

Cold stores consume considerable amounts of energy, with an estimated 60–70% of the electrical energy used for refrigeration. In this work, 30 different technologies/strategies were reviewed that refrigerated warehouses or cold stores could apply to reduce carbon emissions and energy consumption.



Modelling of impacts from 2020 through to 2050

Two typical cold stores were chosen: a frozen store and a chilled storage facility.

Three scenarios were considered:

Do nothing: a climate change representative concentration pathway (RCP) of 4.5 scenario was applied and changes to the electrical grid carbon conversion factors were considered.

Retrofit: shorter term options that could be applied for cold stores that were not due to be replaced in the near future or undergo major refurbishment. This included:

- An air-lock vestibule
- More efficient condenser and fans
- Improved maintenance
- Renewable energy source (solar)

New store (+ retrofit): changes that could be applied to a new cold store.

- High efficiency compressor
- Natural refrigerant applied (chilled store only, as baseline frozen store operated using ammonia).

Predicted impact on CO₂e emissions reduction

The scenarios were applied to 6 locations (the UK, France, Lithuania, Norway, Italy, and Poland). Overall, it was estimated that very close to net zero was achievable in 2050 in all locations except Poland.

Predicted overall energy savings

Combined retrofit interventions could yield savings ranging from 57% to 81%. In the new store scenario, savings were greater in the frozen store.

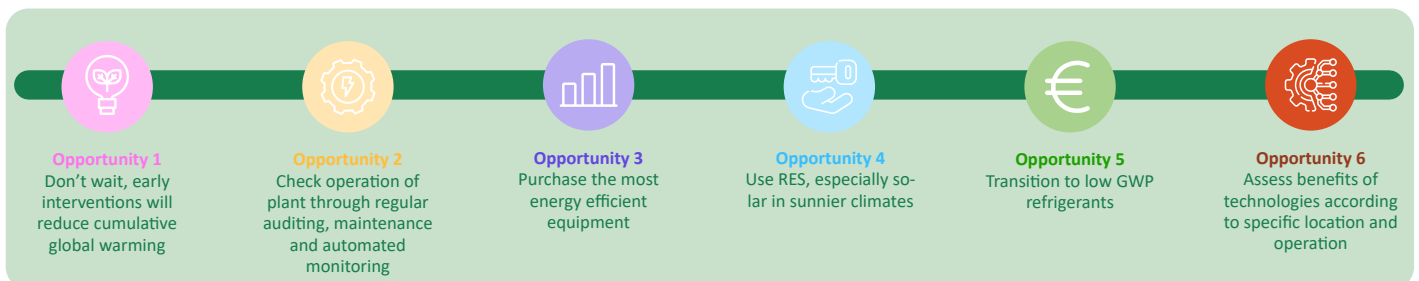
Predicted reductions in carbon emissions

In a 'do nothing' scenario, cold stores in Lithuania, the UK, Norway and France will have near zero carbon emissions by 2050 just through the grid decarbonising.

In the retrofit scenario, the combined impact of the interventions if applied now would save 11-81% of the carbon emissions. In the new store scenario, reduction in carbon emissions could reach 18-91% for the chilled store, and 30-69% for the frozen store.

Roadmap

From the work, this roadmap recommends 6 major opportunities to reduce carbon in cold stores.



A great deal of decarbonisation should occur without intervention from the cold store sector through reductions in the electrical grid emission conversion factors. Nevertheless, it is important to act quickly to achieve the greatest cumulative carbon emissions reduction. Applying technological interventions will enable carbon emissions to be reduced faster and decrease accumulated emissions over time.

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

