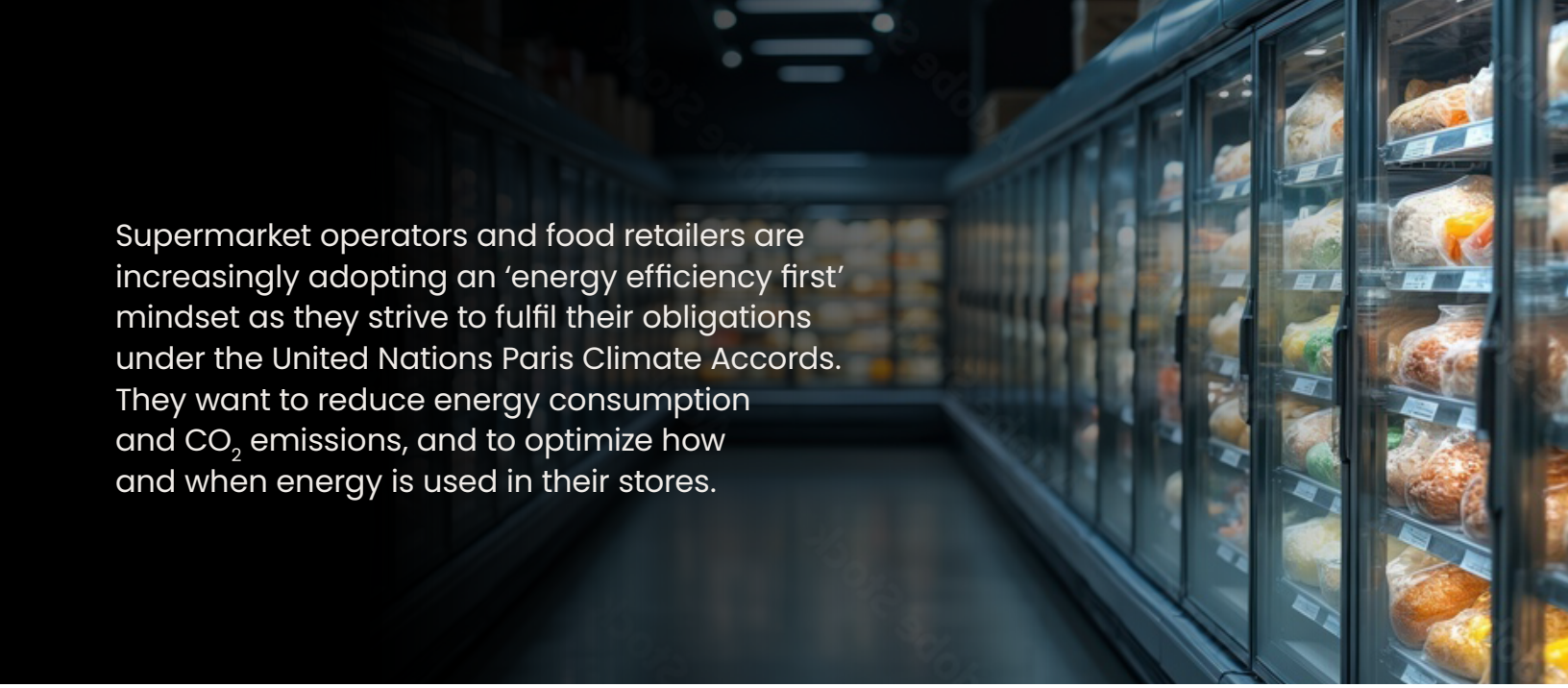
Solstice

SIMPLIFY DECISION-MAKING AND REFRIGERATION ASSET MANAGEMENT IN SUPERMARKETS

CASE STUDY





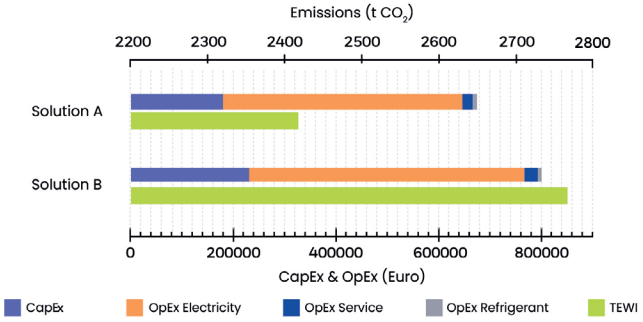
Supermarket operators and food retailers are increasingly adopting an 'energy efficiency first' mindset as they strive to fulfil their obligations under the United Nations Paris Climate Accords. They want to reduce energy consumption and CO_2 emissions, and to optimize how and when energy is used in their stores.

Supermarket operators and food retailers are increasingly adopting an 'energy efficiency first' mindset as they strive to fulfill their obligations under the United Nations Paris Climate Accords. They want to reduce energy consumption and CO_2 emissions, and to optimize how and when energy is used in their stores.

To do this, however, they are having to make complex, impactful decisions about the design and long-term operation of their refrigeration systems – and perhaps most critically, the environmental and financial impact of the refrigerant they choose.

