuring food security for our growing global population that is depending on an interconnected food supply.

In this edition of Net Zero News, we take a look at the issues that farmers are facing worldwide, analyse the impact of climate change on their business, and provide a few solutions for efficient, stable refrigeration to reduce food waste while keeping the impact on the environment to a minimum. As always, we're also looking at research, this time from a university in the Netherlands, that is dedicated to developing a net zero farm.



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NEWS

BRITISH FARMERS PREDICTED TO LOSE ALMOST £1BN AFTER RECORD RAINFALL

The Energy Climate and Intelligence Unit (ECIU) has calculated that British farmers growing crops will see their revenues decline by £890m this year. This is due to persistent wet weather across the UK, with the period between October 2022 and March 2024 being officially the wettest 18 month on record.

The ECIU included only wheat, barley, oats, and oilseed in their calculations which means that the impact on the whole farming industry is likely to be even higher if other crops and livestock are considered too.

According to researchers, the type of wet and stormy weather that the UK experienced over the last few months is now ten times more likely due to the impact of climate change. The severe wet weather is now likely to happen once every five years and once every three years by the end of the century.

The National Farmers Union (NFU) has published a poll of its members which showed that flooding has impacted eighty percent of members and is now a key concern.

Sources: https://tinyurl.com/mr3yc6v3

EXTREME HEAT IN SOUTHEAST ASIA THREATENS LIVES AND FOOD SECURITY

An unprecedented spell of searing heat has arrived in Southeast Asia as early as April. Deaths from heat strokes have been recorded in the region as people's health is suffering in the extreme heat.

Further disastrous consequences are due to arrive later in the year during harvest time. The region's yield will be less than expected as crops have already been destroyed by the severe heat.

In Vietnam, whole rice fields have dried up triggering a state of emergency in the country. Water levels in canals have fallen so much that farmers are struggling to transport their crops. In Thailand, farmers' debt will increase by 8% this year due to a lower crop yield. In Malaysia, the authorities have used cloud seeding in areas that didn't get enough rainfall.

Sources: https://tinyurl.com/y82et333

US FARMERS USE AI TO REDUCE IMPACT OF CLIMATE CHANGE

AI technology has been adopted on many American farms and the federal government is currently fast-tracking the agriculture industry towards using it. The push to adopt AI across nearly two million American farms is supported by financial incentives to speed up the development and deployment of AI.

The US labour shortage has already encouraged the uptake of AI but the climate crisis has been the tipping point. Erratic weather has made it more difficult to predict growing conditions and is reducing crop yields which means that climate change might lead to less food sooner than expected.

While some AI technology such as GPS and drones are already in use, technology is being developed that will enable precision agriculture which will lead to more profits for farmers and use less resources, energy, chemicals, and water. Other sophisticated methods include precision delivery of resources, soil surveillance, pathogen contact tracing, and robotics to help with harvesting.

Sources: https://tinyurl.com/yfr4vsw8

ANALYSIS

FARMERS AT THE FRONTLINES AGAINST CLIMATE CHANGE

CLIMATE CHANGE IMPACTING LIVELIHOODS & FOOD SECURITY

Farmers are feeling the impact of climate change first-hand, seeing their crops drowned or scorched. At the same time, they are responsible for producing enough quality food to ensure food security and for implementing measures to help mitigate climate change.

If you're a farmer and you're feeling frustrated that you're not able to do as much for the climate as you'd like to, you're not alone. According to a recent survey, 82% of British farmers feel guilt or frustration at the fact that they had to put climate action on hold due to rising costs[1]. It is not surprising that farmers had to make the tough decision to delay environmentally-friendly projects, as globally, there has been an average income reduction for farmers by 15%[2].

This income reduction is due to the consequences of climate change, illustrating that farmers are stuck in a vicious circle of cause and effect. A circle that is impacting all of us as we depend on the industry to provide our food, and food security has become a stronger concern for many nations. In recent years, the output of key crops was reduced sharply in the EU due to widespread droughts and other adverse weather conditions[3]. Given how interconnected our food supply systems are, this has the potential to become a crisis on an international scale.

