FOODSERVICE CONSULTANTS SOCIETY INTERNATIONAL
UK & Ireland

A Phased Approach - Measuring and Reducing Carbon in Commercial Catering Equipment

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A report by FCSI UK & I

Introduction

The Foodservice Consultants Society International (FCSI) is a global, non-profit association of professional foodservice and hospitality consultants. FCSI members provide unbiased advice to clients in the design, planning, and management of foodservice and hospitality facilities. With a focus on enhancing operational efficiency, innovation, and sustainability, FCSI serves as a leading voice in the industry.

Why has FCSI produced this framework?

FCSI (UK&I) has developed this framework in response to several converging factors within the foodservice industry:

End-User Sustainability Goals:
A growing number of end users are establishing and implementing sustainability roadmaps, which are becoming a significant driver for change. This is creating a demand for robust and reliable sustainability data to inform decision-making.

Data Gap: Since 2023:
It has become evident that a significant data gap exists between sustainable equipment claims and the actual availability of comprehensive sustainability data. This gap hinders the ability of foodservice consultants to provide accurate and meaningful advice to their clients.

Consultant Expertise:
As foodservice consultants, FCSI members are regularly engaged in discussions surrounding sustainable food and beverage operations, which necessitates access to tangible data for commercial kitchen, bar, and front-of-house equipment.

Supporting End-User Objectives:
To effectively support end users in achieving their sustainability goals, FCSI recognises the need for detailed and transparent data for the products its members specify. This framework is intended to facilitate access to this data, empowering consultants to make informed recommendations and contribute to the development of more sustainable foodservice facilities.

Why is action needed now?

FCSI acknowledges that achieving complete data transparency across the industry will be an evolving process. However, we also recognise that the foodservice sector is currently behind other industries in this regard. Decisive action is required now to secure the future sustainability of the industry and to ensure that foodservice consultants can effectively meet the growing demands of their clients. This framework represents a critical step in that direction.

Where has this change been driven?

The drive for improved sustainability and carbon transparency has its origins in the construction sector and is now rapidly expanding into the hospitality industry. This shift is driven by several key factors:

Construction Industry Precedent: The construction industry has been at the forefront of addressing embodied carbon, with initiatives focused on quantifying and reducing the carbon footprint of building materials and processes.

Hospitality Sector Adoption: Large, well-known hotel groups are increasingly adopting sustainability roadmaps and setting ambitious carbon reduction targets, driving demand for more sustainable practices throughout their supply chains, including foodservice equipment.

Education Sector Requirements: Educational institutions are also prioritising sustainability, with a growing emphasis on incorporating embodied carbon considerations into the design and construction of catering facilities.

Healthcare Sector Initiatives: The National Health Service (NHS) in the UK, for example, is committed to building net-zero hospitals, which includes a focus on minimising the embodied carbon of all materials and equipment used in these facilities.

Stadia and Arenas: New stadia and arenas are incorporating sustainable design principles, including the selection of materials with lower embodied carbon, to reduce their environmental impact.

Policy and Regulation: Policies such as the London Road to Net Zero, which mandates embodied carbon assessments for materials in new developments seeking planning permission, are further accelerating the demand for carbon data.

These factors demonstrate that the demand for embodied carbon data and sustainable practices is expanding rapidly across various sectors, including hospitality, and that the foodservice industry must adapt to meet these evolving expectations.

What is the current position?

Since April 2023, manufacturers have been actively receiving requests for sustainability data, indicating a growing awareness of this issue within the supply chain. However, as of 2025, progress in providing this data has been minimal. There remains a significant lack of cross-industry engagement from key industry bodies, which is hindering the development of standardised reporting mechanisms and data sharing protocols.

This lack of progress is creating substantial challenges for large end-users who are increasingly required to undertake comprehensive sustainability reporting. These organisations are facing significant difficulties in obtaining the necessary purchased product data, including embodied carbon information, which is crucial for accurately assessing their environmental footprint and meeting their reporting obligations. The absence of reliable data not only complicates their reporting processes but also potentially exposes them to increased scrutiny and reputational risk.

