

BEST PRACTICES – AUXILIARY TECHNOLOGY FACTSHEET



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Energy efficiency and heat recovery

Using auxiliary technology is one way to improve energy efficiency in businesses. A small supermarket in Germany effectively demonstrated an efficient use of heat energy, by reusing the waste heat from their cooling installations to heat the sales floor of their store. They invested in energy-efficient freezers, with an automatic defrosting system and refrigeration shelves, with an efficient ventilator, a modern refrigerator that uses heat recovery for air conditioning and they installed LED lighting for all the items, as well as for the entire store.

This new system makes it possible to reuse the excess heat from the cooling installations for the climate controlling of the sales floor and thus save a lot of electricity. Even in the summer months when the outside temperature reaches above 30°C, the sales floor temperature can be kept at a pleasant 21°C, which the modern system manages without technical issues. The store's manager received a prize for his commitment, with the jury praising the measures as an example of how even a small, energy-efficient company can hold its own against larger retail chains if it is economical.

Description

A small supermarket in a medium-sized town in Germany underwent a substantial renovation with the aim of increasing their energy efficiency and

contributing to climate protection through a decrease in their electricity consumption. By investing €450,000 in auxiliary technology, such as new cooling installations and heat recovery systems, they managed to

'Reusing waste heat'

Germany
Retail

Investment
450,000 €

Savings
14,500 €/year
81,800 kWh/year

Main NEBs (other benefits)

Reducing greenhouse gas emissions
Environmentally friendly
Customer-friendly
climate controlling



halve their energy consumption, while increasing their sales floor from 600 to 930 square meters. In 2018, the store manager was awarded a prize for his commitment to saving energy and contributing to climate protection,

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and by demonstrating that small companies can be energy efficient in an economical way.

What is the improvement focus?

The store installed a modern, more energy efficient cooling system, with an energy-saving ventilator. Because cooling installations need to be running continuously with high-duty cycles, energy-saving fans have a high impact on the total energy use of the entire system.

Additionally, the new system is also upgraded with LED lighting. Compared to traditional bulbs, light emitting diodes (LED) typically use about 25%-80% less energy and their lifetime is 3-25 times longer. The main reason that LED lighting is more energy efficient than traditional bulbs is that LEDs emit very little heat, whereas conventional bulbs emit

around 80% of their energy as heat. This makes LEDs more suited to cooling installations than traditional bulbs.

The new system is also able to reuse the excess waste heat emitted by the cooling installations to heat the sales floor. The waste heat emitted by the refrigerator is intercepted before it escapes into the atmosphere, and reused to heat water which is used for room heating purposes. This reduces the need for additional energy to heat the water, saves energy and reduces carbon emissions.

Benefits

During the renovation, the sales floor was increased from 600 to 930 square meters, and the refrigerated shelves were extended from 21 to 35 meters. Despite these increases in

spaces that need temperature-controlling, the new system has been able to cut the store's electricity use for heating by half, and the electricity consumption for cooling by more than a quarter.

The system is able to keep the temperature of the sales floor at a comfortable 21°C without technical issues, even in the summer months when the outside temperature can rise far above 30°C. The investment has thereby led to lower energy costs while preserving the quality of the service.

The improvement of energy efficiency made by using the new refrigeration technology and heat recovery can be implemented in all kinds of supermarkets or other buildings with a refrigeration system. Energy efficient lighting has the potential to save electricity in every building.

Opportunities and barriers to implementation

<i>Opportunities</i>	<i>Barriers</i>
Improved customer experience due to temperature change	Additional costs for renovating
Lower electricity consumption and related cost	Additional costs for new technologies
Cross-business technology	

Calculations

The calculations show a quick idea of the costs and returns of this practice, as well as the economic impact after the implementation of the new equipment. For transparency's sake, the initial situation is directly compared with the final situation and a table of differences is shown broken down into the different key points of savings, using an average price of electricity and emissions taking into account their expected evolution.

	Initial situation	Final situation
Productive capacity	600 m ²	930 m ²
Annual energy consumption [kWh/year]	281,500	199,700
Annual energy cooling consumption [kWh/year]	237,000	185,000
Annual economic energy expenditure [€/year]	50,000	35,500

Total investment (€)	450,000 ¹
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¹ This is the total investment sum. The store received funding for their investment, but there is no data on how much exactly.

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Energy savings [kWh/year]	81,800
Average electricity price [€/kWh]	0.3147 ²
Average emission price [€/tCO ₂]	25 ³
Emission reduction [tCO ₂ /year]	46.38 ⁴
Energy economic saving (€)	14,500
Emission economic saving (€)	1,159.50
Total economic savings (€)	15,659.50
Return period (years)	28.7

References

[1] Handelsverband Deutschland: Klimaschutzoffensive des Handels: Erfolgsgeschichten: Nahkauf Schramm, Potsdam. Zuletzt eingesehen am 23.06.2020 unter:

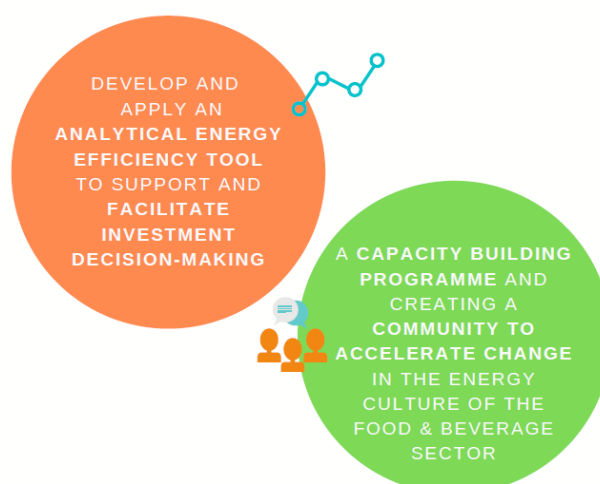
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About ICCEE

The project ICCEE, www.iccee.eu, funded by the EU programme Horizon 2020, aims at improving energy efficiency in the cold chain of the food & beverage sector and making it easier for the sector:

- to undertake energy efficiency measures across the entire supply chain
- to accelerate the implementation of energy audit results

ICCEE follows a holistic approach that moves from a single company perspective to the assessment of the entire cold supply chain. Existing financing schemes for SMEs will be assessed: the optimal ones will support the implementation of energy efficiency measures. ICCEE objectives build on 2 pillars:



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² This is the average retail electricity price in Germany in 2018.

³ This will be the carbon price in Germany in 2021.

⁴ The carbon intensity of German electricity is 567g/kWh.