A recent study showed that 70% of farmers across the globe have seen the impact of climate change on their crops2. And despite the rising cost of living crisis, rising energy prices, and declining profits, farmers still want to take action to achieve net zero. Even more so than the general public as a recent poll has shown[4]. Perhaps this is because farmers are on the frontlines when it comes to experiencing the impact of climate change, witnessing flooded fields from too much rain, scorched crops from too much heat, wildfires, and having to deal with increased insect pests.

For the agricultural sector, reaching net zero goes far beyond reducing emissions. Farmers are also being asked to improve soil health and fertility, accelerate carbon sequestration, improve water and air quality, and optimise biodiversity. Addressing these issues is important to slow down global warming, but any actions are costly to carry out.

But researchers have been working hard for years to develop solutions and innovative technologies from around the world show what might be possible in the future.

One such case study comes from Germany, where a farmer is successfully using solar panels on his fields[5]. So far, this had been an either or scenario: either space had to be given up on fields for solar panels, or the space continued to be allocated for crops. In this case, however, the solar panels were installed among the crops and provide electricity for the whole farm. In the summer they generate surplus energy that can be sold back to the grid.

How well the method works depends on the weather and which crops are planted. If there is too much rain, the water is distributed unevenly, but planting crops with different water needs strategically might be a solution. During droughts, the plants benefit from the shade. In places where there is little rain, such as Arizona, the technology has proven successful protecting crops from the sun. The project is still being tested and refined but it is a good example of what might be possible in the future with technology.

There is also less complicated technology available for farmers who want to take action now. Given the lower output of crops it is now more important than ever to ensure that the harvest doesn't spoil. And this is where farmers can turn their frustration about being unable to do more for the climate into action.

Cost-effective technologies are available for farmers to improve the efficiency of their refrigerated storage spaces. These will help decrease food waste and increase product quality while saving energy at the same time. The money that was saved on energy bills can be re-invested in other net zero technology or biodiversity projects that will help protect the climate and their farm in the long run.

Sources:
NatWest Group:
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https://tinyurl.com/bdhyw6ps
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https://tinyurl.com/26fnpatc
Reasons to be Cheerful:
https://tinyurl.com/rpvcsju7

INTERVIEW

Tim Thain
With over 20 years' experience in refrigeration and building services engineering design and projects, Tim Thain has helped many businesses increase the efficiency of their refrigeration systems.

REDUCING FOOD WASTE & ENERGY USE WITH REFRIGERATION TECHNOLOGY

A global study has shown that farmers have seen an income reduction of 15%[1] due to climate change, and the majority is looking for ways to help fight global warming. How can refrigeration technology help?

Refrigeration is a cornerstone of our food production system. From the moment a crop is harvested to when it lands in the refrigerator at home, the ability to store food at the correct temperature will improve food security, safety, and reduce waste.

Refrigeration helps to protect crops in storage, ensures regulatory compliance, and extends the shelf life of the products. Refrigeration helps build resilience in our food system. When food is destroyed due to spoilage, it's not just the crops, money, energy and work-hours that are lost. Food is the largest user of water on the planet, and so reducing food waste will have a direct impact on the usage of key resources.

However, simply running a refrigeration system is not enough. It is important that the systems are operating efficiently to ensure that the running costs and emissions are as low as possible. When combined with the wider built environment, such as humidity control, it may also increase the yield for certain crops.

According to CIBSE, new research has found that cooling accounts for 15% of UK electricity consumption. Furthermore, without action to promote sustainable refrigeration and air conditioning, it could contribute half a degree to global warming[2]. This in turn will have an adverse effect on crops and livestock.

Would refrigeration technology be expensive to implement?
Not at all. An efficiently controlled refrigeration system will be a wise investment, when considering the energy savings and food protection that it offers. In cold storage facilities with an existing refrigeration control infrastructure, it can also be very cost-effective to not replace the entire controls infrastructure at once. Instead, a central control and monitoring system front-end can be installed first.

