

# Developing Sustainable Energy Strategies for Small Scale Food Retail Businesses

19

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## INTRODUCTION

According to the Climate Change Act 2008, the UK government has set an optimistic target: to achieve a 34% greenhouse gas emission reduction by 2020 and an 80% reduction by 2050, from the 1990 emission levels [1]. The number of companies that tend to minimize their environmental footprint is increasing dramatically on a global scale. Indeed, the food retail sector is responsible for approximately 1% of the total GHG emissions in the UK [2]. Therefore, it is crucial to develop sustainable energy strategies for food retail businesses and improve their environmental profile as supermarkets and convenience stores are highly energy intensive businesses.

## OBJECTIVES

The aim of this research is to find ways to decarbonize small scale food retail businesses and develop a sustainable energy strategy for Sainsbury's convenience stores. The project is based on the energy consumption of local stores and a high level data analysis has been conducted so as to investigate the parameters that are necessary to build sustainable strategies for small scale food retail businesses.

## METHODOLOGY

The methodology that is used to build a sustainable strategy for Sainsbury's convenience stores includes five key stages (Figure 1).

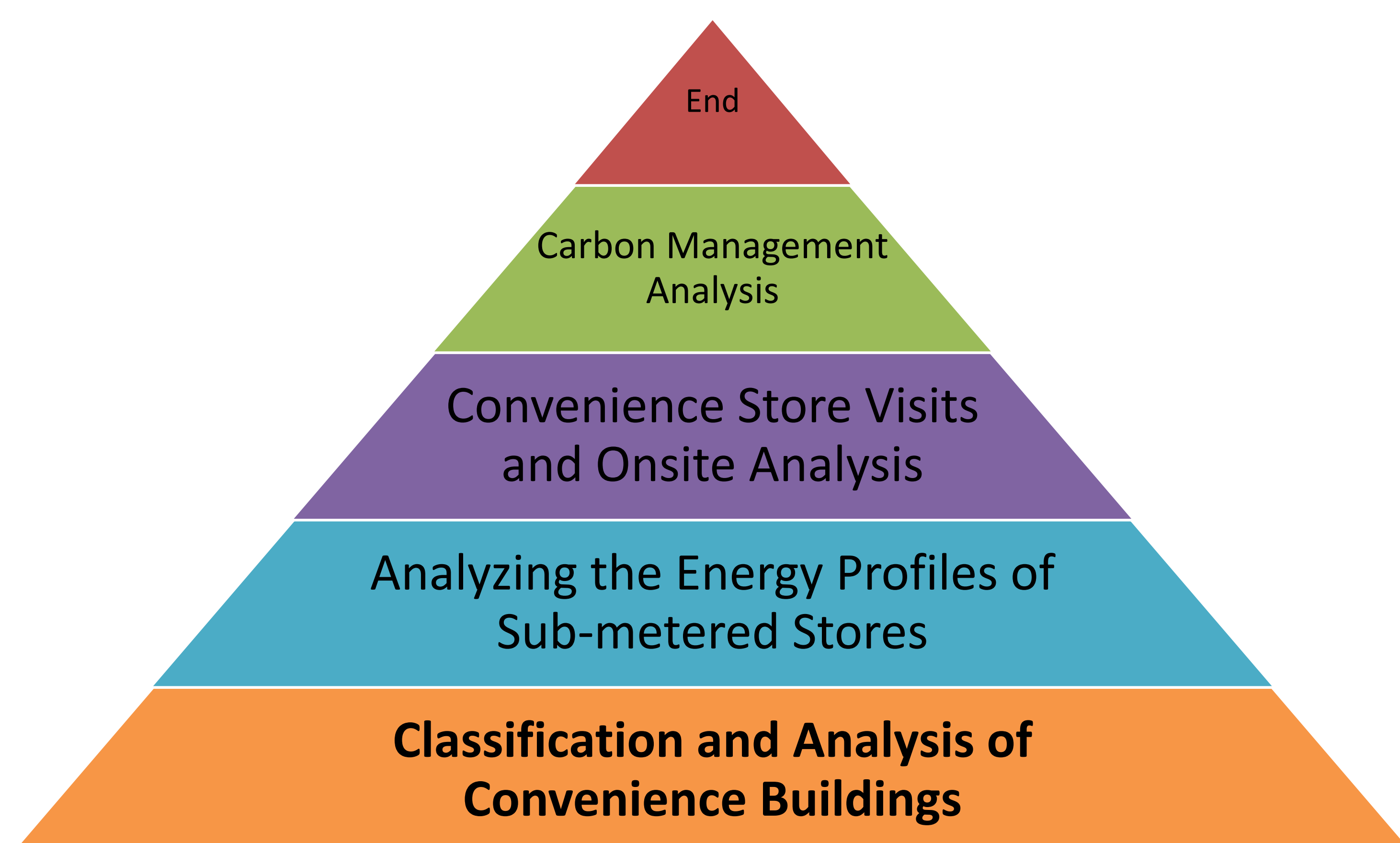


Figure 1: The pyramid structure

- The first part focuses on the analysis of a large sample of stores concentrating on their overall energy consumption.
