



Climate change: melting glaciers, diminishing water resources, trapped sunrays increase global warming



SUPERSMART: ENERGY EFFICIENT SUPERMARKETS AWARENESS RAISING, KNOWLEDGE TRANSFER AND EU ECOLABEL

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SUPERSMART: EXPERTISE HUB FOR A MARKET UPTAKE OF ENERGY-EFFICIENT SUPERMARKETS BY AWARENESS RAISING, KNOWLEDGE TRANSFER AND PRE- PREPARATION OF AN EU ECOLABEL. THE NEW EU PROJECT THAT HELPS TO MAKE SUPERMARKETS MORE EFFICIENT AND ENVIRONMENTALLY FRIENDLY

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Abstract

SuperSmart is an EU project aiming at speeding up the uptake of energy-efficient refrigeration, heating and cooling solutions for Europe's food retail sector, reducing its energy use, lowering its environmental footprint, and increasing its economic benefits.

SuperSmart pursues the removal of non-technological barriers to efficient heating & cooling in the European food retail sector and supports the introduction of a new EU Ecolabel for food retail stores.

Free-of-charge training at food retail sector stakeholders' are provided with the intention of removing knowledge barrier and increasing the expertise level of technical and non-technical staff.

1. Introduction

According to the European 20-20-20 targets, greenhouse gas emissions should be reduced by 20% by 2020 compared to the 1990 level and energy efficiency should be increased by 20%. The share of renewable energies is to cover 20% of the total energy consumption in 2020. As food retail stores account for about 3% of energy consumption and about 1% of greenhouse gas emissions, they can make an important contribution to achieving the 20-20-20 targets.

Refrigeration plays a central role within supermarkets as it is responsible for some 40-60% of the electrical energy supply. On the refrigerant side, new legal requirements (EU F-Gases Regulation) leads to further challenges. In recent times, significant energy savings while employing natural refrigerants have been achieved in many parts of Europe. As an example, a supermarket in Trondheim, Norway, achieved savings of up to 30% compared to neighboring supermarkets. New system variants, for example CO₂ transcritical systems with stages compression and expansion or expansion work recovery, enable efficient use of these technologies even in southern countries with a warmer climate.

However, although these technical solutions are now available and tested, they are not yet widely used. Reasons for this may lay, among other things, on non-technical barriers, such as lack of awareness or ignorance of these technical solutions.

The EU-funded project SuperSmart is committed to achieving environmental benefits through rapid implementation of efficient heating and cooling technologies as well as economic benefits through reduced energy consumption in the food retail sector.

SuperSmart is financed under the European Union Framework Program for Research and Innovation. The project consortium consists of nine project partners from eight countries: SINTEF Energy Research (Norway), Shecco (Belgium), Royal Technical University in Stockholm (Sweden), ITC-CNR Research Institute (Italy), Umweltbundesamt (Germany), Braunschweig University (Germany), CIRCE Research Center (Spain), Energija Energy Consultancy (Macedonia) and the International Institute of Refrigeration (France), which focus their expertise on four work packages. The project, which started in February 2016, has a duration of 3 years, in which the removal of non-technical hurdles in the supermarket area is addressed and the criteria for an EU environmental label or eco-label for food retail stores are developed.

This article describes the background of the project, the goals and the opportunities to participate and contribute.



2. Non-Technological Barriers

Many technical solutions for efficient heating and cooling in food retail stores are already available. Their low diffusion can be partially ascribed to the presence of non-technical barriers. These are different in the different European countries, but they can nevertheless be divided into five groups:

1. Awareness barrier: Some supermarket and cold-market players are not aware of all the ways to increase energy efficiency and reduce energy-related costs in the supermarket. These options include advanced refrigeration systems working with natural refrigerants and adopting technologies such as staged compression and expansion cycles, heat recovery or thermal storage. In addition to various options for reducing energy requirements, investment costs can be additionally reduced by, for example, public, financial subsidies.
2. Knowledge barrier: The actors involved in the selection, operation and maintenance of efficient heating and cooling solutions in supermarkets often do not have the necessary knowledge to operate the plants in the best way. More efficient technology is more complex and requires interdisciplinary knowledge about the integration of subsystems and the implications of certain decisions on energy costs.
3. The social barrier refers to the bias of individuals against changes in several respects: against technologies, planning processes or cooperation with other actors. For example, certain stakeholders might have concerns about a new, efficient technology because they are very experienced with existing technology. Other concerns could arise with respect to the reliability of new technologies with which there are no years of experience.
4. The organizational barrier refers to the relationship between two or more actors involved in the planning or operation of supermarkets. The organizational barrier is often accompanied by conflicts of interest. One example is the separate ownership of buildings and refrigeration or air conditioning system. Only an integration of different trades, such as heating and cooling systems, can lead to a maximum efficiency gain through heat recovery. The question is who pays for the installation of these integrated solutions and who profits later from the lower operating costs.
5. Legislative barriers: There is a lack of clear legal incentives for energy efficiency in relation to entire supermarkets and measures against inefficiency.

These described non-technical hurdles are not the same everywhere in Europe, which is why a European project is the right path for the necessary transfer of knowledge.

	Top score (%)	Average score (1-5)				
		North	Central West	Central East	South East	South West
Complexity in record keeping for HFCs systems	4 %	2.8	2.8	3.0	3.1	3.5
Lack of qualified personnel for system servicing	4 %	2.8	3.2	3.4	3.5	3.7
Lack of awareness of possible alternatives to F-gases when planning the future installations	4 %	2.9	2.9	3.3	3.6	3.5
Lack of/limited availability of suppliers for HFC-free systems	2 %	2.4	2.5	2.8	3.0	2.9

Table 1. Rating the proposed challenges under the F-gas regulation for energy efficient heating and cooling in the European food retail business, from weak (1) to strong (5) challenge

3. Removal of Non-Technological Barriers

The removal of these hurdles is a central aspect of the SuperSmart project. An initial survey was launched in April 2016 to identify the stakeholders' perceived barriers and the ways to address and remove them. The measures to reduce these barriers are selected in such a way that the greatest possible number of persons is reached. Measures to reduce the non-technical hurdles include, firstly, a broadly based information on the subject at conferences and meetings, in various print and on-line media as well as on social media. In addition, training sessions are held at central events and directly at the supermarket premises. Within the framework of the project, an inventory of the existing barriers is first made, as well as the occurrence and the weighting of the barriers for the different sectors and regions are investigated.

