Road map to decarbonise the food service sector by 2050

Food service outlets have a sizeable carbon footprint, with an estimated annual energy use of 245.4 TWh. In this work, 60 different technologies/strategies were reviewed that fast food restaurants could apply to reduce carbon emissions and energy consumption

Modelling of impacts from 2020 through to 2050

Fast food restaurants were chosen because they allow an integrated approach where interactions between all the heating and cooling systems in a facility are considered. The modelling was based on a typical high usage fast-food outlet and an adapted moderate usage one. Two 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. **Retrofit:** options that could be applied in fast food restaurants to save energy/carbon.
   - Increase space temperature dead band by 2K.
   - Economiser in HVAC.
   - Higher efficiency equipment.
   - Maintenance and operational practices.
   - Moving to low GWP refrigerants in the cold stores.
   - Applying renewable energy (solar).

Predicted energy savings and CO_2 emissions reduction

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

Predicted overall energy savings ranged from 38 to 52%.

Savings were the highest when retrofit options were combined.

Carbon emissions could be reduced by 40 to 52%.

In a 'do nothing' scenario, restaurants 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 40-52% of the carbon emissions

From the work, this roadmap recommends 7 major opportunities for the food service

Recommendations

Opportunity 7
Transition to low GWP refrigerants

Opportunity 6
Assess benefits of technologies according to specific location and operation

Opportunity 5
Apply an economiser

Opportunity 4
Use RES, especially solar in sunnier climates

Opportunity 3
Check operation of equipment through regular auditing, maintenance and automated monitoring

Opportunity 2
Purchase the most energy efficient equipment

Opportunity 1
Don't wait, early interventions will reduce cumulative global warming

A great deal of decarbonisation should occur without intervention from the food service 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/