Furthermore, manufacturers are commonly making broad sustainability claims regarding their products. However, when questioned by end-users or their representatives, foodservice consultants are frequently unable to substantiate or verify these claims. This lack of transparency creates a potential risk and liability for foodservice consultants, who rely on the accuracy of manufacturer information when making recommendations to their clients. It also erodes trust between manufacturers, consultants, and end-users, hindering the adoption of more sustainable practices within the industry.

How do we achieve this?

Industry-Wide Collaboration: We urge industry bodies to take a leadership role in facilitating cross-industry collaboration to develop standardised methodologies for measuring and reporting embodied carbon data for foodservice equipment. This collaboration should involve manufacturers,consultants, end-users, and relevant research institutions.

Manufacturer Transparency: Manufacturers must prioritise the provision of transparent and verifiable sustainability data for their products. This includes, as a minimum, conducting TM65 assessments and, where possible, developing Environmental Product Declarations (EPDs).

Consultant Education: Foodservice consultants need to actively seek out and utilise available sustainability data and tools, and in use emissions to educate themselves and their clients on the importance of considering embodied carbon in equipment selection.

End-User Engagement: End-users should clearly communicate their sustainability data requirements to manufacturers and consultants, and to support initiatives that promote greater transparency in the supply chain.

Our grateful thanks goes to the authors of this document

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Executive summary

Sustainability and the environmental impact of commercial catering equipment has become an important and consistent subject over the past 2 years. However, data is scarce, it is difficult to obtain data, review accuracy and bring the journey to measurable signposts, by which we, as an industry can learn and improve. Previous white paper research has demonstrated that even small commercial kitchens carry an embodied carbon impact which is significant and between 8-11% of the total carbon impact of a CAT A/CAT B office fit out.

With this in mind, we have taken the decision to engage, investigate and measure the embodied carbon in catering equipment in a sector where the impact could be significantly higher, spanning over 50 areas on a single site. However, as an industry, the carbon emissions in catering equipment are on a journey. TM65 is largely untested when it comes to catering equipment at a mid-level project, though it has been applied throughout the rest of the built environment.

We have applied several principles, while formulating the carbon budget. These principles are limited to the manufacturer's input and the manufacturer may object.

The outlined data is accurate to the date indicated on the TM65 schedule.

NB: Any data from more than two months before the end of the RIBA stage will not be included and must be addressed as a construction issue.

The manufacturers involved in the specification of a project managed by Danny Potter from Invito Design, were requested to provide what was measured and recorded via CIBSE (Chartered Institution of Building Services Engineers) forms in line with general guidance. Invito Design have liaised with advisors Impact Loop to support their work as current data is largely unresearched and, in many cases, stated as unavailable. The CIBSE TM65 is commonly adopted in the built environment, measuring equipment such as chillers, heat pumps and other MEP (Mechanical, Electrical and Plumbing). Although it has limitations and is not as granular as an LCA (Life cycle analysis) or EPD(Environmental product declaration) it enables a detailed starting point and a comparable measurement for equipment within the same category.

