

## CASE STUDY: CO<sub>2</sub> System installation for Bidfood

## PROJECT: Slashing energy consumption

Star Refrigeration has successfully installed two dual temperature refrigeration systems in a newly built temperature controlled storage distribution centre for Bidfood in Glasgow. The systems provide cooling to a new freezer, chill store and marshalling area and have been in full operation since November, 2022.

The two refrigeration systems use carbon dioxide (CO<sub>2</sub>), a sustainable, future-proof natural refrigerant that does not fall under the F-gas regulation. It has zero ozone depletion potential and a global warming potential of just 1.



### The customer

Bidfood is one of the UK's leading suppliers to the food service industry. The food wholesaler and distributor has been in business for nearly a century, supplying fresh, frozen, ambient and chilled food as well as an extensive range of catering equipment and non-food essentials to customers across various sectors.



Bidfood's vision is to be a positive force for change and has set ambitious carbon reduction targets; they have aligned with max 1.5°C global warming for scopes 1 and 2, and well below 2°C for Scope 3. Their ambition is to have reduced absolute carbon emissions by at least 90% by 2045 (against a 2019 baseline), with the residual offset, which is a science-based approach toward achieving net zero.

### The solution



Star's CO<sub>2</sub> based refrigeration system is located externally, adjacent to the building and serves the main freezer chamber and accompanying chill stores at Bidfood's Glasgow facility. The site also

contains a fleet of temperature-controlled vehicles for transporting meat, chilled foods, alcohol and supplies to the catering industry.

The freezer operates at a temperature of -25 °C with a design cooling duty of 245kW, and the chill areas operate at +2°C and have a combined cooling duty of 268kW.

There are four coolers within the freezer chamber, two in the main chill area and six in the other. Cooler location in all areas ensures optimal air circulation, moving the cool air throughout the facility to maintain consistent temperatures across all produce. All coolers have EC fans to deliver optimum efficiency through reduced fan speed to lower power consumption. The fans operate at 50% speed, equating to just 12.5% of the design fan power and resulting in savings of up to 87.5% compared to traditional fixed-speed fans cycling on and off.



The refrigeration system is fitted with a heat recovery system designed to repurpose waste heat to the underfloor heating mat and facilitate warm glycol defrost on the air coolers. The heater mat installation uses stainless steel pipework headers and a Medium-Density Polyethylene (MDPE) underfloor pipe. Each pipe has been equipped with individual valves and flow indicators to allow for precision control and monitoring.

The site's main control system provides real-time data and enables operators to monitor and adjust the refrigeration system's settings to ensure optimal performance. The fault-dial-out and remote access functionality allows Star's 24/7 maintenance team to actively manage the system from any location and promptly respond to any potential issues. These features provide Bidfood with an added layer of assurance and the ability to recover from unforeseen events remotely and instantaneously.

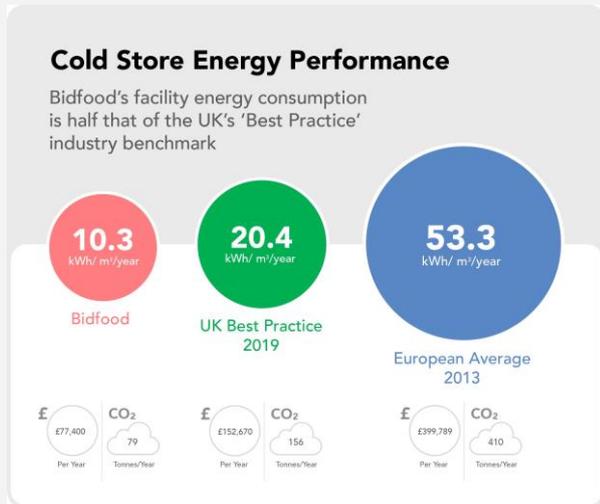
The installation also includes valve station ventilation in the roof void to ensure adequate airflow in the area to meet the requirements of EN378 and DSEAR regulations.

### Benefits

The cold and chill installation by Star at Bidfood has been operational since November 2022 and the facility's energy consumption has been consistently recorded and monitored daily.

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To evaluate the plant's energy efficiency, Star analysed its [Specific Energy Consumption \(SEC\) value](#) – a metric that measures a cold store's energy performance based on kWh/m<sup>3</sup>/yr-. Star used energy consumption data from the plant covering an eight-month period leading up to June 2023, and then extrapolated this data to provide an annualised estimate.



The SEC value for the Bidfood site was calculated to be 10.3 kWh/m<sup>3</sup>/yr – a remarkable figure that is just half of that of the UK's 'Best Practice' benchmark for temperature controlled storage facilities with a volume of approximately 37,500 m<sup>3</sup>.

The UK 'Best Practice' standard recommends energy consumption guidelines for modern, well-maintained cold and chill refrigeration facilities across the country, adjusting for facility size. For a

temperature-controlled storage facility like the one at Bidfood's Glasgow depot, the benchmark SEC value is set at 20.4 kWh/m<sup>3</sup>/yr, meaning that the food wholesaler's CO<sub>2</sub> refrigeration system exceeds energy performance 'Best Practice' by an impressive 49.5%. As a result, the cold store is on track to make significant energy savings and cut CO<sub>2</sub> emissions by 77 tonnes per year compared to the 'Best Practice' industry benchmark, thus supporting the company's financial and environmental targets.

Claire Cox, Head of Property at Bidfood, said, "Our goal is to strengthen our commitment to sustainability by reducing our environmental footprint and energy usage across our estate, while improving the efficiency of our operations. Partnering with Star Refrigeration, with their solid expertise in CO<sub>2</sub> refrigeration, has been instrumental in meeting these objectives and supporting us throughout our net-zero journey.

The energy efficiency achieved at our Glasgow site through the installation of a CO<sub>2</sub> refrigeration system is extraordinary. We appreciate Star's contribution and are encouraged to continue our joint efforts towards improved sustainability and operational efficiency at our facilities in the future."

### Maintenance and compliance

Star Refrigeration's consultancy business, Star

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Technical Solutions, undertook a thorough Written Scheme of Examination and first inspection to ensure Bidfood's cooling equipment complies with the Pressure Systems Safety Regulations 2000 and the Provision and Use of Work Equipment Regulations 1998 (PUWER).

Star has also committed to a comprehensive maintenance contract designed for preventative maintenance to ensure the cold store continues to operate at optimum design conditions in the coming years. Bidfood is served by Star's Bellshill branch, located at just 20 miles from the site. The Bellshill branch boasts over 20 employees, including industrial refrigeration service and maintenance engineers and the aftercare management team. For more than 20 years, the branch has been at the forefront of CO<sub>2</sub> refrigeration technology, dating back to the installation of Star's first CO<sub>2</sub> refrigeration system in central Scotland in 2002 – a system that remains operational today.

The Bellshill branch provides aftercare support to over 50 customers in a diverse range of sectors. It has achieved a customer satisfaction score of 10 out of 10, which is a testament to their commitment to delivering exceptional service and technical expertise.

Star Refrigeration is committed to serve as a strategic partner in support of Bidfood's vision, via

the provision of ongoing maintenance, smart adjustments to make better use of energy at the organisation's coldstores and new installations using natural refrigeration solutions.

 <b>STAR</b> REFRIGERATION	 <b>STAR</b> TECHNICAL SOLUTIONS	 <b>STAR</b> M & E SOLUTIONS	 <b>STAR</b> LEARNING SOLUTIONS	 <b>STARFROST</b> FREEZING & CHILLING SYSTEMS
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