Making such a decision is no easy task: there's no 'one size fits all' refrigerant. That's because, beyond the inherent properties of each refrigerant, every supermarket or retail store is unique in terms of size, layout, age, and geographical location – all factors that influence what type of refrigerant should be used. Another consideration is CapEx and OpEx over the longterm: What will today's choice cost tomorrow? The reality is, food retailers need to balance environmental compliance with the cost of doing so.

Results of an Eco-Efficiency simulation for a 2000 sqm. store in Barcelona (Spain)



This eco-efficiency simulation shows that, by implementing Solution A, a 2000 sqm. supermarket in Barcelona can save 16% on the life cycle cost of the store, and 13% on the TEWI, compared with Solution B.

THE ECO-EFFICIENCY APPROACH FOR DECISION-MAKERS

To help food retailers navigate this complexity and identify the refrigerant that best suits their store's requirements, Solstice has developed a new approach to decision-making and asset management, based on the Eco-Efficiency concept. A vendor-agnostic decision-making platform has been built, and independently validated by Cemafroid, a global consultant in cold chain, refrigeration, and air conditioning. This decision-making platform can simulate the performance of different refrigerants and systems vis-à-vis set parameters to reveal which offers the lowest environmental impact at the lowest possible total cost of ownership (TCO) for a particular store or asset portfolio. With this independently validated Eco-Efficiency platform, users can for the first time make informed decisions about which technology, refrigerants, and systems to use in new and refurbished stores to reach their sustainability goals faster and at a lower cost.

FACTORS IN THE CALCULATION

Solstice's Eco-Efficiency approach takes into account multiple factors, including:

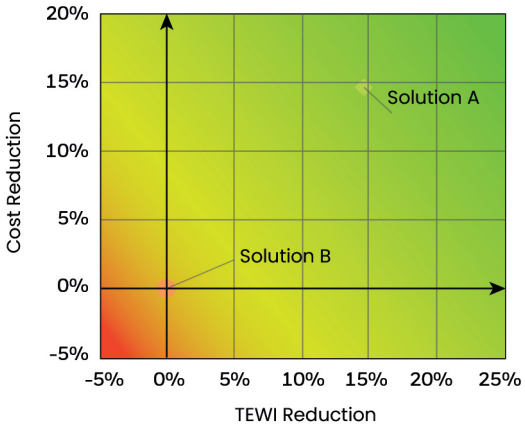
- Type and architecture of the refrigeration system (centralized, distributed, cascade, transcritical, etc.).
- System lifetime.
- Size of sales area (sqm.).
- Geographical location of store.
- Type of refrigerant chosen.

SENSITIVITY ANALYSIS

In order to evaluate the sensitivity of decisions in front of uncertainty, the Eco-Efficiency platform also supports sensitivity analyses on the following parameters:

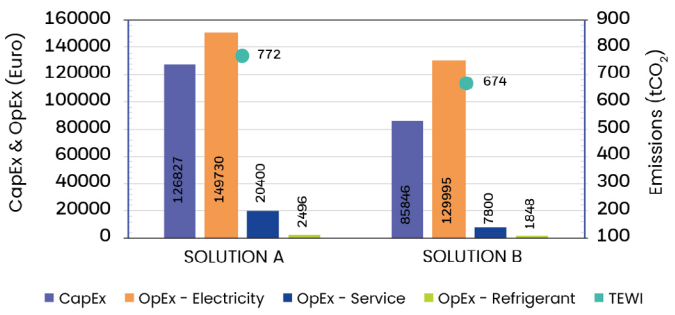
- Local carbon tax.
- Cost & carbon footprint of electricity production.
- System lifetime.
- Plant leakage rate.
- Refrigerant price fluctuations.

Results of an Eco-Efficiency simulation for a 4000 sqm. store in London (United Kingdom)

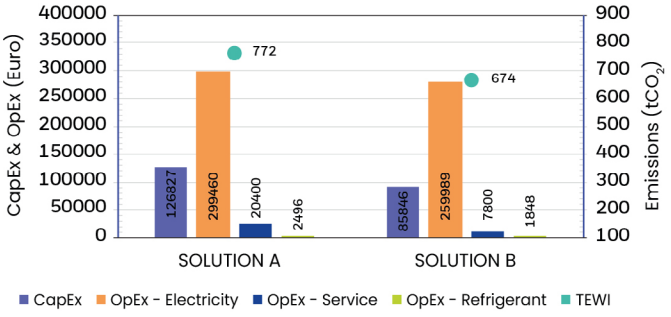


This eco-efficiency simulation shows that, by implementing Solution A, a 4000 sqm. supermarket in London can save 15% on both the life cycle cost of the store, and on the TEWI, compared with Solution B.

Results of an Eco-Efficiency sensitivity analysis with cost of electricity for a 500 sqm. store in Rome (Italy)



CAPEX, OPEX & EMISSIONS - BASE ELECTRICITY PRICE



CAPEX, OPEX & EMISSIONS - NEW ELECTRICITY PRICE

This sensitivity analysis shows that, by implementing Solution B, a 500 sqm. store in Rome can double its savings on electricity vs. Solution A when its price doubles over the life cycle of the store.

For More Information Visit
https://www.solstice.com/us/en

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