Limitations

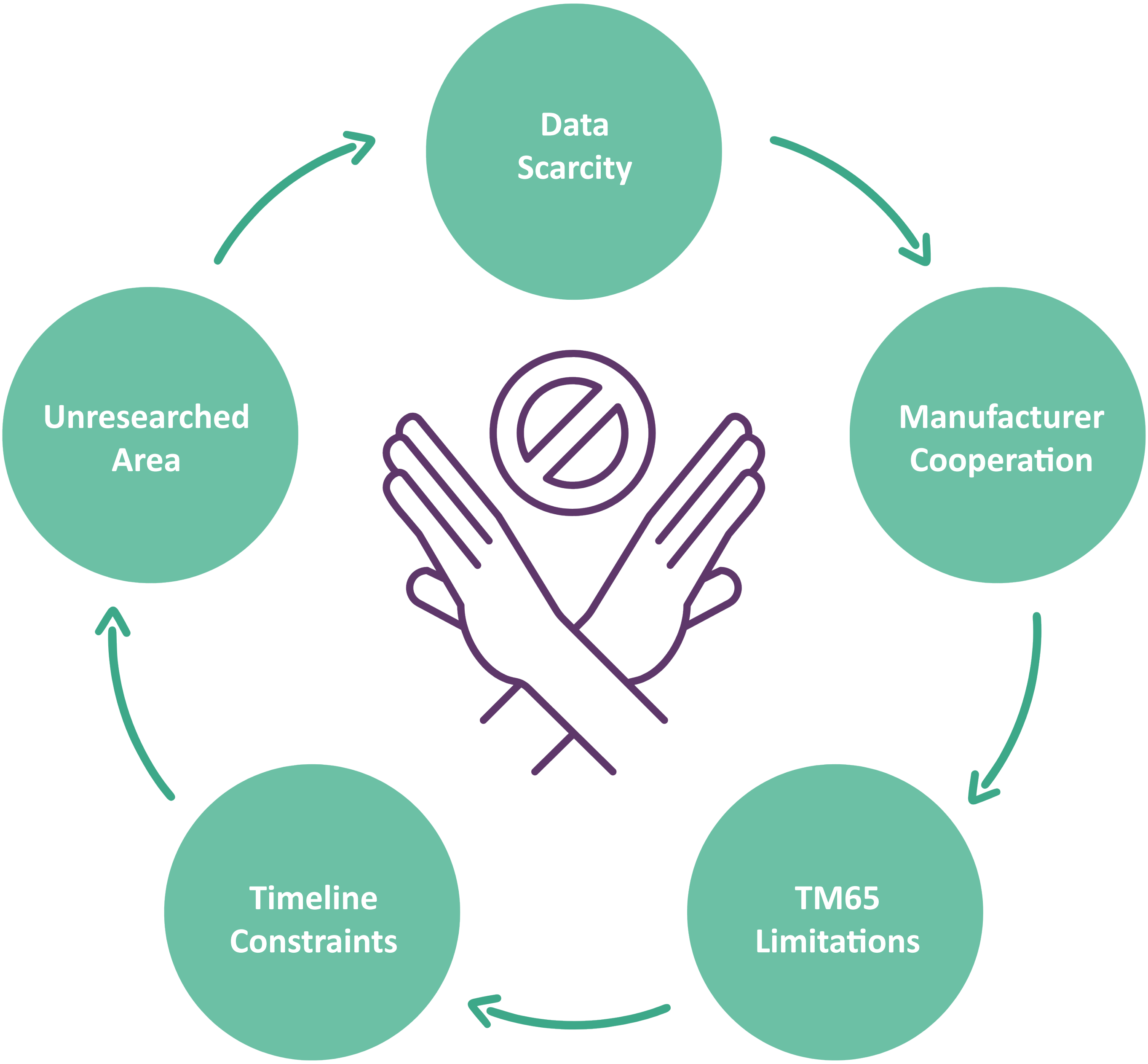
Data Scarcity: Limited availability of embodied carbon data for catering equipment.

Manufacturer Cooperation: Reliance on manufacturers for data, which may be incomplete or unavailable.

TM65 Limitations: CIBSE TM65, while useful, is not as granular as LCA or EPD.

Timeline Constraints: Data older than two months before the end of the RIBA (Royal Institute of British Architects) stage is excluded.

Unresearched Area: Catering equipment embodied carbon is largely unresearched.



Phase 1 - Establishing a baseline - Embodied carbon and material transparency

Focus: Gathering foundational data on embodied carbon and material origins for key catering equipment components.

Detailed Deliverables:
TM65 Mid-Level Embodied Carbon Assessment:

- Conduct a detailed analysis of each piece of catering equipment, adhering strictly to the CIBSETM65 mid-level methodology.
- Include all relevant modules (A1-A3, C1-C4, D) as applicable and provide a breakdown of the embodied carbon for each stage.
- Document all assumptions and calculations clearly.
- Provide a comprehensive report detailing the embodied carbon footprint for each piece of equipment.
- Specifically, this will involve working with manufacturers to obtain detailed bills of materials(BOMs) for each piece of equipment.
- Where Environmental Product Declarations (EPDs) are available, these will be prioritised for data accuracy.
- In the absence of EPDs, industry-average data from reputable databases (e.g., ICE Database, Bath Inventory of Carbon & Energy) will be used, with clear justification and sensitivity analysis.