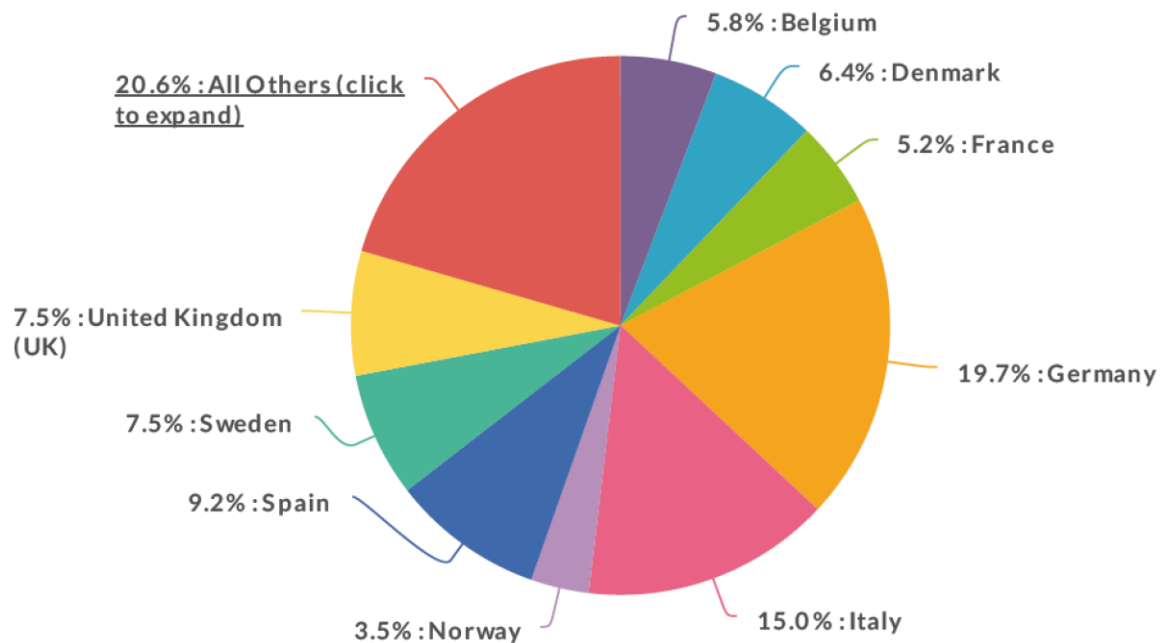


Figure 1. Location of European headquarters for survey respondents

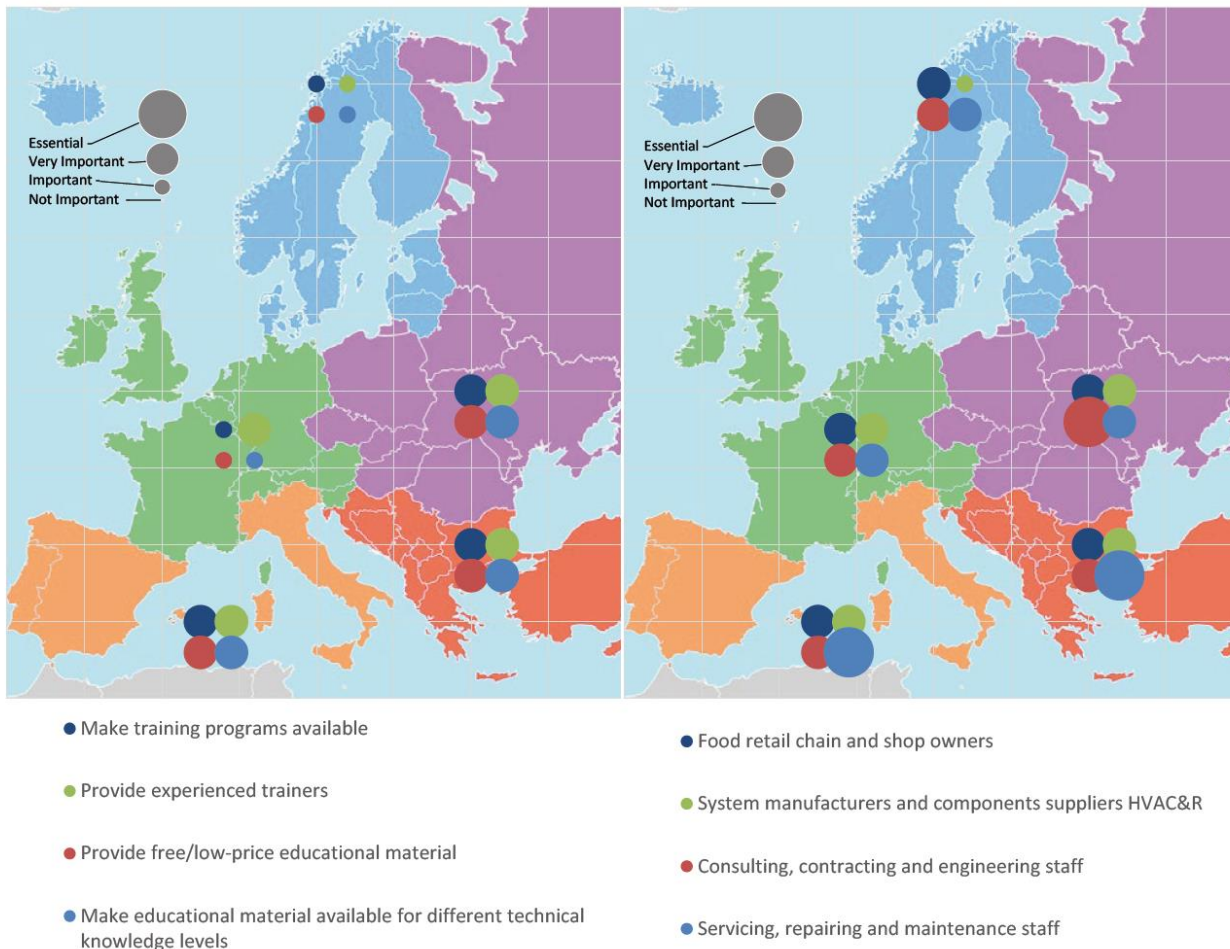


Figure 2: suggested actions to remove the knowledge barriers and people to be trained to successfully address the knowledge barrier.

Based on these results, training materials have been developed on various topics relevant to the market:

1. Environmentally friendly supermarkets: An overview
2. How to build an environmentally friendly supermarket
3. How to refurbish a supermarket
4. Computational tools for supermarket planning
5. Environmentally friendly supermarkets: operation and maintenance
6. EU eco-label for supermarkets

These reports are freely downloadable from the site www.supersmart-supermarket.org.

In addition to training sessions at conferences / trade fairs, such as those already held at major events as Atmosphere 2016 (Barcelona, Spain, April 2016), Gustav Lorentzen Conference (Edinburgh Scotland, August 2016) or Ammonia and CO2 Technology Conference (Ohrid, Macedonia, 10-13 May 2017), as well as the Chillventa (Nuremberg, Germany, October 2016) and Euroshop (Dusseldorf, Germany, March 2017), on-site training by the project partners are offered to Companies and Associations all over Europe. Further information on how to get in contact with partners and obtain dedicated training can be found on the project website www.supersmart-supermarket.org.

4. European Eco-Label for Food Retail Stores

The EU Eco-label is available for a wide range of consumer goods and some services. It helps consumers to identify environmentally friendly products and encourages manufacturers and service providers to increase the environmental performance of their products.

There are already two relevant national eco-labels for food retail stores in Europe: the "Nordic Swan" in Scandinavia and the "Blue Angel" in Germany.

The advantages of eco-labels are that they create awareness on the part of the end customer and on the other hand offer incentives for operators and planners to label their environmentally friendly markets accordingly.

