

Upgrading of thermal energy in retail stores

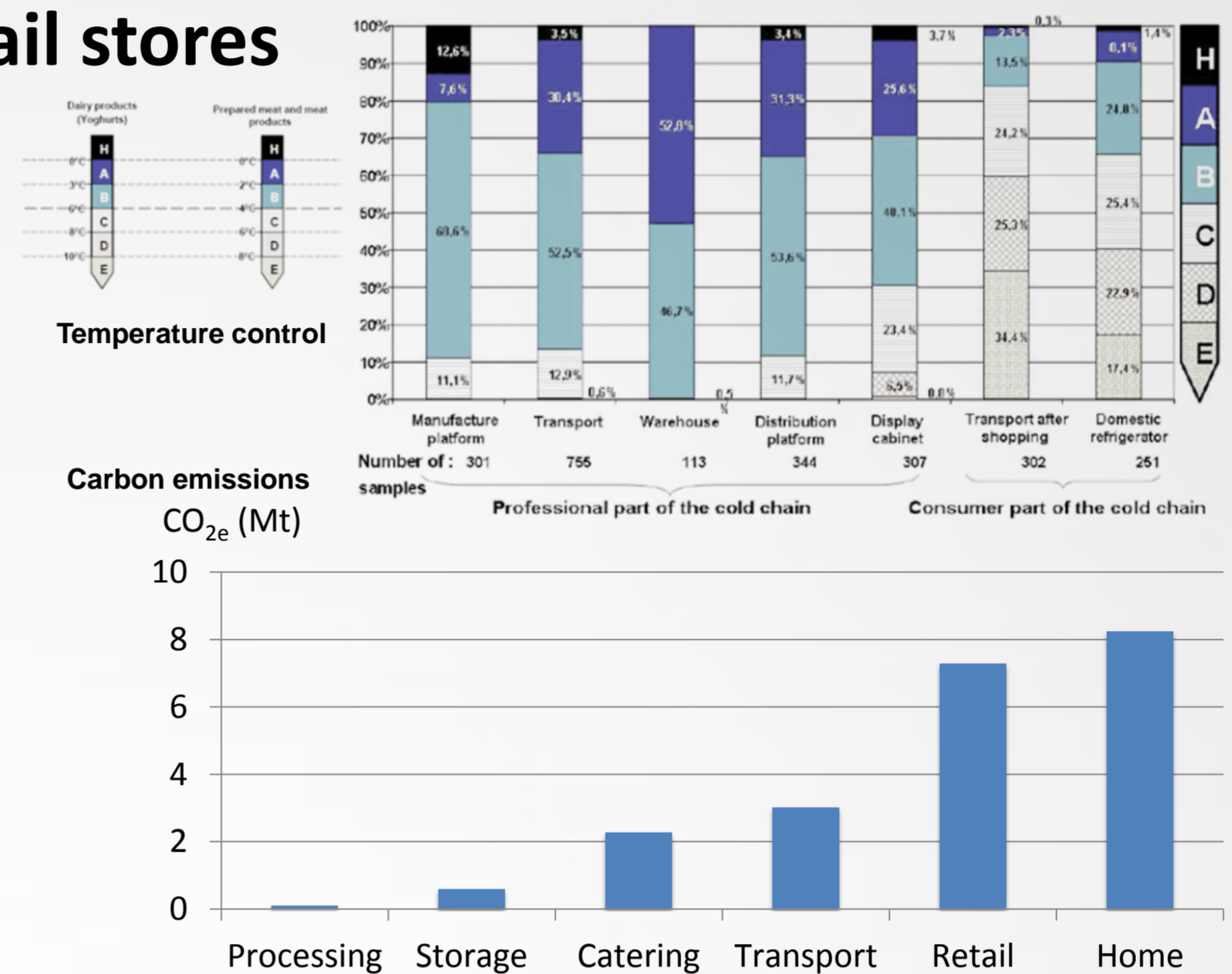
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Temperature control, energy and carbon use in retail stores

Temperature control and carbon emissions increase at consumer end of cold chain

UK Supermarkets are large energy users/carbon emitters

- 40-70% of energy in supermarkets used for refrigeration
- Further 25% is used for heating, of which 1/3 offsets cooling losses from retail display cabinets
- UK retail refrigeration used approximately 9-10 TWh/year (2% of UK electrical energy)
- Of this approximately 75% is related to chilled and 25% to frozen food
- Overall 7.3 Mt CO₂ (26% from direct, 74% from indirect)



Energy saving options for retail

- Supermarket cold store
- Cabinet selection
- Borehole condensing
- Occupancy sensors and controls - doors
- Dynamic demand
- Cleaning and maintenance
- Re commissioning
- Floating head pressure
- Store temperature
- Evaporator fan motors
- Suction pressure control
- Pipe optimisation
- Curtains (strip)
- Air curtain optimisation
- Condenser fans
- Evaporative condensers
- Cabinet lighting (non LED)
- Night blinds

Large selection of potential technologies available, however, not all are economically viable

divided into 3 application periods:

1. Short term CO₂ saving options that could be retrofitted
2. Medium term CO₂ saving options available during a store refit
3. Longer term CO₂ saving options available when designing a new store/retail concept

72 technologies identified and investigated (energy and carbon savings)
Economics of options and ability to apply technologies investigated

Initial results and next steps

To challenge the concept of the retail display cabinet, specifically from fundamental aesthetic, ergonomic and energy use perspectives

Road map being developed to create energy efficiency supply curve charts to identify:

1. Technologies that can be economically applied to current cabinets
 - Proof of concept prototype developed
 - Non technical barriers investigated
 - Trial in supermarket
2. Technologies that can be applied to new cabinets to make significant savings in carbon (to deliver new concepts in RDC that have 1/10 of the existing energy consumption)

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