The assessment will cover the following stages:

- A1 (Raw Material Supply): Extraction and processing of raw materials.
- A2 (Transport): Transportation of raw materials to the manufacturing site.
- A3 (Manufacturing): Energy used in the manufacturing process, including fabrication, assembly, and finishing.
- C1-C4 (End of Life): Deconstruction, transport, waste processing, and disposal.
- D (Benefits and Loads Beyond System Boundary): Potential benefits from recycling or energy recovery.

Material Traceability:

- Identify and document the supply chain locations for dominant materials, particularly stainless steel.
- Trace the material origins from raw material extraction to manufacturing processes, including details of smelting, forming, and fabrication.
- Provide geographical locations of suppliers and manufacturing facilities.
- Document the percentage of recycled content, if any, in the materials.

This will involve:

- Requesting detailed supply chain information from manufacturers, including the names and locations of their suppliers.
- Mapping the flow of materials from extraction to the final product. Verifying the origin of raw materials through documentation (e.g., mill certificates, supplier declarations).
- Investigating the manufacturing processes involved, such as the type of furnaces used in steel production and the energy sources.
- Quantifying the amount of recycled content using supplier declarations and industry-standard methodologies.

Replaceable Parts Inventory:

- Compile a comprehensive list of common replaceable parts for each piece of equipment, including heating elements, motors, seals, and control boards.
- Include the embodied carbon data for each replaceable part, applying the TM65 methodology where possible.
- Document the material composition and manufacturing processes for each part.
- Provide information on the expected lifespan and replacement frequency of each part.

This will include:

- Identifying all components that are typically replaced during the equipment's lifespan.
- Obtaining detailed specifications for each part, including material composition, weight, and manufacturing location.
- Applying the TM65 methodology to calculate the embodied carbon of each part, using EPDs or other documents as appropriate. Estimating the replacement frequency based on manufacturer recommendations, industry best practices, and historical data.

CIBSE Forms and Manufacturer Liaison:

- Ensure the manufactures provided data is recorded via CIBSE forms and in line with general guidance.
- Maintain constant liaison with manufactures to ensure data accuracy.

Rationale: This phase establishes a robust foundation by providing a clear and detailed understanding of the initial carbon footprint and material sources, laying the groundwork for subsequent analysis.

Phase 2 - Expanding the scope - Logistics and operational carbon estimates

Adding logistical considerations and operational carbon estimates based on typical use cases.

Detailed Deliverables:

- Logistics data integration
- Collect detailed transportation data from manufacturers to the point of installation, including distances, modes of transport (road, sea, air), and fuel consumption
- Calculate the carbon emissions associated with transportation using recognised emission factors.
- Document all transportation routes and modes.
- Provide a breakdown of the carbon footprint associated with logistics for each piece of equipment.

This will involve:

- Obtaining detailed shipping records from manufacturers, including origin and destination points, transport modes, and distances.
- Calculating the fuel consumption for each transport mode using industry-standard methodologies and emission factors (e.g., DEFRA, GLEC).
- Accounting for any intermediate storage or handling stages.
- Providing a comprehensive logistics report that details the carbon emissions associated with each stage of transportation.

Operational Carbon Estimates by Use Case:

- Develop detailed operational carbon estimates for each piece of equipment, tailored to specific use cases such as hotels, schools, and hospitals.
- Analyse energy consumption patterns and usage intensity in these different settings, considering factors such as operating hours, load factors, and standby power consumption.
- Utilise energy consumption data from manufacturers and industry benchmarks
- Provide separate operational carbon estimates for each use case, detailing the assumptions and calculations.

This will include:

- Gathering detailed energy consumption specifications from manufacturers, including power ratings, energy efficiency ratings (e.g., Energy Star), and standby power consumption.
- Conducting site visits and surveys to understand typical operating hours, usage patterns, and load factors in different use case settings (hotels, schools, hospitals).
- Using industry benchmarks and academic research to supplement site-specific data.

