



**Cooling as a Service**  
Refresh the planet

## Case Study



### State-of-the-Art Ammonia Cooling Service for South African Frozen Food Producer

*When upgrading its storage and production facility, Dr Oetker chose to outsource their refrigeration needs through CaaS, allowing them to focus on their core business while leaving the cooling to the experts.*

**Country/Region**  
South Africa

**Sector**  
Food and beverage

**Retrofit OR New**  
New

**Project Size (cooling equipment)**  
1,671kW (475.2TR) total cooling

**Technology**  
Three-stage refrigeration plant

**Refrigerant**  
Ammonia

#### Partners



## Overview

**The need:** Dr Oetker in South Africa, a producer and importer of frozen foods, wanted to increase their production and storage capacity since their existing facility was running out of space.

**The solution:** Energy Partners Refrigeration (EPR) installed a new three-stage ammonia refrigeration plant to supply cooling to the process areas, process fluids, blast freezers, holding freezers and cold rooms at the new production facility in Johannesburg (South Africa). Reclaimed heat from the plant has been included in the solution to generate hot water for the site. With the selection of the Cooling as a Service (CaaS) model, the plant could be optimised for operational efficiency and redundancy while achieving the lowest possible carbon footprint.

**“Not having to invest a huge amount of capital, as well as the cost savings, has enabled us to complete the entire project.”**

Erkan Yağar Project Manager – Dr Oetker.

## Benefits

The capital-sensitive nature of providing an optimised project in terms of efficiency and the use of natural refrigerants, shows that the choice of the CaaS outsourced solution from EPR allows the client more flexibility in its capital allocation towards the project, without compromising on the quality of cooling. The client is receiving access to a highly efficient refrigeration system that has sufficient capacity to match its future expansion ambitions. All operational and maintenance responsibility will be the responsibility of EPR, giving the client the freedom to focus on its core activities.

The refrigeration system was part of a larger project to expand the production capacity of the operation. As with any large-scale project, there are always budget constraints that need to be managed. The outsourced model therefore allowed the client to free up budget to the larger project.

“We are extremely satisfied with the technical solution delivered by Energy Partners and working with people who have expertise and knowledge in this field, is extremely valuable,” said Erkan Yağar Project Manager – Dr Oetker. “Not having to invest a huge amount

### Inside the new ammonia plant room







The existing Dr. Oetker facility across the road

of capital, as well as the cost savings, has enabled us to complete the entire project. EP has shown us that a good quality job can also be done in South Africa. I see this as the beginning of a long term relationship.”

The project also offered great savings in terms of energy efficiency and reducing CO<sub>2</sub> emissions. A baseline plant estimated at 20% less efficient will use 334MWh more electricity, which results in 317 tons of CO<sub>2</sub> per year being avoided in this installation based on energy savings alone. When taking in an average refrigerant leak rate of 15%, the number of CO<sub>2</sub> emissions avoided goes up to an annual amount of 1,200 tons.

## Background

Dr Oetker South Africa is a producer and importer of frozen foods. They are most famous for their frozen pizza products. They are part of The Oetker Group, one of the biggest German family enterprises. The new plant in Selby, Johannesburg (operational since July 2020) will double as a production and distribution facility, therefore requiring significant amounts of cooling at different temperatures for its process and holding areas. The compact site layout and long operating hours presented an ideal opportunity for using waste heat to generate domestic hot water.

## CaaS Contract Information

A cooling service contract with full maintenance offer was signed for an initial 15-year contract period, with yearly extensions thereafter. Dr Oetker has the option to purchase the plant from EPR and to end the outsourcing contract at any stage, while the invoicing for the refrigeration services is made through EPR's unique “cooling meter”. The fixed payment per unit of cooling includes all operating costs, even the electricity consumed by the plant. This means that Dr Oetker will not be paying more for the plant operation even if the efficiency of the plant is lower than expected.

The CaaS product offered to the client is an off-balance sheet transaction, with ownership of the plant residing with EPR. The solution provides a fully outsourced refrigeration system that includes the refrigeration plant, piping, and evaporators. This approach changes the relational dynamic from being a contractor to being a strategic business partner to the client.

During the contract period, EPR will have full responsibility for operating and maintaining the plant; guaranteeing the capacity and quality of cooling that is being delivered to the different sections of the site. EPR will also take full responsibility for any and all breakdowns that occur during the contract period, without any addi-

tional cost to the client, providing peace of mind to the client and allowing them to focus on their core business operations.

The client will be billed in ZAR/kWh consumed and will be refunded for the electricity that has been consumed by the refrigeration plant.

In many commercial and industrial businesses, refrigeration systems use from 20% (heavy industrial sector) to 45% (retail sector) and even as much as 80% (cold logistics) of the electricity. In the life cycle cost of a refrigeration plant, this cost is by far the greatest component (capital and maintenance are the others) and varies between 50% and 75% in South Africa, explained Dawie Kriel: Head of Business Development Energy Partners Refrigeration. "To manage this, it's wise to include optimal design, equipment, control, monitoring and environmentally responsible technology to reduce the energy portion of the lifecycle cost by 20-50% resulting in significant savings."

"The CaaS model solves for the lowest life cycle cost solution placing the emphasis on energy efficiency," said Kriel. "This approach is especially valuable in the industrial sector where businesses work with long term

horizons but are often capex constrained in the initial phase of production. Many of the businesses in South Africa are battling to find and retain good technical expertise to run and maintain complex refrigeration systems at peak performance. CaaS solves the biggest ownership headache – namely management focus, time and cost."

## Project information

EPR installed a new ammonia refrigeration plant that supplies cooling for the building HVAC, process areas, process fluids, blast freezers, holding freezers and cold rooms for the new production facility. Total cooling capacity is 1,671kW (475.2TR) split between -33°C (-27°F), -9°C (16°F) and 0°C (32°F) suction conditions. It also uses heat reclaim to supply a portion of the building's hot water requirements. The plant includes the evaporators, refrigerant piping, plate heat exchangers, secondary pumps, wiring, and controls.

The plant comprises a three-stage ammonia system with six reciprocating compressors and two evaporative condensers. Heat recovery is done from the discharge gas. There is pumped overfeed to the low-stage and glycol secondary cooling on the high-stage.

## The heat exchangers and other state-of-the-art refrigeration equipment







The ammonia compressors up close

From an execution point of view, the main challenge has been trying to coordinate between multiple services that have to do installations in an existing building. Building Information Modelling (BIM) has been of great assistance in minimising the number of clashes. "It forced us to be innovative around pipe routing and optimising the layout of the plant room in the space that was made available to us," explained Kriel.

Not only is the client satisfied with the solution and the installation, the quality of workmanship has left them very impressed, according to Kriel. The heat recovery from the plant is also proving sufficient to provide the entire site with domestic hot water.

## Contact Information

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