Whitepaper

Revolutionizing retail with whole life carbon assessment

Navigating the complexity of emission accountability through data technologies for carbon and cost reduction

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Retail buildings are not just physical structures; they are significant catalysts in the life cycle emission, energy consumption and waste flow. The energy embodied in every stage of a building's life—from its initial design and construction, through maintenance and renovation, to its operational stage—is a potent force driving climate change. In fact, buildings across Europe are responsible for absorbing 50% of all extracted materials and consuming 42% of the final energy, while contributing to 35% of greenhouse gas (GHG) emissions and 32% of waste flow (Gervasio & Dimova, 2019). This isn't just a statistic; it's a call to action.

This call to action directs us towards the critical question of responsibility. Who should be held accountable for these emissions? The answer to this question is complex and multifaceted. In this context, the allocation of responsibility for a building's emissions becomes a critical factor.

This responsibility is often contingent upon the sector and the specific stipulations of the lease agreement. Frequently, the onus falls on the occupant or leaseholder, especially in sectors such as retail where the tenant exercises substantial control over the building's operations.

The role of whole life carbon assessment

To navigate this complexity, we turn to whole life carbon assessment (WLCA). WLCA can play an important role by providing a comprehensive view of a building's carbon emissions throughout its life cycle. WLCA can help identify the key areas where emissions are generated and who is responsible for them. This can inform strategies to reduce emissions, whether they fall under the responsibility of the building owner, the tenant or both.

In the case of the retail industry, the most significant portion of a building's emissions come from the use of the building during the operational and maintenance stages (i.e., renovation and retrofitting), and in most cases, the tenant has control over this aspect. This highlights the unique challenges and opportunities in the retail sector.

In essence, WLCA can provide the data needed to understand where emissions are coming from and who has the ability to reduce them. This can help to overcome the "split incentive" problem by providing a clear case for both building owners and tenants to invest in reducing emissions. Thus, WLCA serves as a powerful tool in our fight against climate change, particularly in the retail sector.

The challenges of assessing the whole life carbon emissions

Assessing and managing the whole life carbon emissions in the retail building portfolio can feel overwhelming. Building stocks can't be easily assessed as their assets vary substantially in terms of design, construction, energy usage and location. Each building, for example, can vary in terms of the complexity of its energy system, the extent of historical preservation such as renovation and retrofitting, and the microclimate to which it is subject.

One of the key challenges is obtaining reliable and comprehensive data, which can be difficult due to the diverse stakeholder groups that own the data. This can make access difficult and diminish the data quality.

Another important insight that has emerged from our engagement with clients is the limited presence of sustainability key performance indicators (KPIs). These KPIs influence the decision-making process and create bottlenecks in the retailer's effort to decarbonize portfolios quickly, and at scale.

Overcoming challenges: Real-world examples

The potential of WLCA in reducing emissions is not just theoretical; it's backed by empirical evidence and real-world examples. Yet studies have shown that methodologies for assessing the whole life carbon emission (WLC) in combination with data technologies and tools can significantly reduce both operational and embodied GHG in the retail buildings (McKinsey, 2020; Joseph Hawkins 2023).

According to the World Economic Forum, such capabilities can enable the reduction of GHG emissions by up to 20% by 2050. Walmart is a preeminent example of leveraging data strategies and digital technologies to reduce 1 billion metric tons of GHG emissions from its value chain including its warehouses and retail stores within six years.

Managing the carbon footprint of the building stock

Carbon emissions is a highly material topic in the retail sector and as we have already mentioned above, the building stock is one of the key sources. Retail stores are prone to frequent maintenance, renovations, and retrofitting that aggregate substantially into the building footprint and impact on the company's overall net zero performance. Yet, delaying taking actions in assessing and managing GHG in the retail building stock can lead to significant risks that can be related to operational efficiency and customer satisfaction. Improving operational efficiency for instance, through energy efficient lighting, HVAC systems and smart controls not only reduces the operational cost and the carbon footprint, but it optimizes the indoor environment quality, which resonates positively with customers experience.