Developing operational carbon models for each use case, considering factors such as:

- Daily and annual operating hours
- Peak and average load factors
- Standby power consumption
- Energy efficiency degradation over time
- Providing a sensitivity analysis to account for variations in usage patterns and energy sources.

Framework Manufacturer Operational Data:

- Collaborate with manufacturers to obtain their estimates of operational carbon emissions based on standardised usage scenarios.
- Request detailed data on energy consumption, including power ratings, efficiency ratings, and standby power consumption.
- Document the usage scenarios and assumptions used by manufacturers in their estimates.

This will involve:

- Engaging with manufacturers to obtain their data on energy consumption
- Reviewing manufacturer testing methodologies.
- Comparing manufacturer data with real-world data and benchmarks.

Rationale: This phase broadens the analysis by incorporating logistical considerations and providing context-specific operational carbon estimates, enhancing the realism and applicability of the assessment.

Phase 3: Real-world monitoring and lifecycle analysis - whole life carbon

Implementing ongoing monitoring of operational carbon and tracking repair data to refine lifecycle assessments.

Detailed Deliverables:

- Asset-level operational carbon monitoring
- Deploy monitoring systems to collect real-time data on energy consumption for each piece of catering equipment in operational settings.
- Utilise smart meters and sensors to track energy consumption, operating hours, and load factors.
- Establish a data management system to store and analyse the collected data.
- Provide regular reports on operational carbon emissions for each piece of equipment.

This will involve:

- Selecting and installing appropriate monitoring equipment (e.g., smart meters, sensors) to measure energy consumption, operating hours, and load factors.
- Establishing a secure and reliable data acquisition system to collect and transmit data from the monitoring devices.
- Developing a data management platform to store, process, and analyse the collected data. Generating regular reports on operational carbon emissions, including trends, anomalies, and comparisons to baseline estimates.
- Ensuring data accuracy and reliability through calibration, validation, and quality control procedures.

Repair Data Collection:

- Establish a comprehensive system for tracking repair and maintenance activities. Document the frequency and types of repairs, including parts replaced and labour hours.
- Track the lifespan of replaceable parts and identify patterns of failure.
- Maintain a database of repair data for each piece of equipment.

This will involve:

- Developing a standardised repair and maintenance log to record all repair activities
- Training staff on proper data collection procedures. Implementing a computerised maintenance management system (CMMS) to track repair history,parts inventory, and maintenance schedules.
- Analysing repair data to identify common failure modes, predict maintenance needs, and optimise replacement strategies.

Lifecycle Data Analysis:

- Utilise the collected operational and repair data to refine the lifecycle assessment
- Calculate the total carbon footprint of each piece of equipment over its entire lifespan, including embodied carbon, operational carbon, and end-of-life emissions
- Identify opportunities for reducing the environmental impact through improved maintenance,replacement strategies, and end-of-life management.
- Provide a comprehensive lifecycle assessment report, including recommendations for reducing the environmental impact.

This will involve:

- Integrating the monitored operational carbon data and the collected repair data into the lifecycle assessment model.
- Recalculating the total carbon footprint using the refined data, and comparing it to the initial estimates. Identifying key drivers of the lifecycle carbon footprint
- Evaluating different end-of-life scenarios (e.g., recycling, reuse, landfill) and their associated carbon emissions.

Developing recommendations for reducing the environmental impact, such as:

- Optimising maintenance schedules
- Extending the lifespan of equipment and components
- Selecting more durable and energy-efficient equipment. Promoting recycling and reuse of materials

Rationale: This phase transitions from estimations to real-world data collection and analysis,enabling continuous improvement and a more accurate understanding of the long-term environmental performance of catering equipment.

Our commitment

The FCSI and the Foodservice Consultants recognise that this journey towards greater sustainability and carbon transparency in the foodservice industry will take time, potentially spanning 2-3 years.

It will require close collaboration and open communication between all stakeholders, including manufacturers, consultants, end-users,and industry bodies.

We understand that achieving perfection in data collection and reporting may not be immediately possible. However, we firmly believe that we must embark on this path together, embracing a spirit of continuous improvement and shared responsibility.

The ultimate goal is to create a more sustainable future for the industry and to better serve the needs of our clients.