47th International Congress and Exhibition on Heating, Refrigeration and Air-Conditioning

For healthy and sustainable buildings, resilient cities, and stopping the climate change

Belgrade, Sava Centre, 30th November – 2nd December 2016
Expertise hub for a market uptake of energy-efficient supermarkets by awareness raising, knowledge transfer and pre-preparation of an EU Ecolabel
SuperSmart is a EU funded Horizon 2020 Project

- Duration: 36 month,
- Start: 1st of February 2016
- Project Partners:
  - SINTEF (coordinator)
  - Shecco
  - CNR
  - Umweltbundesamt
  - KTH
  - TUBS
  - CIRCE
  - Energija doo
  - IIR
SuperSmart is an EU project to speed up the uptake of more energy-efficient refrigeration, heating and cooling solutions for Europe’s food retail sector by:

- Identifying & removing non technical barriers
- Reducing its energy use
- Lowering its environmental footprint
- Increasing its economic benefits
- (Pre-)preparing of an EU Ecolabel
Current status:

Systems for efficient and integrated heating and cooling solutions for the retail sector are available!

Natural refrigerants (R744 systems etc.) are the preferred option for new installations.

They are not yet implemented to a large extend: Why?

Which are the non-technological barriers?
Current challenges

• How to avoid high investment and service costs due to the F-gas regulation?

• How to reduce the energy consumption of the supermarket(s)?

• How to reduce the environmental footprint?

• How to find vendors able to supply/ install /maintain R744 refrigeration units in all European regions?
AIMS OF SUPERSMART

• Active **removal of non-technological barriers** in the European food-retails sector

• Help **supermarket stakeholders** to implement more efficient and environmental friendly technology

  → Be able to use the best suited technology and prevent vendors from installing immature applications

  → **Save** energy-, investment- and service **costs**

  → Comply with all regulations

  → Help to achieve environmental commitments
SUPERSMART has three main working tasks:

1. Removal of non-technological barriers:
   - Workshops, seminars, awareness-raising
   - Training for supermarket stakeholders free of charge

2. Support for the Development of an EU Ecolabel
   - Development of label criteria & Product group proposal
   - Supermarket stakeholders can participate, influence and comment

3. Communication & Dissemination
EXECUTIVE SUMMARY

REMOVING NON-TECHNOLOGICAL MARKET BARRIERS:

RESULTS OF THE STAKEHOLDERS SURVEY
WE DO KNOW

that there do exist NON-TECHNOLOGICAL BARRIERS preventing from the adoption of ENERGY EFFICIENT SOLUTIONS in supermarkets across EUROPE

WE DID NOT KNOW

the IMPACT of DIFFERENT BARRIERS in EU REGIONS

the POINT OF VIEW of STAKEHOLDERS for the same barrier

how to ADJUST OUR ACTIONS/MEASURES to achieve IMPACT/BENEFIT for the supermarket stakeholders
OBJECTIVE: systematizing the non-technological barriers to efficiently address them

WHICH barrier? WHERE? WHO is affected by?

METHODOLOGY: a survey was launched on the web in six languages (English, French, German, Italian, Serbian, and Spanish) from 18.4.2016 to 17.06.2016
1. RESPONDENTS AND ORGANISATIONS PROFILE

- Total number of valid questionnaires: 178
- 79% of respondents come from EU based organisations, 10% from US companies
- EU headquarters location:
### Most important for «end users» (food retail chains)

<table>
<thead>
<tr>
<th>Category</th>
<th>Top Score (%)</th>
<th>Average Score (1-5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food retail chain / Single store owner</td>
<td>100 %</td>
<td>5</td>
</tr>
<tr>
<td>Consulting, contracting, engineering</td>
<td>50 %</td>
<td>4</td>
</tr>
<tr>
<td>Association</td>
<td>50 %</td>
<td>4</td>
</tr>
<tr>
<td>Servicing, repair, maintenance</td>
<td>47 %</td>
<td>4</td>
</tr>
<tr>
<td>System manufacturer: HVAC</td>
<td>45 %</td>
<td>4</td>
</tr>
<tr>
<td>Components supplier</td>
<td>41 %</td>
<td>4</td>
</tr>
<tr>
<td>System manufacturer: Refrigeration</td>
<td>36 %</td>
<td>4</td>
</tr>
<tr>
<td>Research Institute / University</td>
<td>33 %</td>
<td>4</td>
</tr>
</tbody>
</table>

Accepted **pay-back time** for investments in energy efficiency:
- 3 years for 51% of respondents,
- 6 years for 42%

