LONDON
LEADING TO A GREEN LONDON

BETTER BUILDINGS PARTNERSHIP

Sustainability Benchmarking Toolkit for Commercial Buildings

Principles for best practice

Acknowledgements

The Better Buildings Partnership (BBP) brings together a number of the largest commercial and public property owners in London under one collaborative organisation. All members are working together to improve the sustainability of London's existing commercial building stock and accelerate the reduction in CO_2 emissions from those buildings.

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Special thanks go to the participants of the Benchmark Working Group for their contributions and critical comments.

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The views expressed in this report are not necessarily those of either the individuals who provided input or of their organisations.

A special recognition is given to the work of Bill Bordass at the Usable Building Trust over the last 10 years improving our understanding of sustainability in the building sector, and to his indefatigable efforts to push forward the important issue of measuring and assessing performance.

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Chairmen's Statement

Sustainability benchmarking within the property sector is an important tool to help us assess and reduce our impact on the environment. It aims to help improve measurement, asset performance and design, as well as incentivise the most appropriate behaviours and actions. To achieve these objectives it is necessary to develop, over time, benchmarking processes that are robust yet sufficiently flexible to allow for the inclusion of a range of characteristics that influence the sustainability performance and carbon footprint of a property.

Benchmarking can be a difficult and time consuming exercise. It is therefore necessary to start simply and build up complexity as understanding of our buildings and property portfolio grows – in essence, adopting a 'graduated approach'.

Any approach to improve the sophistication of benchmarks will require time and commitment. However, the process should remain flexible to allow for the inclusion of additional metrics that account for changes in the industry while, at the same time, finding the right balance between the original focus of improving performance and seeking increasingly sophisticated ways of measuring it.

The purpose of this Toolkit is two fold, to present the Better Buildings Partnership's experience of sustainability benchmarking, and to propose some principles for best practice which may be of interest and assistance to others in the property sector who have a desire to improve the environmental performance of their buildings.

It is also our hope that this Toolkit encourages a debate on the methodology of benchmarking for sustainable property. Indeed, the BBP hopes to stimulate and encourage the market to define and agree a set of industry standards and common sustainability metrics for reporting and benchmarking. This would be of great benefit in helping us all measure and improve the environmental performance of our buildings.

Peter Clarke
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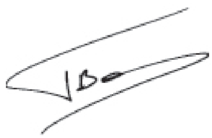

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Glossary

Benchmark

A point of reference for measurement; a defined level of performance used as a reference for comparisons. Benchmarks can be based on averages or percentiles of real performance. On the other hand, they can be based on policy-driven objectives such as 'net zero carbon'.

Carbon Target

A carbon target is a defined number setting a quantitative goal to be achieved in a given time frame. Such targets can be absolute or can be based on a comparison with relative industry averages.

Data

Factual information collected in a standardised way and which is used as a basis for calculation or discussion.

Indicator

A yardstick used to measure performance, often dividing one metric by another (e.g., an impact with a driving factor, like water consumption in litres per person).

Industry Standard

A definition or format that has been approved by a recognised standards organisation or is accepted as a de facto standard by the industry.

Metric

A quantifiable measurement that needs to be defined and collected in a standardised way.

Sustainability Benchmarking for Property

A method that assesses and compares sustainability performance of property assets against peers or against set targets. This process can incorporate a wide range of asset criteria and characteristics. Well designed benchmarks should allow flexibility and adaptation to changes in the industry over time.

Target

A quantified goal within a stated timeframe. Targets often use Indicators (e.g., improve performance from x to y using the indicator by 2011 on a 2008 baseline). They can also use benchmarks (e.g., for 75% of properties to surpass x benchmark by 2009).

Executive Summary

Benchmarking can be a lengthy and complex process but results in numerous benefits including a greater understanding of how a building portfolio operates, allowing comparisons of buildings to be made, identifying areas of improvement and helping preparation for new legislation.

Tools and approaches to assess the sustainability and energy performance of buildings are currently available, such as BREEAM and LEED for new buildings, and LES-TER and BREEAM in Use for existing buildings. A number of organisations also offer sustainability benchmarking services. Such initiatives have enabled a greater understanding of sustainability measurement, reporting and benchmarking processes.

