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## EUROPEAN ALLIANCE TO **SAVE ENERGY**

*Creating an Energy-Efficient Europe*

# Building tomorrow's supermarket today



# The challenge



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- Günter Walter, general manager of aktiv & irma in Oldenburg, was looking for innovative solutions for the refrigeration system in the newly constructed market in Oldenburg-Kreyenbrück.
- The system had to be energy-efficient, environmentally friendly and come with maximum food safety.
- It would use CO<sub>2</sub> as a refrigerant and green electricity with solar power, and would reduce lower energy consumption.





# The solution

- A co-operation between Danfoss A/S and SMA Solar Technology
- A prosuming supermarket which combines energy efficient cooling, solar energy, battery storage, heat recovery, and electric vehicle charging for peak load shaving and flexibility.



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## Components include:

- Refrigeration controllers and programmable controls to regulate cooling, heating, ventilation and air-conditioning.
- Compressors of the refrigeration system linked to drives to compensate fluctuations, guaranteeing maximum food safety and minimum energy consumption.
- Using environmentally friendly CO<sub>2</sub> as refrigerant for cold-storage shelves and freezers. The refrigerant also reduces energy consumption at higher outdoor temperatures.



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# The result

- Energy costs reduced around 20 per cent
- Payback period of 6-7 years



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# Unleashing the potential of the water- energy nexus



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# The city of Aarhus makes whole water cycle energy neutral



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- Wastewater treatment plant located in Marselisborg, Denmark, services around **200,000 people**.
- The treatment plant **produces more than 150% of the energy it needs** to operate due to investments made in efficient technologies.
- The transformation of the plant started in 2010 and also **led to a reduction of water losses by around 6% and of water price for consumers by 9%**
- Carbon footprint of the plant **has been reduced by 35%**.
- Results have been achieved through the **digitalisation** of water facilities, meaning a much higher use of sensors, variable speed drives and advanced process control.



# Recycling water at end-user level



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- Orbital System water saving recirculating solution for showers saved up to **90% of water and 80% of related energy** in a hotel in Malmö, Sweden.
- The system collects the water that would normally go down the drain, analyses its quality, cleans, heats it and reuses it in the same shower cycle.
- The sensors in the systems analyse the quality of water **up to 20 times per second** and decide whether it is good to be sent back for re-use. The purification is done by a micron filter and a UV light.
- The system also collects data on water quality and usage that **can be monitored by a mobile app**