With our open protocol solutions, it is possible to start with the installation of a front end, because it can communicate with the existing third-party controls. The third-party controls can then be replaced as and when required. This builds up a control and monitoring infrastructure across the estate slowly, without needing to replace still functioning equipment. It saves installation costs and reduces waste as it prevents equipment from going to landfills before it has reached end of life.

Given how important it is to ensure optimal conditions to store the harvest, what happens if there is a fault in the system?
Our systems can provide alarms to alert users of problems. The alarms can be set according to different criteria. Temperature alarms can alert users if the temperature rises above or falls below a certain threshold that would cause spoilage or deteriorate product quality.

Alarms can also be set to alert staff to equipment issues that would lead to inefficiencies and high energy use. Setting up alerts, users can take a proactive approach to manage their estate, instead of a reactive one, thus reducing the risk of stock losses, preventing equipment problems, and saving time and money dealing with maintenance issues.

Our systems can go further by supporting businesses with optimising their refrigeration systems to ensure that they are operating as efficiently and smartly as possible. We empower our customers to take a data-led approach by providing the data they need to optimise or install efficient refrigeration systems. Data can also be used on a wider scale to measure the effectiveness of sustainability plans, helping businesses assess if they're going in the right direction or meeting targets. Using a data-led strategy helps build a resilient and sustainable business.

Our systems can be accessed remotely, with 24/7 monitoring. However, our customisable solutions go much further than this. It is possible to create a bespoke control and monitoring system that meets the exact needs of your business. For instance, you can control a farm's soil irrigation system or finetune environmental conditions for growing chambers. Farmers can access all devices across their whole estate, and have the power to make changes and adjustments to react to changing environmental conditions, such as temperatures, humidity, and CO_2 levels.

How can farmers be sure that the crops are stored at the right temperature?
Our open protocol control and monitoring solutions provide the ability to monitor and log all refrigeration temperatures including those from third-party sensors and store data for regulatory compliance. These can be accessed at any time, and from any location via a web browser.

Users can also access their data in real time, providing much needed insights into the operation of their estate. Given the importance of storing crops at the correct temperatures and humidity levels, it is again essential to have access to data to spot any problems or inefficiencies as early as possible.

Accurate control of an estate is one aspect of decarbonising your built environment. When part of wider measures, such as installing heat pumps or passive environmental technologies, it is possible to reduce your operational energy and fugitive emissions.

Sources:
Bayer:
https://tinyurl.com/bdhyw6ps
CIBSE:
https://tinyurl.com/ycks43jj

SOLUTIONS

REDUCE WASTE WITH THIRD-PARTY CONTROLS INTEGRATION

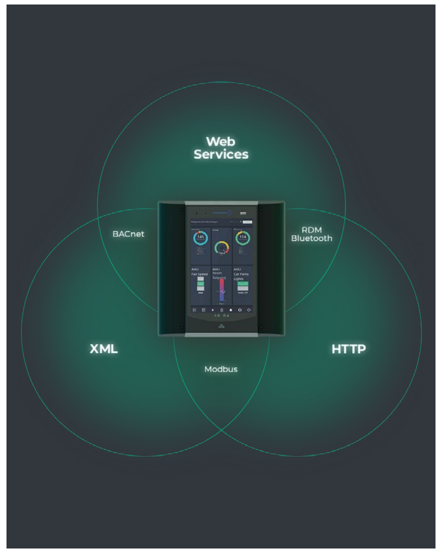
SAVING ENERGY AND RESOURCES

Installing an efficient refrigeration system in cold storage areas ensures that agricultural produce is preserved in optimum conditions to prevent food waste. It also saves energy compared to inefficient systems.

While it is important to have refrigeration equipment with a high energy efficiency rating, the control system for the refrigeration equipment is just as important. A control strategy that is set up correctly ensures that the efficiency rating can be used to its full potential.

Integrate an existing control system into a single front-end device
A centrally controlled refrigeration system works better than a system in which different components are controlled separately. Only when all components work with each other can they achieve the best results.

If components are controlled separately, this is either due to an inefficient control strategy or it's due to different manufacturers' control devices being installed. Both problems can be solved by installing a central front-end device that can manage control devices from different manufacturers as part of one overarching strategy.