All results see: [www.supersmart-supermarket.org](http://www.supersmart-supermarket.org)
Conclusions and suggestions for removing non-technological barriers:

- Promote the **awareness** of **financial support/instruments**

- **Provide easily accessible dedicated training** by experienced trainees, especially to food retail service and maintenance staff and to consulting and contracting people (**knowledge**)  

- **Defeat the concern about too long pay-back time** of energy efficient systems (**social**)  

- **Promote a comprehensive energy planning and management** of the food retail stores (**organisational**)  

EU-Ecolabel is positively perceived as an important tool to reduce the carbon footprint of food retail stores
DEVELOPMENT OF THE EU ECOLABEL CRITERIA FOR SUPERMARKETS

RESULTS OF THE STAKEHOLDERS SURVEY
LABEL DEVELOPMENT WITHIN THE SUPERSMART PROJECT

Criteria development

2016
Start of Preliminary Report

2017
Technical Report

2018
Follow-up

2019
End of Product group proposal

47th KGH Belgrade 01.12.2016
• a survey was launched on the web in six languages (English, French, German, Italian, Serbian, and Spanish) from 06.06.2016 to 06.09.2016
• Total number of valid questionnaires: 88
• 19 different European countries
• “Do you agree that the following facilities should be **inside the scope** of the product group "food retail stores"?"

• “Do you agree that the following facilities should be **outside the scope** of the product group "food retail stores"?"
**DEFINITION AND SCOPE OF THE PRODUCT GROUP**

**Definition** of the new Product Group: - 89% of the 88 respondents accepted this definition

*Food retail stores include all store formats in the retail trade with at least 50% of annual turnover for groceries, except those specifically excluded.*

**Scope** of the new Product Group:

**INSIDE**
- Supermarkets
- Self-service food stores and markets
- Food discounters
- Hypermarkets
- Self-service warehouses
- Convenience stores

**OUTSIDE**
- Wholesalers
- Web shops
- Cash-and-carry beverage shops
- Caterers
- Restaurants and hotels
- Kiosks
- Cafeterias
- Hospitals
- Nursing homes
• “Answers regarding criteria for food retail stores #1”

- Energy consumption (86)
- Energy saving display cabinets (86)
- Integrated energy management of HVAC&R systems (87)
- Utilization of waste heat (86)
- Energy or environmental management system (86)
- Natural refrigerants (85)
- Water consumption (83)
- HVAC&R maintenance as regular practice (86)

• “Answers regarding criteria for food retail stores #2”

- Sustainable building (84)
- Use of renewable energies (86)
- Waste (and wastewater) management (81)
- Transport and distribution of goods (84)
- Chemical use (84)
- Ecolabelled products and organic food sold (84)
- Employment practices (85)
- Location and accessibility of the food retail store (83)

All results see:

www.supersmart-supermarket.org
PROCEDURE/STEPS FOR CRITERIA DEVELOPMENT

• SuperSmart partners will define draft criteria and compliance verifications for the EU Ecolabel for food retail stores

**Basis:**
- Existing criteria of national type I Ecolabel
- LCA analysis
- **Recommendation from a majority of experts**

**Aim:**
- criteria are applicable in whole of Europe
- compliance verifications are applicable in whole of Europe
- EU Ecolabel criteria must **NOT BE STRICTER** than criteria of national Ecolabel! (Due to harmonization process for all European Type I ecolabel)

• Proposals will be discussed with supermarket stakeholders at Labelling Board Assemblies and via surveys
<table>
<thead>
<tr>
<th><strong>Mandatory requirements (Refrigerants)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>M-R-1</strong></td>
</tr>
<tr>
<td><strong>M-R-2</strong></td>
</tr>
<tr>
<td><strong>M-R-3</strong></td>
</tr>
<tr>
<td><strong>M-R-4</strong></td>
</tr>
</tbody>
</table>
## Mandatory requirements (Refrigeration System)