- The second part involves a smaller group of convenience stores that have sub-meters. The key objective is to study the electricity consumption of these stores and calculate the energy load of lighting, HVAC and refrigeration facilities.
- The next step includes the analysis of one specific well performing store, evaluating its energy profile as well as how the refrigeration energy consumption changes according to weather conditions. Additionally, onsite visits helped to understand how behavioral issues affect stores' energy use.
- The Carbon Management Analysis forecasts Sainsbury's energy consumption and carbon emission levels until 2030, giving appropriate recommendations on how convenience stores could reduce their energy intensity and become more sustainable.

## REFERENCES

[1] DECC . *The Carbon Plan: Delivering our Low Carbon Future*. [Online] 2011 Available from: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/47613/3702-the-carbon-plan-delivering-our-low-carbon-future.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/47613/3702-the-carbon-plan-delivering-our-low-carbon-future.pdf) [Accessed: 19 February 2013].

[2] Gouldson, A. & Sullivan, R. Long-term corporate climate change targets: What could they deliver? *Environmental Science & Policy* 2013; 27, 1-10.

## RESULTS

The classification of Sainsbury's convenience stores has been made according to their size, period of existence and energy performance (Table 1) , indicating that:

- ❖ new stores perform much better than old stores .
- ❖ energy intensity rises for smaller sized stores (Figure 2).

Surface Area Range (ft <sup>2</sup> )	Store Category
Store < 1,500	1K or 1,000
1,500 < store < 2,500	2K or 2,000
2,500 < store < 3,500	3K or 3,000
3,500 < store < 4,500	4K or 4,000
Store > 4,500	mega