In addition, a growing number of mandatory mechanisms require property organisations to start collecting sustainability data, though the data requirements will vary with each scheme, such as the Energy Performance Certificates (EPCs) and Display Energy Certificates (DECs) and the Carbon Reduction Commitment (CRC). Furthermore, a number of international initiatives on sustainability measurement and reporting are underway, such as the GRI Construction and Real Estate Sector Supplement (CRESS), the UNEP Global Guide for Building Performance under the Sustainable Buildings and Climate Initiative (SBCI).

The purpose of this discussion paper is to present an overview of current practices in sustainability benchmarking and identify principles for best practice to support the development of this important process in the future. This work does not purport to replicate existing approaches or tools, but rather seeks to complement them through offering further insight on the associated challenges and the lessons learned by the BBP in undertaking its own benchmarking exercise for its members. While our focus here is on measuring and benchmarking energy and carbon, the findings can be transferred to other indicators such as water, waste, and transport.

The Better Buildings Partnership's (BBP) own benchmarking exercise identified many challenges associated with the process. These included: the availability and capacity to collect data; the need to properly identify and use the most appropriate metrics and indicators for measuring environmental performance; learning to compare like with like in terms of buildings and portfolios; recognising that some characteristics or factors (such as the particular use to which a building is put) can need special consideration.

In meeting these challenges, a key finding to emerge from our work, and which is one of our main principles for best practice, is to keep the process simple at the outset and only build up complexity as understanding of your buildings' and portfolios' environmental performance grows. This approach is termed a "graduated approach".

A second finding to emerge from our work is the necessity of industry standards for sustainability metrics in the real estate sector. This would ensure all benchmarking tools and services follow methodologies based on an agreed set of metrics and indicators. It would improve the overall efficiency of sustainability benchmarking by avoiding the duplication of data collection and ensuring that the data is compatible, comparable and portable between various tools and services.

Industry standards could also lead to the formation of a central database which could hold national or even international data sets to allow for comparisons and for setting sector-wide benchmarks. The BBP welcomes the effort of the Green Property Alliance Measurement and Reporting Working Group, and in this respect will seek to work closely with it to support the group's objectives.

1. Introduction to Sustainability Benchmarking

What is sustainability benchmarking?
The benefits of sustainability benchmarking

What is sustainability benchmarking?

Sustainability benchmarking is a process that assesses and compares the sustainability performance of a building against other properties or pre-defined targets and benchmarks. The process covers a wide range of property characteristics as well as operational performance, including building fabric, energy, waste, water and transport. It also allows comparisons to be made at a unit, building or portfolio level as well as over time.

The sustainability performance of a building can be viewed from two basic perspectives, and we have used two simple terms to describe them:

Design

- The sustainability performance which the physical fabric and components of the building has been designed to achieve, e.g., the performance specification of the insulation, heating and cooling systems, or lighting systems.
- Refurbishment or significant maintenance programmes present opportunities for the owner to improve systems such as heating/cooling or lighting and upgrade the sustainability performance of the physical fabric of the building and its plant.

In-use

- The measured operational sustainability performance of the building when it is in use by occupiers.
- Operational performance is affected by both how occupiers utilise a building and how the owner runs shared services. The interface between the two parties is important in determining how efficiently the overall building is operated.

A number of organisations offer to analyse building characteristics and operational data and provide sustainability benchmarking services. These include IPD, Upstream Sustainability Services at Jones Lang LaSalle, and Bureau Veritas. Such initiatives have enabled a greater understanding of sustainability measurement, reporting and benchmarking processes (see Appendix 2).

The benefits of sustainability benchmarking

Sustainability benchmarking of a property or property portfolio brings a number of benefits to its users, as it:

1 **Enables an organisation to assess its impact on the environment at both an individual building and portfolio level**

This may be in terms of CO_2 emissions, fuel consumption, waste generation or water consumption, etc., of individual buildings or portfolios, and can be reported in absolute and/or normalised terms.

2 **Facilitates a greater understanding of how a portfolio is operating**

The benchmarking process will identify high impact and low impact buildings, leading to a greater understanding of why certain buildings may consume more than others. For example, a highly intensive building within a portfolio may simply house energy intensive activities, such as a server room. The key question is whether the building is performing optimally.

3 Identifies where action is appropriate and where greatest savings can be made

A greater understanding of the sustainability profile of a building or portfolio will highlight poor-performing and well-performing buildings, identifying the areas where action is required and where the greatest improvements/cost-savings can be made.