Third-Party Integration Using Open Protocols
Integrating refrigeration controls and sensors from multiple manufacturers into one control strategy allows creating an efficient refrigeration system that reduces energy use and ensures product quality. This is only possible if the control and monitoring system front-end is based on open protocols.

Control and monitoring system front-end DMTouch is based on open protocols to help businesses create an integrated control system. This front-end device can control and monitor third-party HVAC and refrigeration controls and sensors.

DMTouch can be integrated into an existing control and monitoring infrastructure. Because it can communicate with third-party legacy devices, those devices do not have to be replaced when a DMTouch front-end is installed on site. This saves resources, reduces waste, and presents a cost-effective solution.

Energy Management
Software features of the DMTouch for controlling and monitoring refrigeration systems help achieve energy savings and create optimum temperature conditions. They also provide data insights that facilitate predictive maintenance and the improvement of operating efficiency.

The features include options to view the temperature performance of a cold storage facility at a glance to easily spot underperforming storage spaces. Users can also gain 10-30% of energy savings by utilising a software feature that optimises evaporator performance. Other features can ensure that condensers are operating as energy efficiently as possible.

DMTouch can also be configured to monitor metered consumables like water, gas, and electricity. DMTouch can use the data to provide consumption statistics, predict budgets, provide warnings, and display trends to help businesses adhere to energy management strategies.

SOLUTIONS

Onsite and Offsite Monitoring
Users can see critical operating data onsite on the DMTouch's touch-screen or offsite using a web browser. Data can be viewed from anywhere with internet access, allowing users to check refrigeration temperatures or energy consumption. Temperature alarms can also be sent via email or SMS to provide peace of mind that nothing goes undetected while being away from the site.

Temperature Compliance
DMTouch securely logs and stores temperature data from cold stores. Temperature data can be logged as often as every fifteen seconds and stored for up to ten years for food safety and regulatory compliance purposes.

NET ZERO

RDM'S NET ZERO JOURNEY

Over the past few months, we have increased our focus on the concept of reduce, reuse, recycle. RDM has been founded on the idea of efficiency and reducing the impact on the environment by developing solutions that increase a building's efficiency and in turn reduce emissions. Concerned with how humanity is leaving the planet for the next generation, we have continuously developed our solutions to improve emissions' savings. We are now looking at new ways to reach net zero by reducing our emissions, reusing old equipment, and recycling where possible.

Reduce
We have already reduced our scope 2 emissions to zero by switching to renewable electricity.

Over the next year, we are looking to reduce our scope 3 emissions by 5-10%. We'll be focusing on three areas specifically to achieve this:

- Business travel: reducing emissions from this activity by holding virtual meetings where possible. Our entire electric business car fleet ensures that customer visits can be carried out without emissions.
- Purchased goods & services: we'll increase our work with suppliers who have a strong focus on reducing their carbon footprint
- Waste management: a newly introduced recycling scheme will reduce the waste sent to landfills

Reuse
As part of our efforts to reuse old material, we have donated old equipment to the community or staff.

Unused plastic pallets have been donated to a Glasgow-based school art project. Old flower planters have found a new home in a staff member's garden and out-of-date PC screens were given away to those who needed them.

Recycle
We recently introduced a new recycling scheme in the office following a poll if staff would support this and it received a firm yes from 100% of staff. Under the new scheme, paper, plastic, and food waste are separated from regular waste in easily accessible bins.

ECOVADIS

RDM AWARDED BRONZE SUSTAINABILITY RATING FROM ECOVADIS

We are pleased to announce that we were awarded the bronze sustainability rating from EcoVadis.

To achieve this rating, RDM completed a comprehensive evaluation of our sustainability practices. EcoVadis represents an impartial global standard for corporate sustainability ratings. Their evaluation considers 21 sustainability criteria grouped into four main themes: sustainable procurement, labour & human rights, ethics, and environment.

This Bronze rating shows our ongoing efforts to reduce our impact on the environment, taking continuous steps towards reaching net zero. As a company, we are determined to reduce emissions even further to become a fully sustainable business.