Table 1: Size of Local Stores

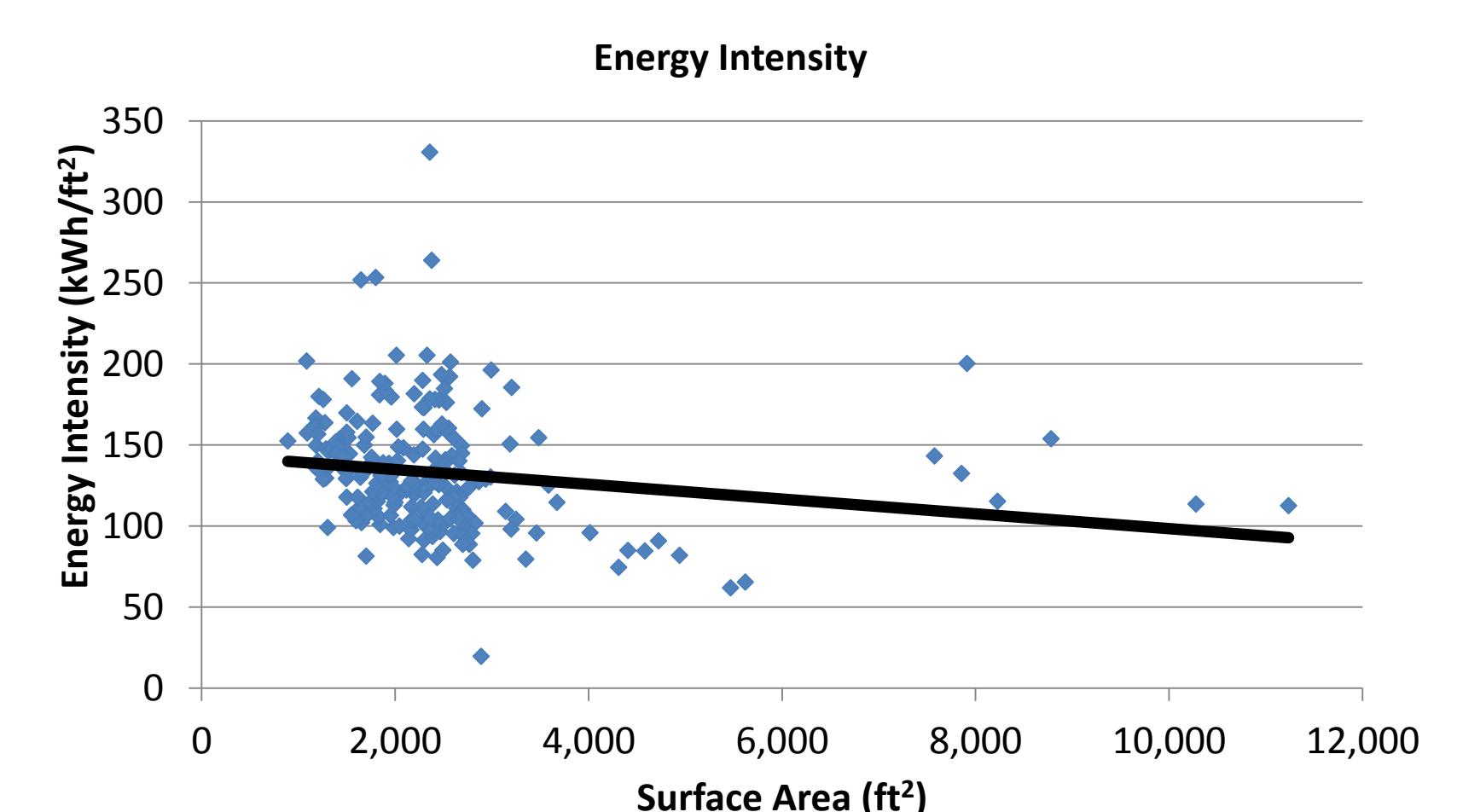


Figure 2: Energy intensity

Onsite visits have been conducted so as to explore the technologies that are used and innovative recommendations have been proposed in order to increase the energy efficiency of :

