ENGINEERING TOMORROW

Case Story | Danfoss Heat Revovery Unit (HRU)

Danish supermarket cuts heating bill and CO_2 footprint with **Danfoss Heat Recovery Unit (HRU)**

A busy Danish supermarket reduced its annual heating bill by 89.7% and its CO_2 footprint by 6.7 tons a year by making use of the waste heat from its refrigeration system. Instead of letting the heat simply dissipate, as most supermarkets still do, a Danfoss Heat Recovery Unit (HRU) now recycles it to heat the store's 1,900 m² and provide plenty of hot tap water year-round. The best part, according to store manager Morten Birkebæk, not one of his 55 employees noticed a thing during installation or the first year of operation.

The challenge:
Recycle waste heat from a CO_2 refrigeration system—without disrupting operations

As everyone who's ever been near the business end of a refrigerator or air conditioner knows, keeping things cool produces heat. In a home, the amount of this waste heat is minimal. In a modern supermarket with aisles full of refrigerators and freezers, the amount of heat is significant—and enough to heat the entire supermarket and its hot water if it can be properly recycled.

According to Morten Birkebæk, store manager at MENY's Fredericia supermarket in Denmark, making better use of waste heat was a "win-win". "As a merchant with responsibility for the store's bottom line, I'm of course interested in cutting unnecessary costs wherever possible," he explains. "But if we can reduce our carbon footprint at the same time and do it all in a way that is hassle-free for our customers and employees, then count me in."

The solution:
Turnkey installation of a Danfoss Heat Recovery Unit (HRU)

The business case for recycling heat from the store's CO_2 refrigeration system was clear.

"The calculations were straightforward," Birkebæk recalls. "We knew how many kWh we needed to heat the store and provide it with hot water, and we knew what we were paying the district heating company for that energy. Danfoss and the installer, Dansk Varmegenvinding, proposed a turnkey solution that included everything: the hardware, connections, installation, and a service agreement. With their help, we calculated the payback period for the investment, and it was good. My only concern was making sure that the installation and operation of the heat recovery unit would not complicate the lives of my staff."

Morten at the Heat Recovery Unit (HRU).

The result:
Annual energy savings of 89.7% and a reduction of 6.7 tons of CO_2— without operational disruptions

After a full year of operations, Birkebæk can now see precisely how much energy, money, and CO_2 the store has saved. During the first year, MENY in Fredericia reduced its energy consumption by 135 MWh in total, with 56 MWh coming directly from the Danfoss Heat Recovery Unit (HRU) and 79 mWh through a year-long Danfoss EnergyTrimTM contract. What's more, the store reduced its carbon footprint by 6.7 tons of CO_2, close to that of a car driving around the equator.

"There were no big surprises in terms of energy savings," he says. "We are very close to the savings that the installer and Danfoss calculated in their proposal. In fact, we saved more in Year 1 than we thought we would. That we could also save so much CO_2 is really a plus."

What did surprise Birkebæk was how simple the installation and operation of the new heat recovery unit has been. "None of my 55 employees noticed anything. The installer came and set up the heat recovery unit and made sure it was running optimally, and it has ever since. We have all the hot water we need for cleaning and restrooms, and all the heat we need year-round."

According to the installer, Peter Thomsen, Manager at Dansk Varmegenvinding, MENY's experience is a good example of what many supermarkets can expect. "We've installed 50 heat recovery units so far with an average payback period of 2.4 years. For this project, we proposed a heat recovery unit that best matched the store's size and refrigeration system from the 83 versions available from Danfoss. While the MENY results are typical, it's important to note that all installations vary with regards to site size, electrical wiring, and piping. It's also critical that the CO_2 refrigeration system works as an energy system and produces sufficient heat."

In addition to the simplicity of the Heat Recovery Unit's installation, Birkebæk did have one other surprise. In the middle of the first winter of operation, he received an unannounced visit from the district heating company that provided the store with heat. "They were sure that the meter that measures the district heating water flow was broken," he smiles, "because they couldn't see that we were drawing many kWh from the system. We could assure them that everything was working just fine."

MENY Fredericia

Cooling pack: CO_2 system with 165 MT and 25 LT kWh from Knudsen Køling /EPTA
HRU installed : DSA HRU 2 HE 85D CO_2 100 S
Store size: 1,900 m²

About MENY

MENY is a full-service Danish supermarket chain renowned for its dedication to quality fresh food and professionally staffed butchers, delicatessen, fish, cheese, and fruit and vegetable departments. In Denmark, the chain comprises 111 stores, and employs about 5,500. For more information (in Danish), visit https://meny.dk/om-meny.

About EnergyTrim™ in Denmark

EnergyTrim™ optimizes the heating system of your entire store, taking the cooling pack and HRU into consideration. Quarterly reviews of your store's energy data by a certified expert ensure peak performance.

Morten Birkebæk in MENY Fredericia.

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