Ged Evans – RDM UK Managing Director – commented on the achievement:

> RDM considers itself to be a leader in sustainability efforts and we want to continue to challenge our suppliers, our processes, and our people to improve from our current standard. As we all know, everything around sustainability is at the front of many business decisions. With the support of our parent company Sdiptech we are in a great position to become a leader within our business sector supporting our customers with hardware and software solutions to meet their own sustainability strategies.
>
> We have recently employed a sustainability coordinator to work across the RDM group and our people will work closely with them to improve all areas in line with our goal to achieve the gold award in the coming years.

RESEARCH

UNIVERSITY TEAM LOOKS TO DEVELOP ZERO FOSSIL FUEL FARMING SYSTEM

In the Netherlands, the second biggest exporter of agricultural goods worldwide, researchers are looking for new farming methods that reduces the pressure on the nation's environment. A team at Wageningen University is working to create a high food production farm system with zero fossil fuel energy use, with no damage from pesticides, resilient to heavy rainfall or very long dry periods.

A recent BBC report discusses their approach. One of their current experiment focuses on crop diversity. The team is sowing eight different crops at one time into a field, including wheat, potatoes, and broad beans. They also use cover crops to help improve the soil and biodiversity.

Crop diversity is resulting in a more efficient use of water, has a lower risk of pest disease, a higher biodiversity, it's better for the soil, and it gives higher yields. Perennial flower strips ensure that there is food and shelter for insects when the crops are harvested.

The team is focusing on sustainable production to regenerate soil and biodiversity, to counteract the effects of large-scale and uniform agricultural production.

The researchers have also worked on a method that tackles two effects of global warming: heavy rainfall and long dry periods. They have created a drainage system that gathers excess water during heavy rainfalls and pumps it underground. This water can then be used during dry weather periods to water the crops.

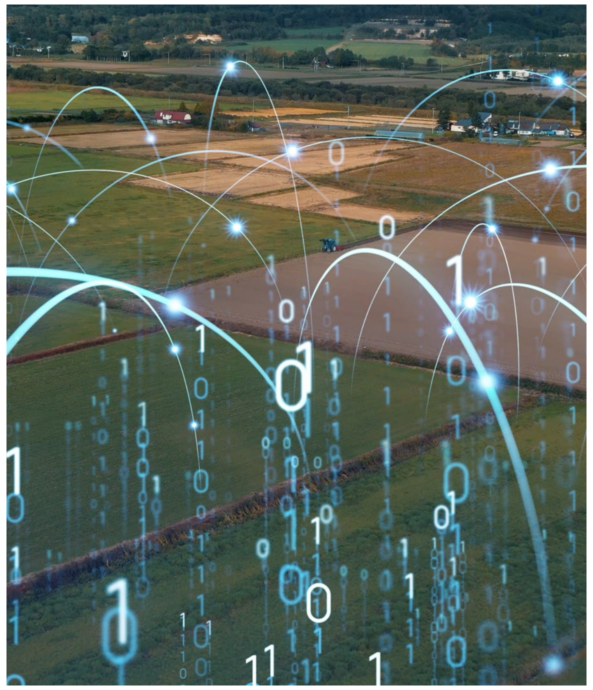
At the university's farm, the researchers have also invested in technology that recognises weeds to help make the farm's production stronger and more sustainable. Instead of spraying all crops, the machine distinguishes the weeds from the culture plant and sprays a small amount of germicide accordingly.

On a farm in the southwest of the Netherland, a third-generation farmer is also turning to technology to create a more sustainable business. GPS technology assists him in precision farming to measure, analyse, and research his crops efficiently to achieve a higher yield.

Soil scanning technology allows mapping and documenting every square meter of soil which allows finding the good spots and improving the rest. Another option to improve sustainability is variable rate irrigation which provides pre-planned levels of water when needed.

The key benefit that this and other type of AI technology provides is access to data, to understand problems, analyse them, and find solutions.

Sources:
https://tinyurl.com/4k6484ab



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