



# Intelligent cooling, sustainable savings

Cooling control that adapts in real time to actual operating conditions.

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# The high energy demand of cooling



Cooling is one of the most critical industrial services in modern industry, but it is energy-intensive and expensive. In many facilities, **up to 85% of electricity consumption is used for cooling.**

Despite its importance, refrigeration systems are still **operated statically today**, with fixed temperature limits and rigid defrost cycles, regardless of actual operating conditions.

**However, operations are highly dynamic.**



# Real-world operation of refrigeration systems



The operation of a refrigeration system **changes continuously**: doors are constantly opened, production processes change, product flows vary, and room conditions fluctuate every day.

However, these changes are not considered by conventional systems. **They operate without a real data basis**, leading to high energy consumption, unstable temperatures, system disturbances, and icing.

# System efficiency is determined during operation

Ice formation is a direct and visible **effect of real-world operation**: door openings, product movement, and processes continuously change temperature and humidity – directly impacting system efficiency.

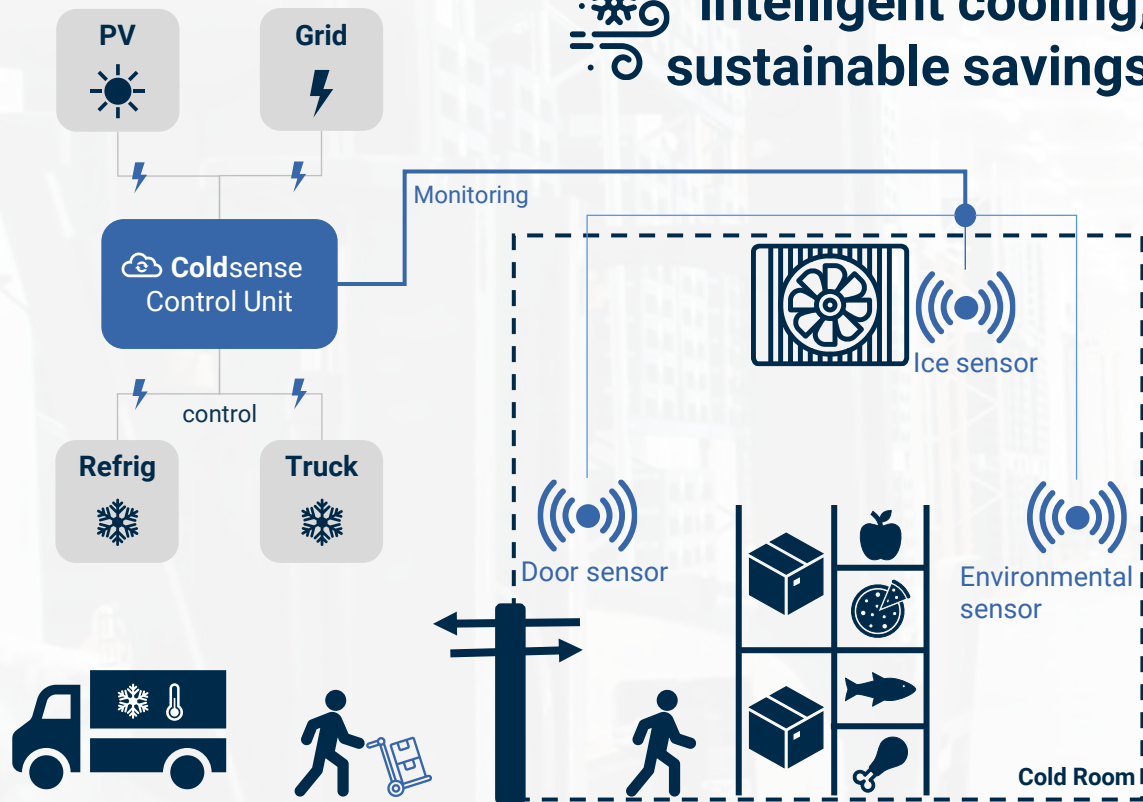
**The dilemma**: Defrosting too infrequently causes icing and performance loss, while defrosting too often leads to unnecessary energy consumption.

Today, this balance is controlled using fixed time intervals, without considering actual demand or user behavior. **The optimal balance is systematically missed.**

# Intelligent refrigeration control based on real user behavior



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For the first time, we enable continuous and **dynamic optimization in real time, based on actual user behavior.**

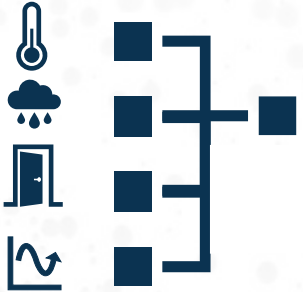
Using innovative ice, door, and environmental **sensors combined with AI**, we capture the real condition of the refrigeration system and its environment completely and in real time.

This enables a **self-learning, data-driven refrigeration control** system that optimizes the entire operation holistically.

# How user behavior becomes intelligent refrigeration control



## Capture user behavior



Ice formation  
Temperature  
Humidity  
Door movement  
Production activity  
Energy flows

## Perform AI analysis



Identify correlations  
Predict room conditions  
Prepare control actions

## Control cooling intelligently



Intelligent defrosting  
Dynamic temperature control  
Thermal energy storage

## Results



Higher energy efficiency  
More stable temperatures  
Fewer disturbances  
Reduced ops costs

# What improves during daily operation



## **Up to 40% energy savings**

through demand-based control instead of fixed intervals



## **Up to 60% fewer disturbances**

through more stable, smoother system operation and improved transparency of system conditions



## **Sustainable cooling and CO<sub>2</sub> reduction**

through optimized energy flows and the use of thermal energy storage



# Successfully deployed in industrial applications



Food production | Wholesale | Logistics | Large-scale catering | Specialized industrial applications

# What our customers report from real operation



*„With Coldsense Technologies, we achieved around **60% fewer defrost hours**, which has had a major impact on our energy balance.“*

**Robert Stiens** | Head of Refrigeration Technology | Wernsing Feinkost GmbH



*„The results speak for themselves – we save **more than 10,000 kilowatt-hours per month** and are highly satisfied.“*

**Jens Löser** | Executive Board | FDBS eG

*„We were able to demonstrate a reduction in electricity consumption of **up to 47.9%...**, and the cold rooms now run more smoothly and more stably.“*

**Sabine Herrmann** | Head of Construction & Facility Operations | Studierendenwerk OstNiedersachsen





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