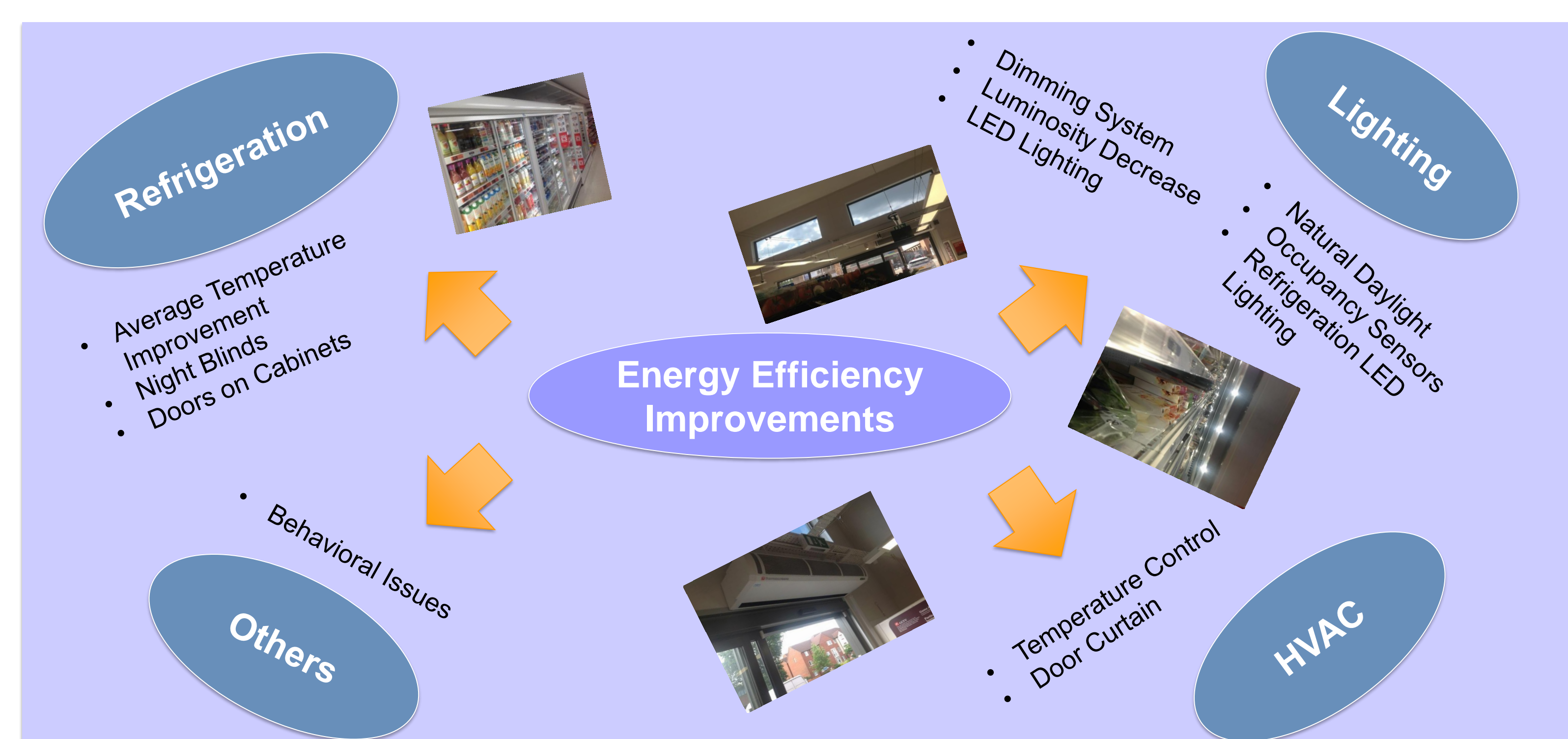
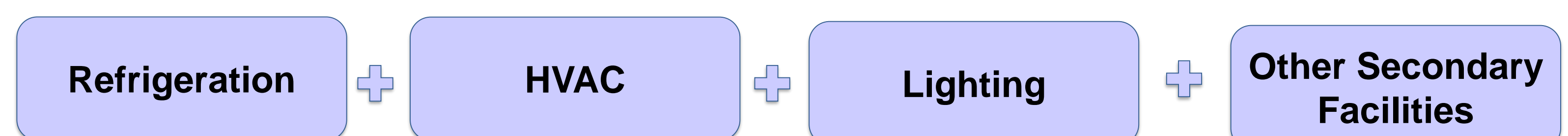


