



Less cooling load by improved insulation and air curtains

A logistics company that mainly transports chilled and frozen food wants to save both energy and costs by reducing the cooling load of its trucks. In order to achieve this, it was analyzed how heat enters the cold store and thus increases the cooling load. In this way, possible inefficiencies are to be identified and assessed to what extent this can be avoided.

The study has shown that especially transmission and open doors lead to heat transfer into the truck interior. Especially in the case of frozen goods, the loss due to the exchange of air when the doors are opened is very high.

For this reason, two energy efficiency measures were implemented that were able to significantly reduce the cooling load. Firstly, the vans were additionally insulated or old insulation, whose heat transfer coefficient has deteriorated over time, was replaced. Secondly, air curtains were fitted to the doors, which can significantly reduce energy losses via air circulation when the doors are opened.

Description

Since transmission and air circulation when opening the doors are mainly responsible for heat input into refrigerated trucks (see Figure 1), the insulation is improved and air curtains are installed.

The old insulation is first cleaned and checked for damage. The age of the

insulation is taken into account, as this is associated with a deterioration of the insulation. If necessary, trucks or the insulation will be renewed. For example, vacuum insulation can result in energy savings of up to 30% [1].

As a second measure, air curtains are used, which can result in energy

‘Fuel saving and quality assurance’

Germany

Logistics company

TRL 9

Implementability: 99%

Payback period:

Air curtain: 8 month

Energy savings

Insulation: up to 30 %

Air curtain: up to 40 %

Main NEBs (other benefits)

Less maintenance

Product quality

savings of up to 40% [1]. In addition, open doors are avoided if possible.

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What is the improvement focus?

The key regarding both measures is to reduce heat transfer to the cooled area. Improved insulation reduces thermal conduction and an air curtain minimizes convection by air circulation. In this way, the cooling load is reduced and thus the fuel consumption for refrigeration.

Benefits

The main advantage of both measures, insulation and air curtain, is the decrease in energy consumption and costs for cooling technology.

In addition to the energy savings, another benefit of the air curtain is that the goods are less exposed to temperature fluctuations. For example, it has been reported that avocados change color less due to an air curtain, thanks to less temperature fluctuations. [2]

In contrast to an automatically closing door, the air curtain does not cause any time delays and truck drivers are very satisfied with the result. It has been observed that the air curtain is just as energetically

effective as an automatically closing door. [2]

Opportunities and barriers to implementation

Opportunities	Barriers
Lower fuel consumption and related cost	Costs for air curtain
Negligible maintenance	Staff training required
Available worldwide	
Simple handling	
Improves food quality	

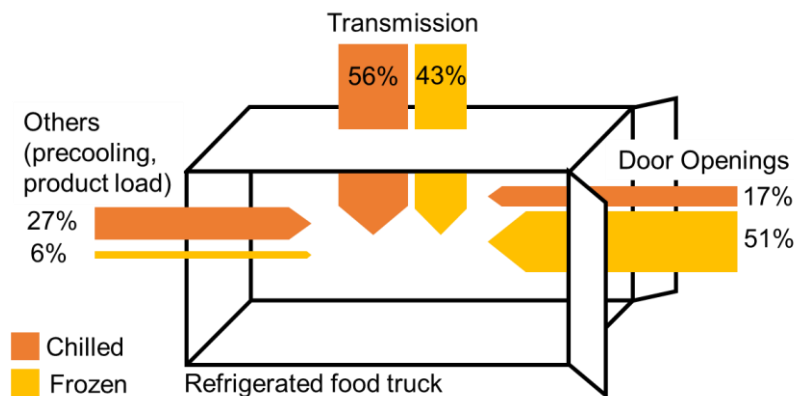


Fig. 1: Example for thermal loads chilled and frozen food trucks, based on [1]

References

- [1] Tassou, S. 2010. 'Energy Savings in Refrigerated Trucks' presentation. School of Engineering and Design, Brunel University. https://grimsby.ac.uk/documents/defra/08Jun10_Transport.pdf. Accessed 19 March 2020.
- [2] Brightec BV. <http://brightec.nl/>. Accessed 19 March 2020.

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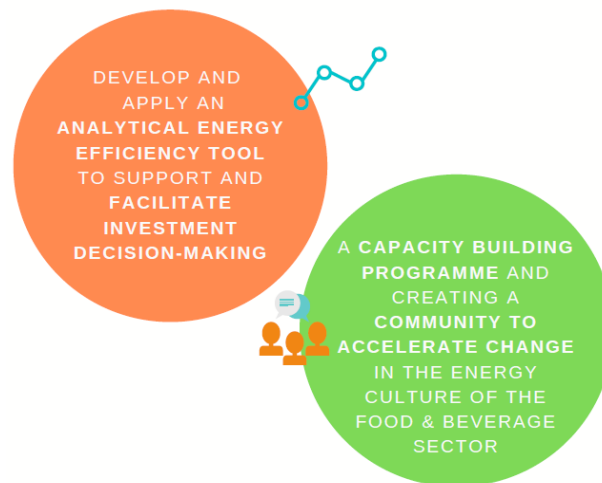


About ICCEE

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 and
- 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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