<p>| M-RS-1 | <strong>Energy efficiency</strong> of the refrigeration system must meet requirements set by the Blue Angel Label. The reduction in key energy efficiency index must be higher than 15% for existing systems and at least 35% for new ones |
| M-RS-2 | <strong>Evaporation temperature</strong> of the refrigeration unit <strong>must not be lower than</strong>: +5 °C for AC units; -8 °C for MT units and -33 °C for LT units |
| M-RS-3 | Active <strong>control of high side pressure</strong> (condenser, gas cooler) must be put in place (to achieve max COP) |
| M-RS-4 | Active <strong>control of evaporation pressure</strong> (rpm control of each compressor stage) |</p>
<table>
<thead>
<tr>
<th>Point system –Refrigeration System</th>
<th>Max points</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-RS-1 80% of all MT Equipment: unit evaporation temp. higher than 0°C</td>
<td>10</td>
</tr>
<tr>
<td>10 points @ $t_o=-8^\circ C$, linear distribution)</td>
<td></td>
</tr>
<tr>
<td>P-RS-2 Minimum part load capacity of each compressor suction level</td>
<td>9</td>
</tr>
<tr>
<td>5% of nominal capacity 3 points, 20% 0 points, linear in between)</td>
<td></td>
</tr>
<tr>
<td>LT max 3 points; Mt max 3 pints; AC max 3 points</td>
<td></td>
</tr>
<tr>
<td>P-RS-3 Heat and Cold storage (5h demand; centralised or local)</td>
<td>8</td>
</tr>
<tr>
<td>Heating: 2 points; LT: 2 points; MT: 2 points; AC: 2 points</td>
<td></td>
</tr>
<tr>
<td>P-RS-4 Expansion work recovery (ejector (EJ) or expander (4 p)):</td>
<td>5</td>
</tr>
<tr>
<td>liquid EJ only (2 point); liquid and vapour EJ (MT  PC) (3 points)</td>
<td></td>
</tr>
<tr>
<td>separate AC EJ (2 points)</td>
<td></td>
</tr>
<tr>
<td>P-RS-5 90% of AC capacity for the building provided by central</td>
<td>4</td>
</tr>
<tr>
<td>refrigeration plant (with Parallel compressor 4 points, with</td>
<td></td>
</tr>
<tr>
<td>MT compressor 1 point)</td>
<td></td>
</tr>
<tr>
<td>P-RS-6 90% of heating demand for the building provided by central</td>
<td>4</td>
</tr>
<tr>
<td>refrigeration plant</td>
<td></td>
</tr>
<tr>
<td>P-RS-7 High efficiency fans at all condenser/gas cooler (2 points);</td>
<td>4</td>
</tr>
<tr>
<td>additional water spray or adiabatic saturation on condenser/gas cooler</td>
<td></td>
</tr>
<tr>
<td>air (2 points)</td>
<td></td>
</tr>
<tr>
<td>P-RS-8 90% of equipment: has electronic expansion valves</td>
<td>4</td>
</tr>
<tr>
<td>P-RS-9 Staged compression (parallel compression, two-stage compression,</td>
<td>3</td>
</tr>
<tr>
<td>economiser 2 points; flexible suction port switch of PC and MT</td>
<td></td>
</tr>
<tr>
<td>compressors 2 points</td>
<td></td>
</tr>
<tr>
<td>P-RS-10 Sub-cooling, internal heat exchanger or staged expansion</td>
<td>2</td>
</tr>
</tbody>
</table>
BENEFITS
Manufacturer/planners:

• Trainings of your employees and customers
  -> increased awareness for eco-friendly supermarket equipment
  -> increased acceptance of higher payback time for energy efficient equipment
• Information about barriers which prevents your customers to buy high-efficient equipment
• Participation in Ecolabel development: your needs and requirements will be considered
Operators:

• Training of your employees: increased knowledge to choose the best technology
  -> environmental benefits
  -> economic benefits

• EU Ecolabel:
  -> marketing for your business, if your supermarkets are awared
  -> going for the Ecolabel ensures the utilization of eco-friendly and energy-efficient technology

-> saving costs for your business
Reports & Training Material

Click directly on the report cover to download the file:

- Report 1 - Mapping and segmentation of barriers & description of supermarket sector
- Report 2 - Eco-friendly supermarkets - an overview
- Report 3 - How to build a new eco-friendly supermarket
- Report 4 - How to refurbish a supermarket
- Report 5 - Computational tools for supermarket planning
- Report 6 - Eco-friendly operation and maintenance of supermarkets
- Report 7 - EU Ecolabel for food retail stores

All reports see:

www.supersmart-supermarket.org
WHAT’S NEXT?
WHAT’S NEXT?

• Labelling Board Assembly
• Online survey on first criteria for the EU Ecolabel on: 
  
  www.supersmart-supermarket.info

• Next Labelling Board Assembly in May 2017 – IIR Ohrid 2017 Conference

• Stay informed and contribute to the criteria development process:
  ➢ Become a member of an Expert Panel and the Labelling Board of the SuperSmart project.

➢ Sign up for the expert panels and training events at:
  info@supersmart-supermarket.org
THANK YOU FOR YOUR ATTENTION!

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