

Case Study

Retailers save up to EUR 12.000 a year on excess heat from refrigeration units

25 new CO2 refrigeration units are now running with a brand new heat recovery solution from Danfoss, and the retailers are excited: the heat recovery system operates with flawless performance, and the savings are already paying dividends.

ZERObutik

SuperBrugsen Augustenborg
31-50%

DETTE DIPLOM ER BEVIST PÅ, AT DENNE BUTIK ER EN AKTIV DEL AF PROJECTZERO VISIONEN OM AT GØRE SØNDERBORG-OMRÅDET CO₂-NEUTRALT I 2029.

DIPLOMET ER ET BEVIS PÅ, HVOR MEGET DET ER LYKKEDES NETOP DENNE BUTIK AT REDUCERE DERES CO₂-UDLEDNING, OG HVOR DER HAR VÆRET SAT IND. FRA BELYSNING TIL VARMEKILDER, EL-INSTALLATIONER OG BYGNINGEN – SÅ ER DER FOKUS PÅ TILTAG, DER TILGODESER BÅDE BUTIKKEN OG KLIMAET.

VI HAR SAT IND PÅ FØLGENDE OMRÅDER:

- LED**
BELYSNING
- EL-INSTALLATIONER**
- VARMEKILDER**
- BYGNINGER**

PROJECTZERO ER ET UNIKT SAMARBEJDE MELLEM BØRGERNE, ERHVERVSLIVET OG KOMMUNEN, DER ALLE GØR EN INDSATS I DAG FOR AT SKABE ET BEDRE I MORGEN.

ProjectZero

Danfoss' latest innovation in CO2 refrigeration systems for retailers is a tailor-made heat recovery unit. The system is supplied directly from Danfoss in an integrated unit. With a payback period of 1-3 years, the new unit covers the supermarket's own heating consumption and heating of domestic hot water for cleaning. As an additional bonus, the store owner may be able to sell the excess heat to the local district heating company at an agreed price.



Heats up the store, the bakery and the local gym

Peter Poulsen is a store manager at SuperBrugsen cooperative supermarket in Kjellerup in Central Jutland. Next year, the supermarket celebrates its 100th anniversary and has experienced many changes in its long lifetime: "In Kjellerup, we store managers have a reputation for sticking to our jobs for a long time, but also a reputation for making good investments," Peter Poulsen explained.

In 2017, the well-established store from 1972, which also includes a bakery, a florists and a gym, underwent a comprehensive renovation with new refrigeration units and a heat recovery solution from Danfoss.



The choice of heat recovery was an obvious one. It promotes green energy rather than letting go of the excess heat. We have made a good deal with the district heating company at a reasonable price, and we also supply district heating to local residents.



"With this new heat recovery unit, and with the data provided, we can already see a drop of 20 percent on our heating bills. We are expecting savings of somewhere between EUR 20.000 to EUR 22.000 this year due to the new initiatives we have implemented in the store. The savings cover the total consumption of electricity, water and heating," Peter Poulsen commented.

He added: "This is quite an amount of money saved, and it has also been quite an investment. We are an independent cooperative association



The price of district heating in Kjellerup is one of the five cheapest in Denmark. Despite this, Mr. Poulsen opted to invest in a heat recovery unit from Danfoss, and after just a few months, it has slashed the heating bills by 20 percent. In the Kjellerup store the unit is placed at the loading dock, which makes it easy to access without disturbing the customers.

and owned by our members, consequently, money for these types of investments need to be self-funded.

This project had such a short payback period that we did not need a loan to finance it."



In the local gym in Kjellerup, local residents can enjoy the benefits of the heating.



Store manager Per Beierholm in front of his new heat recovery unit from Danfoss. He produces heat for the store's own consumption and for roughly 15 households. Last year, he saved EUR 12.000 on electricity and district heating.

SuperBrugsen in Augustenborg saves EUR 12.000 a year on heating

Further south in beautiful Augustenborg, store manager Per Beierholm proudly presents his new heat recovery unit.

Per has every reason to be proud, as he has managed to save 50 percent on electricity costs since the renovation of the supermarket in 2015, when he also added heat recovery to the store.



We have saved 90 percent on heating. The district heating bill was previously around EUR 13.000 a year, and now it is about EUR 1.300.



"It seemed obvious to select heat recovery to make savings wherever we can. We have replaced the refrigeration units, as freon is being phased out. Since we were already renovating we wanted to choose the latest technology. We have also switched to the latest generation of LED lighting, despite the lighting we had being relatively new," Per commented.

Refrigeration provides heating for 15 households

In addition to covering the store's own heating needs for offices, kitchen, and domestic hot water for cleaning, the refrigeration system in the SuperBrugsen in Augustenborg also supplies enough district heating for around 15 households in the local area.



I have nothing but praise for Danfoss for the cooperation we have enjoyed. We had a few initial issues with the heat recovery unit, but the technician from Danfoss arrived quickly and adjusted the valves.





When Danfoss has visitors with an interest in refrigeration and heating systems at its nearby head quarter in Nordborg, they often pay a visit to SuperBrugsen in Augustenborg to experience the heat recovery unit. "Apparently, our visitors would like to see the heat recovery unit, but if they are from Asia, they are typically also interested in seeing and taking photos of our open sandwiches, local sausages, and vegetables," Per Beierholm commented.