4 Enables an organisation to set and monitor realistic targets

Once an organisation understands how a specific building or portfolio is operating, appropriate targets can be set and the performance against these targets monitored. Sustainability benchmarking will also identify where performance improvement programmes have been successful and what changes have been achieved, thereby helping plan the most appropriate allocation of resources for improvements.

5 Enables for the comparison of buildings and portfolios between peer groups

Commercial property owners will be able to compare assets within their portfolios, as well as against other owners' properties/portfolios. Sustainability benchmarking would also enable fund managers or potential investors to compare across funds or property portfolios.

6 Assists legislative and regulatory compliance

Benchmarking also creates a robust framework that can help facilitate preparation for compliance with emerging legislation, e.g., the forthcoming Carbon Reduction Commitment Energy Efficiency Scheme (CRC) and changes to the EU Energy Performance of Buildings Directive (EPBD).

7 Helps improve asset value

There seems to be an increasing trend among investors to take sustainability factors into account in their decision-making processes. Furthermore, the increasing volume of legislation and mandatory standards for the environmental performance of buildings, as well as occupiers' rising aspirations for greener buildings, would seem to indicate that green factors will play a greater role in the way buildings are valued in years to come. Sustainability benchmarking should therefore assist valuation as well as investment processes and decision-making in the future.

From an owner's perspective, there is some early emerging evidence to suggest that sustainable properties may limit the risk of depreciation to an asset's value over time[1].

1 Doing Well By Doing Good? An analysis of the financial performance of green office buildings in the USA, RICS Research (2009).

2. Issues and Challenges in Operational Sustainability Benchmarking

Data collection
Measuring and assessing performance
Comparing and benchmarking performance

The process of sustainability benchmarking will vary according to its specific purpose and data availability, however, the key steps and associated challenges involved are likely to include: data collection, measuring and assessing performance, comparing and benchmarking performance, and acting upon results.

Data collection

Collecting accurate, consistently measured and verifiable data is the first step to develop an appropriate and robust benchmarking process that will enable performance and progress to be measured, monitored and managed and, most importantly, help focus behavioural changes to achieve the best results in terms of sustainability performance.

Unfortunately, a lack of data may lead to situations whereby it is not possible to employ the most effective metrics to improve and incentivise changes in operational performance. However, organisations can start by using available data, however limited it may be, and increase and improve the sophistication and robustness of the process over time.

It is important, at the outset, to clearly define the scope and purpose of the benchmarking exercise and the intended areas for incentivising behaviour. Following this, organisations should carefully consider the indicators they wish to report (e.g., annual $kgCO_2$ per m^2) and accordingly identify the type of metrics and associated data that needs to be collected.

However, deciding which indicators to employ will be influenced by the nature of data available for metrics to be measured, e.g., gross, or net lettable area for floor space; full time employees equivalent (FTEs) or workstations for number of employees; or sub-metered data, if available, for 'special-uses'. Indeed, data is often inaccessible or not readily available. For example, measuring energy consumption of individual occupiers in a multi-let building would require the installation of sub-meters. Over a large portfolio, such installations can involve significant expense and time.

Moreover, care must be taken when benchmarking a property to clearly state the scope of the data collected, for example whether whole building data is collected, including both owner-provided services and occupier consumption.

The way in which data is collected can also vary, greatly affecting the robustness of the benchmarking results. There is no current standard business practice in this field, with, for example, some organisations relying on estimates from utility bills for collecting energy data and others measuring actual energy consumption through half-hourly automatic meters and smart meters.

While it is possible to benchmark a building using annual data, more regular data collection allows for a more active environmental property management approach through frequent monitoring and targeting techniques.

Appendix 4 provides a list of energy data requirements BBP collected in 2009, its first year of benchmarking. The BBP wishes to share its experience but is not suggesting that these metrics are the minimum level of data collection an organisation should follow. These characteristics are the minimum the BBP felt was necessary to achieve its scope and purpose during its first year of benchmarking while taking into consideration the data available for collection at the time. Although focus is currently on energy consumption, this scope is intended to widen over time to include other sustainability related aspects, such as water and waste.

Measuring performance

A number of critical aspects must be accounted for when measuring performance.

The operational performance of a building can be represented in both absolute and normalised terms. While both types of indicators have their own benefits and problems when measuring and assessing performance, it is important to note that both absolute and normalised indicators are complementary and necessary to provide a complete picture of an asset's performance and to support active property management.