The aggregated amount of the embodied and operational emission sources, known as whole life carbon emissions (WLC), provides a comprehensive understanding of the retailer's carbon footprint across the entire life cycle of their building stock. In this context, retailers must deeply understand their building stock profile. This helps them make informed decisions using accurate information. This is an action that requires high volume and quality data able to quantify the carbon emission throughout the entire life cycle of their building stock.

A comprehensive approach

Sample selection

- Building profile
- Geographic coverage

Data selection

- Embodied level
- Operational level
- Consumer behavior

Technology enablers and data sharing

- Data robustness
- Data accessibility
- Digital Integration (e.g., LCA software, cloud-based data platforms)

Scenario planning

- What-if analysis
- Scenario implementation and monitoring

A comprehensive approach

We have identified few critical steps that must be taken by the retailers to assess and reduce the carbon emission and the environmental impact of their building stock:

1. Sample selection

The process of sample selection and building classification through typology is a cornerstone in the carbon assessment of the building stock. This stage is pivotal as it enriches the data, enhances the accuracy of the assessment and substantially reduces the time required for the procedure.

a. Building profile

Understanding the profile of their building stock is an imperative task for retailers. The building stock in the retail sector is diverse, ranging from brick-and-mortar stores to mall departments, flagship stores, and factory outlets, each with its unique characteristics and carbon footprint.

Retailers need to delve into the specifics of each building type, considering factors such as the building's age, size, construction materials, energy systems and usage patterns. This detailed understanding allows for a more accurate assessment of the carbon emissions associated with each building type and helps identify opportunities for emission reduction.

b. Geographic coverage

Geographic coverage is another critical aspect of the sample selection. Retailers must consider the climate characteristics of the locations where their stores are situated. The local climate can significantly influence a building's energy consumption and, consequently, its carbon emissions.

Moreover, the energy sources that each area relies upon—whether fossil fuels or renewable energy—also play a crucial role in determining the carbon footprint of the buildings. Retailers should ensure that their sample selection is representative of the diverse climates and energy sources across their store locations.

By taking these factors into account in the sample selection process, retailers can gain a comprehensive understanding of the carbon emissions of their building stock. This understanding is the first step towards developing effective strategies for carbon reduction.

2. Data selection

The selection of appropriate data sets is a critical step in capturing the intricate details of a building's carbon footprint, including the comfort of tenants, operational costs and environmental impact. The right data can provide a comprehensive picture of a building's carbon emissions and help identify areas for improvement. We have identified three core data sources to extract data from:

a. Embodied level

Embodied carbon refers to the carbon emissions associated with the materials used in a building's construction. This process can be complex, as materials with identical profiles might have vastly different embodied carbon levels. Therefore, it is crucial to utilize data from the retailer's database inventory, such as construction-related sources like contractor bids and bills. In cases where data is absent, external data sources such as material libraries can be utilized to fill the data gaps. This approach ensures a comprehensive understanding of the embodied carbon in the building stock.

b. Operational level

Operational energy consumption in retail buildings is typically three to five times higher than that of office and residential buildings. Therefore, identifying the sources of energy consumption is of utmost priority for retailers. Energy-using sites, systems, processes and equipment are a few of the critical sources where retailers must systematically extract data. This data can provide insights into the operational efficiency of the buildings and help identify opportunities for energy conservation and carbon reduction.

c. Consumer behavior

Understanding consumer behavior is another critical parameter to comprehend the source of emissions and provide the retailer with insights on how to reduce them. Data on store visits, average stay duration, peak shopping hours and the popularity of different sections within the store can be invaluable. This data can help determine when and where energy is most used within the store. By analyzing these data sets, retailers can gain insights into the relationship between consumer behavior and GHG emissions. This understanding can then be used to develop strategies to reduce their carbon footprint. For example, they could adjust store opening hours according to consumer behavior to reduce energy use during low traffic times or redesign the store layout to optimize energy efficiency.

In conclusion, the selection and analysis of the right data sets can provide retailers with a comprehensive understanding of their building stock's carbon emissions. This understanding is crucial for developing effective strategies for carbon reduction.

3. Technology enablers and data sharing

Technology enablers are instrumental in supporting whole life carbon assessment by providing comprehensive and accurate data, facilitating benchmarking and enabling effective carbon management strategies across the building stock.

