

## COOL-SAVE

### **Development and dissemination of cost effective strategies to improve energy efficiency in cooling systems in the food and drink sector.**

#### **Relevance of the project proposed**

Around 15 – 20%<sup>1</sup> of the world energy consumption is produced by cooling and air condition systems.

**Cooling installations by Vapor-compression mechanical system**, which have a **large untapped energy saving potential**, are used in more than 90% cooling industrial installations.

Due to the strong energetic impact of cooling systems in food and drink sector, **effective and realistic saving strategies are needed.**

Control systems used nowadays don't have an effective adaptation to work conditions and don't take in account energy optimization criteria. Most automatic controls implemented are PID regulations, manually adjusted in the start-up process of the installation, which only try to meet in a quick way the required cooling demand, without considering the energetic criteria.

The main objective of the project proposed is based in the **optimization of the Vapor-compression mechanical systems in the food and drink sector**, which is the biggest manufacturing sector in the UE with a global turnover of 815 billions of Euros in 2004 (14%<sup>2</sup> of the total industry), and giving work to 4<sup>3</sup> million people.

The energy and money saved with the **implementation of energy efficiency strategies** are key factors for a sector under a big economic crisis, which needs to improve its competitiveness. The reduction of energy consumption together with environmental impact minimization could be the basis for a sustainable economic growth.

#### **Project description**

The COOL-SAVE project aims to **reduce industrial energy consumption in cooling installations by Vapor-compression mechanical system in the food and drink sector through the dissemination of cost effective energy efficiency strategies implementation.**

The industrial refrigeration systems based on Vapor-compression mechanical system are designed to satisfy maximum thermal demands taking into consideration adverse weather

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<sup>1</sup> Saving energy in refrigeration air conditioning and heat pump technology, International Institute of Refrigeration – IIR guides

<sup>2</sup> CIAA data.

<sup>3</sup> Eurostat data.

conditions. However, nowadays we can find that many design systems do not work in the conditions they were designed for, operating thus at partial loads or in atmospheric conditions which differ from those considered in the initial design of the plant.

The solution proposed in this project is to develop some cost effective energy efficiency strategies in food and drink cooling systems. These strategies will be obtained through real data taken from companies' installations, simulations obtained through Energy Management Tools and cost effective analysis.

A key factor is the use of an Energy Management Tool, which is an intelligent cooling system that measures a series of critical parameters regarding energy. This measure enables it to analyze the performance of the system (COP) and calculate the most relevant work efficiencies of the different elements that constitute the installation. The system will not only analyze the Mollier thermodynamic cycle (P-H) of the installation but will also maximize performance by managing and deciding the best control strategies adapted to the conditions of both production and demand to the weather conditions existing at the time.

Main conclusions and strategies obtained will be discussed with all the stakeholders involved around Europe in order to assure a realistic implementation in nowadays food and drink companies. Food and drink industry associations will play a key role in order to establish industry needs and to do dissemination activities to promote the use of these strategies.

National and international workshops will be organized by industry associations with the technical support of technology centres in order to make food and drink industry aware of the implementation of energy efficiency strategies to reduce energy consumption in cooling systems.

### **Major outputs & expected results**

- Analyze the efficiency of those cooling systems belonging to food and drink industries.
- Set common strategies that reduce the electric energy consumption of the cooling systems.
- Knowing about the strategies that involve a stronger impact in industries regarding their implementation cost.
- Elaborate a guide of good practices so that food and drink industries can establish measures that significantly reduce their electrical consumption through the implementation of improvements in their cooling systems.
- Spreading the results of the project throughout all European industries belonging to the food and drink field.

**Flow chart of your work programme:**