Figure 3: Energy efficiency improvements

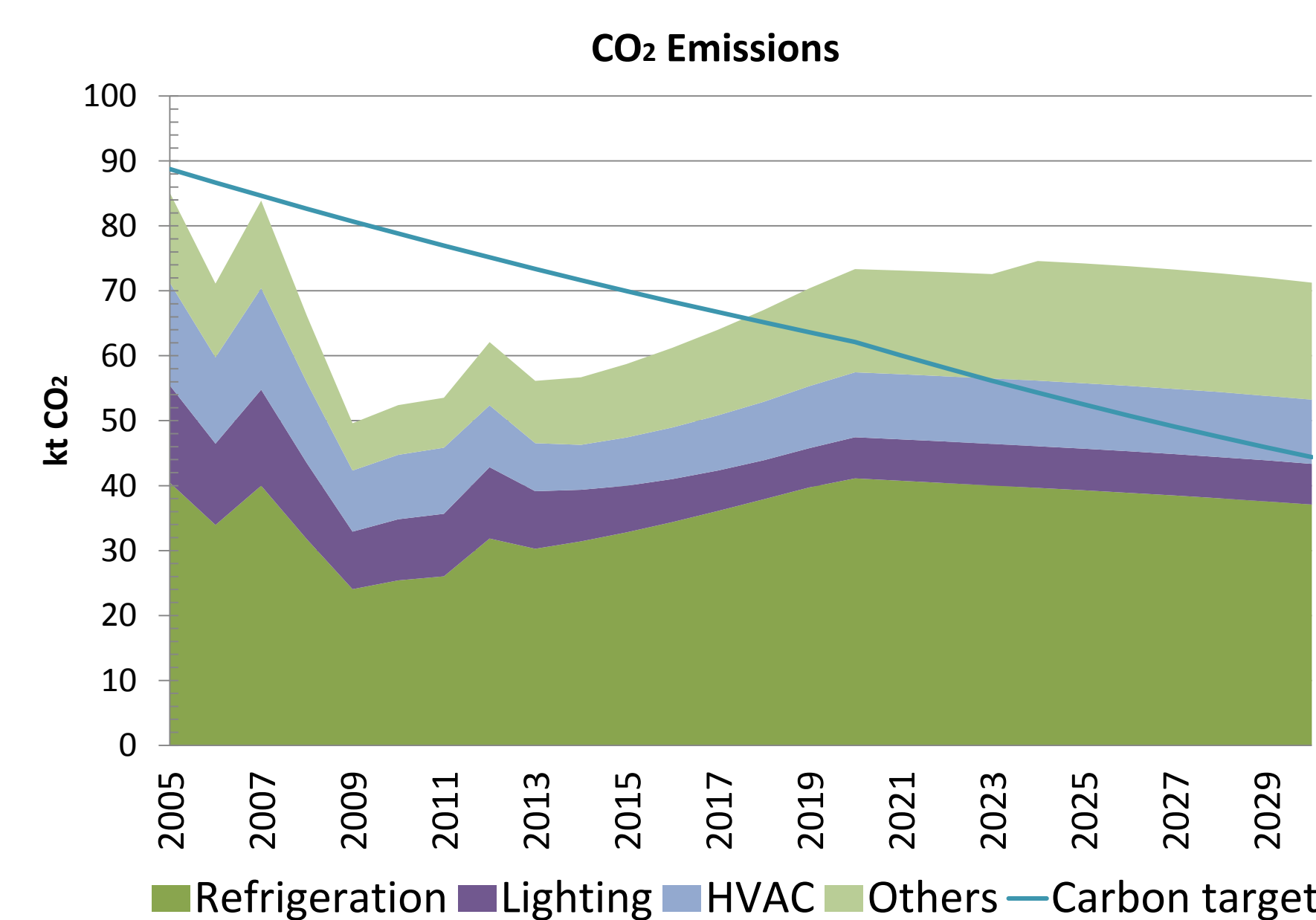


Figure 4: Carbon reduction results

The Carbon Management Analysis estimates the potential energy and carbon savings from the proposed energy efficiency improvements until 2030, indicating that those recommendations are completely vital for Sainsbury's sustainable strategy.

The company's goals are achievable only under optimistic decarbonisation scenarios. Realistic scenarios show that it will be difficult for the company to meet the CO<sub>2</sub> reduction targets simply by implementing the energy efficiency improvements (Figure 4).

## CONCLUSION

- The willingness of the UK government to invest in green energy production, reducing in this way the carbon emission factors, is definitely important for a successful sustainable strategy.
- Due to space limitations, the built environment of local stores makes it difficult to use renewable energy technologies onsite. Therefore, investing in the renewable energy sector by providing economic assistance to wind farms or biomass projects, while receiving tradable carbon offsets, would be a great opportunity for Sainsbury's to meet its sustainable targets and offset actual CO<sub>2</sub> emissions.
- Decarbonization of Local stores is necessary as they are highly energy intensive businesses .