The development of an EU Ecolabel for a new product group is a complex process that takes several steps, covering all the aspects of food retail stores, ranging from building envelope, HVAC&R, water and waste management, labelled products, etc. Within the framework of this project, the criteria for such an eco-label are under development and will be published in the form of a technical report. The criteria for environmentally friendly food retail stores are to be established in close cooperation with supermarket stakeholders. To this end, end-users, manufacturers and innovation experts can contribute with their expertise and knowledge of the sector. Workshops have already been held at Chillventa (Nuremberg, Germany, October 2016), ISH (Frankfurt, Germany, March 2017) and Ammonia and CO2 Technology Conference (Ohrid, Macedonia, 10-13 May 2017) and online surveys are periodically published on the project website. To be involved, visit the section <http://www.supersmart-supermarket.info/get-involved>.

Summary

The technology for efficient and environmentally friendly supermarkets exists and allows a significant reduction in energy consumption, in the range of up to 30%. Nevertheless, these techniques are not yet applied in width. This is also due to non-technical barriers, such as lack of awareness, lack of expertise or social or organizational hurdles.

The EU-funded project "SuperSmart" combines the competence of nine high-profile European institutions from eight countries and aims at reducing the non-technical hurdles for efficient heating and cooling in supermarkets, thereby increasing the environmental friendliness, lowering energy consumption and thus also economic profits.

Within the scope of the project, besides information campaigns, training courses on the topic of efficient heating and cooling are carried out also at companies' premises. Market players from the supermarket sector can find out about these trainings at the project home page and register for internal training events by experts from the project consortium.

The project is also developing criteria for an EU eco-label for food retail stores. Again, there is the possibility for stakeholders from the supermarket sector to contribute to the development of the criteria.