"This was because our radiators are not ideally placed. They are installed high up under the ceiling of the store. We have chosen to place the heat recovery unit outside at the back of the building, where it does not affect me, the staff or the customers when a technician from Danfoss turns up to check on the unit," Per explained. "The cooperation went incredibly well, and Danfoss was focused on developing the unit to run optimally. It now performs flawlessly."

"I sincerely hope that it will become easier over time to be a local and alternative green district heating provider. Imagine what we could achieve on a global level? It is wasteful that we do not reuse the excess heat," Per added.

Per Beierholm also proposes adjusting the prices on excess heat to a fair and equal price for all smaller providers in Denmark. In his local area, there is a difference of up to 10 percent between

what the district heating companies will pay for excess heat from the stores.



Just imagine if all the supermarkets did as we do. There are huge amounts of energy and heat going to waste every day all over the world. It is senseless not to follow suit, Per concluded.





Just six years ago, Hans Jørgen Andersen received the District Heating Award of EUR 3.300. Today, along with 18 other Coop stores, he has chosen not to sell the excess heat to the district heating utilities. Instead, he gives away the heat free of charge to the district heating utility in Skjern.

In Skjern, SuperBrugsen gives the excess heat away free of charge to the district heating utility

At the SuperBrugsen supermarket in Skjern, the collaboration with Danfoss started when the store received a new CO2 refrigeration system. For the past 84 years in Skjern, there has been a cooperative store, and it has been based at the same location for the past 50 years. Despite it being mid-morning, business is lively, and customers are flocking into the large, welcoming store. Store manager Hans Jørgen Andersen is a busy man, and with the new heat recovery unit on the first floor, he does not have to pay attention to anything else but the customers:



It's all set up and operates as expected. I see it as a good thing that Danfoss reads the meters for us.



“Danfoss manages this from its own office. We store managers do not have much technical knowledge, and we need someone to manage that aspect of the system for us. It must be easy and simple, and we just need an overview of the figures. There isn't much data yet, as the unit was recently installed. In spite of it being a brand-new unit, we have not experienced any issues. The technician from Danfoss takes care of any problems for us, and there has been excellent communication throughout the whole process. It went really well,” Hans Jørgen Andersen explained.

Although the unit produces plenty of excess heat, Hans Jørgen Andersen has chosen not to engage in selling the heat to the district heating utility.

- “If you live in a place where the district heating is already cheap then you cannot take it for granted that the district heating utility will be interested in setting up a price agreement for excess heat from the supermarket. In Skjern we have an agreement and a contract with the district heating utility, but we give them the excess heat free of charge.”

In total 18 of COOP's stores have said no to a pricing agreement with the district heating utilities.

- “The administrative costs required are not worth the savings,” said Hans Jørgen, adding:
- “Our executive board likes the idea of district heating produced by the refrigeration units. Everyone does.



"It just runs by itself," Hans Jørgen Andersen said. The new heat recovery unit from Danfoss heats up 3,400 sqm and also ensures that there is plenty of hot water for the store's butcher and bakery. When there is a baker and a butcher in a supermarket, then there is a high consumption of hot water for cleaning. The excess heat from the refrigeration units handles this as well.



Seen from a store manager point of view it makes good business sense, because the unit is paid back within just a few years.



I am excited to see the figures, and how much we have saved on our investment in the new unit."

Danfoss on heat recovery

At the present time, Danfoss has supplied the solution to 25 supermarkets in Denmark, and the new

heat recovery unit from Danfoss can also be used globally. The unit can be placed almost anywhere, minimizing the use of valuable floor space, without affecting the daily operations in the store and providing easy, undisturbed access for technicians.

Application Engineer Preben Bertelsen and Service Manager Jørgen Seerup from Danfoss are the leaders behind the new heat recovery unit, and according to Preben Bertelsen, CO2 with heat recovery is the way forward for supermarkets across the entire world:

– "The big vision for Danfoss is to always have heat recovery on CO2 refrigeration units, and CO2 units are already widespread throughout the world. Every country can use heat recovery, Danfoss has new initiatives in pipeline, including solutions for locations without a district heating grid. Our heat recovery solution is a complete unit and is one of many innovations we have created. Luckily within the heating and cooling industry everything is a process, and everything develops over time," explains Preben Bertelsen.

As part of the 2018 Energy Agreement, Danfoss recommends the following: "In general, the companies need a simpler set of rules, especially in connection with sales to district heating utilities. It must be transparent and easy for all smaller providers to sell their excess heat to a district heating utility. The possibility of introducing a de minimis threshold in the rules for the excess heat charge as well as a relaxation of the Danish Energy Regulatory Authority's reporting requirements (prices, budgets and accounts) for smaller suppliers. This should support smaller plants in being able to take advantage of the excess heat from local supermarkets, for the benefit of the local community."

SuperBrugsen in Kjellerup heats up a 2,000 sqm store area, a bakery, florists and offices, not to mention the local gym which is located at the top of the building. The system also provides domestic hot water. The supermarket owner has a lucrative price agreement with the local district heating utility.



