Sustainable cooling solutions:
Doing more with less: cooling as an enabler for a sustainable energy system

CATEGORY:
Commercial Refrigeration

THE CONTEXT:
Already today, cooling represents up to 6% of the total energy consumption in Europe. With the demand for cooling set to grow with a warming climate and trends such as increasing urbanisation, digitalisation and others, sustainable cooling plays an essential role in the future energy system. It means that cooling can be delivered using minimum amounts of energy, while allowing for the uptake of renewables in the energy system. This can for example be achieved by holistic solutions based on three main pillars: energy storage, demand response and the use of heat recovered from cooling processes. Accounting for an important share of the total electricity consumption in Europe, supermarkets provide a useful example on how to put such holistic solutions into practice.

SUSTAINABLE COOLING SOLUTION:

- Energy storage: Due to peak seasonal demand, a supermarket has a high unused energy capacity. Therefore, it can store its compressor energy (as cold or heat) when electricity is cheap. The stored compressor energy can be used later when electricity production is needed during peak hours, and can be shared with neighbours if connected through thermal networks.
- Demand response: In the case of electricity grid problems, and provided that energy storage solutions are in place, the compressors can be turned down quickly – and be kept in low power mode for a short period without compromising food safety. Long-term, energy storage enables the supermarket to use more energy when it's cheap and reduce costs by consuming less energy when it's expensive.
- Heat recovery: Cooling processes produce heat, but traditionally this heat is not used and simply vented. Supermarkets can be retrofitted with a heat recovery system to recapture that heat and use it to keep the store warm or to produce hot water. Once connected to a thermal grid, the supermarket will have other potential opportunities beyond the traditional heat recovery as well.

BENEFITS:
- Combined supermarkets can play a key role in the energy transition.
- Supermarkets can reduce their energy bill by up to 30% and deliver energy to surrounding communities
- Supermarkets can sell "waste" heat and help surrounding buildings save up to 50% on energy costs
- Supermarkets can store and sell energy to local utilities, add flexibility and respond to peaks in energy demand, helping to ensure a stable supply of electricity and saving electricity costs by providing energy when it's most needed
- Supermarkets can reduce the carbon footprint by up to 30% with a sustainable refrigeration system based on CO_2 as a refrigerant

EPEE

EPEE - European Partnership for Energy and the Environment

Avenue des Arts, 46 - 1000 Brussels
Tel: +32 (0)2 732 70 40
Fax: +32 (0)2 732 71 16
secretariat@epeeglobal.org
www.epeeglobal.org

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TAGS:

- Energy efficiency
- Synergies with heating
- Heat recovery
- Thermal storage
- Demand side flexibility

GENERAL INFORMATION

NAME OF THE COMPANY: Danfoss

CONTACT PERSON: Jonas Loholm Hamann

HYPERLINK TO LEARN MORE ABOUT THE SUSTAINABLE COOLING SOLUTION:
https://www.danfoss.com/en/markets/food-and-beverage/dcs/food-retail/