The establishment of an optimal data sharing ecosystem is pivotal. This involves putting in place robust data governance to ensure accessibility and transparency. For instance, IKEA has a well-established data governance framework that ensures data quality, accessibility and protection.

Technological tools such as cloud computing and artificial intelligence (AI) are key enablers of data sharing and interoperability. IKEA, for example, uses cloud computing to store and manage large volumes of data in a secure and accessible manner. It enables real-time access to data, facilitating collaboration among different stakeholders.

AI, on the other hand, can be used to analyze the collected data and generate insights. For example, H&M uses AI to optimize energy use in its stores, helping to reduce carbon emissions.

These technological tools not only enhance a company's ability to mitigate risks associated with data disclosure and data protection but also ensure the reliability and authenticity of the data, thereby enhancing its value. By leveraging these technologies, retailers can make informed decisions and develop effective strategies for carbon reduction. This approach aligns with the goal of reducing the carbon footprint and achieving sustainability in the retail sector. For instance, Walmart has been leveraging data strategies and digital technologies to reduce GHG emissions from its value chain, including its warehouses and retail stores.

In conclusion, the selection and analysis of the right data sets, coupled with the use of technology enablers, can provide retailers with a comprehensive understanding of their building stock's carbon emissions. This understanding is crucial for developing effective strategies for carbon reduction.

4. Scenario planning

The final, yet critical phase for emission reduction is scenario planning. This phase empowers retailers to make informed decisions and simulate the response of their building portfolio to various carbon reduction strategies. For instance, scenario planning can help estimate potential energy savings and reductions in carbon emissions by simulating the impact of various renovation options.

Incorporating the Scope 3 angle, retailers should also consider the indirect emissions that occur in their building stock. This could involve analyzing data on the carbon footprint of building materials used, waste generated from building operations, and energy consumed by appliances and equipment in the buildings.

Scenario planning necessitates the collection and analysis of large sets of diverse data types. These could encompass information on past and current energy use, building materials used, refurbishment activities, and projections of future energy prices and policy changes.

Simultaneously, the company must consider a broad spectrum of other relevant parameters to establish a comprehensive range of possible scenarios. These parameters could include new building regulations or policies, shifts in consumer behavior or changes in the microclimate. Each of these conditions could significantly impact the carbon emissions of the retail building stock, and therefore, should be integral to the scenario planning process.

The scenarios must be regularly updated to ensure that the company is prepared for a variety of possible risks. This regular update fosters resilience and agility in the planning process, enabling the company to swiftly adapt to changing circumstances and continuously optimize its carbon reduction strategies.

In conclusion, scenario planning is a powerful tool that enables retailers to proactively manage their carbon emissions, making it an essential component of a comprehensive carbon management strategy. By considering both direct and indirect emissions, retailers can gain a more holistic understanding of their carbon footprint and develop more effective strategies for carbon reduction

Expected returns

Implementing whole life carbon assessment (WLCA) within the retail building stock offers several benefits to retailers. At a larger scale, this process can contribute to the goals of the **Paris Agreement**:

- Retailers can gain carbon visibility by assessing the environmental impact of various renovation and retrofitting scenarios and choose the right materials and processes with the lowest carbon footprint.
- They can identify carbon positive interventions that lead to cost reductions, such as operational and maintenance costs.
- They can leverage WLCA to comply with regulations such as the **EU Taxonomy and Energy Performance of Buildings Directive** and mitigate litigation risks.
- Ultimately, WLCA can optimize the in-store customer experience. A well-designed, energy-efficient retail space creates a positive customer experience. Proper lighting, ventilation and temperature control contribute to customer comfort. Customers are more likely to spend time in a store that prioritizes their well-being, encouraging repeat visits and loyalty.

Unlocking value in the retail sector

Cognizant stands at the nexus of technology and sustainability enablement, poised to support retailers through the complex journey towards carbon neutrality and climate resilience. Our comprehensive methodology which includes meticulous sample selection, rigorous data selection, cutting-edge technology deployment and strategic scenario planning, empowers retailers on their journey towards carbon neutrality. Together, we navigate complexities, transform risks into opportunities and set new standards for climate resilience in the retail sector.

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