SuperBrugsen in Augustenborg heats the 1,000 sqm store area and corresponding offices and supplies district heating to around 15 households. The store has both an in-house bakery and butcher's, and also produces hot water for cleaning. The store has a fixed price on the excess heat and sells it to the district heating utility.



SuperBrugsen in Skjern heats up a 3,400 sqm store area and offices. The store has a bakery and a butcher's shop. SuperBrugsen in Skjern has chosen not to take advantage of the opportunity to sell its excess heat to the district heating utility, as Skjern has a large paper manufacturer that supplies excess heat to most of the local area. The excess heat from SuperBrugsen in Skjern is given to the district heating utility free of charge.



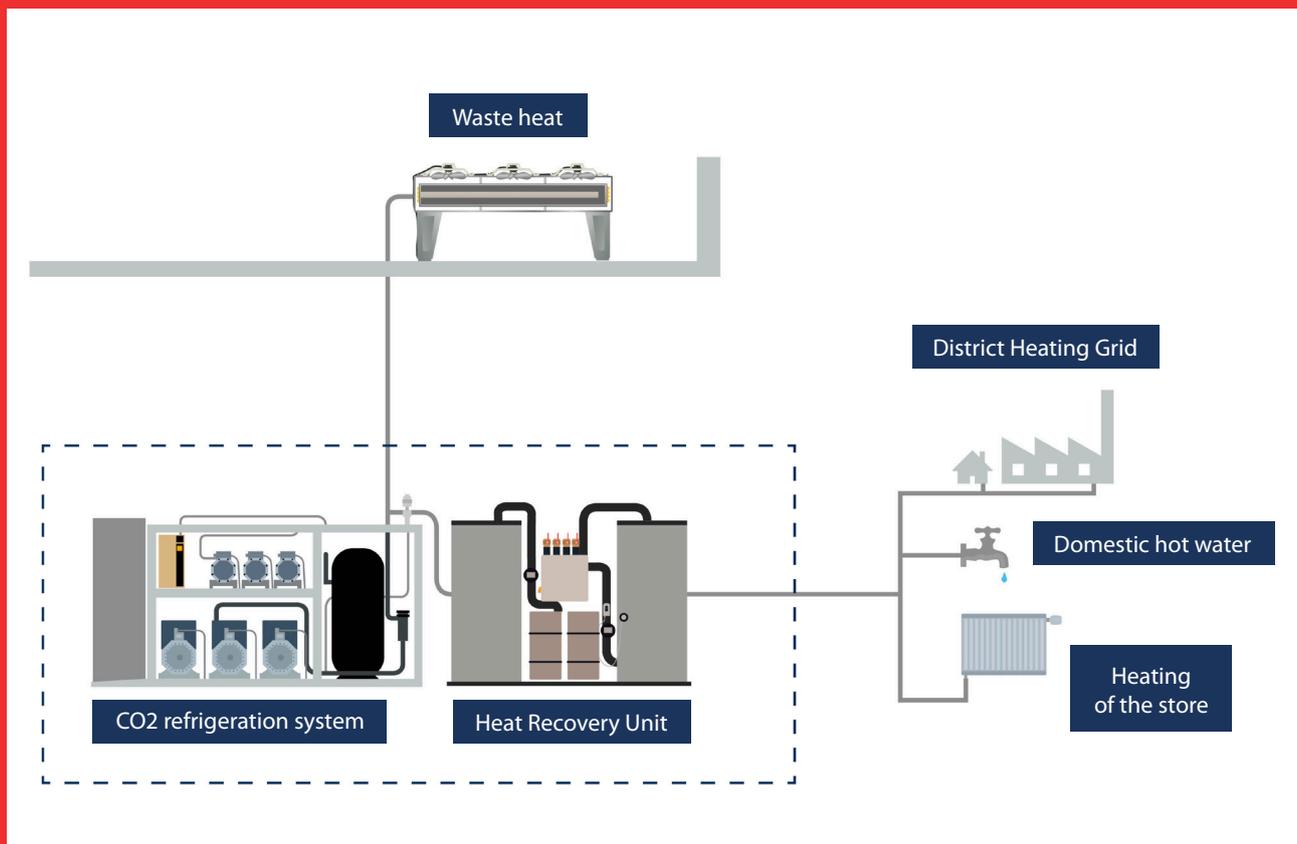
The refrigeration system heats up your home and benefits the climate

In the supermarket, the refrigeration system generates excess heat what would otherwise be wasted. The green heat recovery solution from Danfoss ensures correct recovery of the heat from the refrigeration system to:

- Heat up the store
- Domestic hot water
- Sales to the local district heating grid

There is hardly any waste heat - the system reutilizes 95% of the the excess heat. The refrigeration system reduces CO₂ and natural refrigerants ensure no impact on the environment.

Whether it is sold to or provided for free to the local district heating grid it is important for the environment that this valuable energy resource not be wasted. The returns go beyond simple finance and benefit the entire planet.



Read more about the supermarket of the future, CO₂ and heat recovery at danfoss.com

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