



Road map to decarbonise the retail food sector by 2050

The retail sector has relatively high scope 1 and 2 emissions. In Europe, the annual electrical energy consumption can vary from around 700 kWh/m² sales area in hypermarkets to over 2,000 kWh/m² sales area in convenience stores. In this work, 95 different technologies/strategies were reviewed that retail stores could apply to reduce carbon emissions and energy consumption.

Modelling of impacts from 2020 through to 2050

Two supermarkets were considered in the modelling, a medium (2,100 m²) and a small (600 m³) store. The model investigated energy usage and carbon emissions from 2020 to 2050 taking into account the impacts of global warming, changes in the grid carbon conversion factor and a range of technologies/strategies that could be applied in the supermarkets.

Three scenarios were considered:

1. **Do nothing:** an RCP 4.5 climate change scenario was applied and changes to the electrical grid carbon conversion factors were considered.
2. **Minor retrofit (+ do nothing):** shorter term options for stores that were not due to be replaced in the near future or undergo major refurbishment.
3. **Major retrofit (+ do nothing + minor retrofit):** more significant changes that would require the store to be temporarily closed.

Predicted energy savings and CO₂ emissions reduction

The scenarios were applied to 6 locations (UK, France, Lithuania, Norway, Italy, Poland).

- **Predicted overall energy savings ranged from 55 to 94%.** Savings were the highest in Rome where 95% of the energy was saved in the medium store and 70% in the small store, thanks to the use of solar panels in a country with abundant sunshine.
- **Carbon emissions could be reduced by 61 to 97%.** In medium stores, reduction was highest in Rome, mainly due to the energy saving potential from solar panels. In small stores, reduction was highest in Oslo, due to the high impact of reducing fugitive emissions (and changing the refrigerant from an HFO to R744) in a country with very low electrical grid intensity.

From the work, this roadmap recommends 6 major opportunities for supermarkets.



Achieving near net zero carbon emission in supermarkets will require a range of initiatives, such as:

- Legislation or industry agreements for the use of doors on cabinets to become the norm in all supermarkets.
- Incentives for the use of other technological interventions as many have marginal paybacks.
- Demonstration of the use of new technologies to provide quantified carbon and energy savings and confidence in the application of these technologies.

Find out more about this work: <https://enough-emissions.eu/publications/>



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