It is also important to select the appropriate driving metric to normalise the sustainability performance indicator in order to influence the right behaviour and deliver improved performances. However, the following issues currently prevent using the most effective metrics: lack of agreed metrics definitions and limited availability of accurate and replicable data.

Absolute performance

Absolute performance can be an important means of understanding the overall impact of a portfolio/organisation, e.g., total CO_2 emissions per year or comparing a consistent portfolio over time. Most real estate organisations collect the necessary data to measure and report absolute environmental performance.

However, given the characteristics of the property sector, there are concerns about the effectiveness of absolute measures of performance in influencing the right behaviour that will deliver improvements to the sustainable operation of a building. The main concern with absolute measures of performance is that care has to be taken to take account for the dynamic nature of the real estate market and the potentially rapid changes of portfolio size and asset ownership. For example, if the total size of the portfolio held by BBP members were to reduce significantly, absolute emissions would also be reduced, even if no direct actions to cut CO_2 emissions have actually been taken. The opposite is also true, whereby significant reductions in CO_2 emissions of an owner's property portfolio can be outstripped by an increase in their portfolio size over time. By comparing a consistent, like-for-like set of properties it is possible to compare absolutes over time, but the longer the time span being analysed, the more properties may have to be excluded from the like-for-like set.

Normalised performance

Normalised indicators take into account the dynamic nature of the real estate market and allow comparisons of portfolios and buildings' performance over time. Normalised measures have the further advantage of allowing for comparisons against near-peer groups at both the building and portfolio level. This is important in setting a sector-wide benchmark and identifying industry leaders. Finally, by providing a more detailed assessment of how assets are performing, they allow organisations to set more appropriate targets.

Normalisation is achieved by relating the impact of a performance metric (e.g., CO_2, or litres of water) to another driving variable, such as floor area or density of occupation of a building. For example, emissions could be presented for an office building in terms of CO_2 per m^2, or CO_2 per full time equivalent employee (FTE) or per workplaces.

Deciding which normalisation metric to use for assessing sustainability performance and developing benchmarking tools can be challenging, as the results ultimately can have an influence on the appropriate behaviour to improve building performance. The most common approaches are to assess performance relative to floor area and to occupational density, with each having specific advantages and issues. Moreover, benchmarking usually adjusts data for weather conditions, and in some cases for special uses.

Normalising relative to floor area

Measuring performance relative to floor area (m^2) is the most widely used and simplest normalised indicator in sustainability benchmarking. This indicator was originally chosen because it has a long history of being recorded for all types of property for other property management purposes, such as rents and insurance, and the relevant data is available, relatively accurate, replicable and verifiable. Furthermore, it has more recently become compatible with legislation on Display Energy Certificates (DECs) required for government-occupied buildings.

Normalising relative to occupational density

In the past years, organisations have started to increase the occupational density of buildings they occupy, e.g. across the government estate. This strategy may improve overall organisational carbon and environmental footprint, but results in a higher emissions per unit of floor area, as more people occupy a given space, and these improvements are not captured by a per-floor-area indicator. This situation can be addressed by measuring performance relative to occupational density. Whilst less common, it is an approach that is increasingly being discussed and researched.

Measuring density of occupation requires the measurement of the number of 'persons' that occupy the building and use its facilities during a given period of time. Such an approach has its own issues related to how occupancy is defined and measured, the types of activities carried out by occupiers, and the risks of unintended consequences due to increased density.

The first concern is that there is no clear set of industry definitions for occupational density and the notion of 'persons' is not universal and differs per property type. The issue of industry definitions needs to be clarified for this form of normalisation to be developed further.

The varying definitions for the office and retail sectors illustrate the point. In offices, a person is defined either by some notion of a 'worker', such as full time employee (FTE), or some description of a workstation. Managed retail properties have 'visits' measured by footfall, but their energy consumption is less driven by numbers of visitors than in the office sector, and there are questions as to how comparable footfall measurements are for different types of retail properties. Definitions should also indicate how often measurements are taken to account for changes in occupancy levels, e.g. annual average, or based on monthly or quarterly assessments. The issue of type and frequency of data is complicated by the practical matter of data collection.

The second concern is the type of occupier business activities which will influence the appropriate metrics to use. For example, a consultancy may have a large workforce (i.e., large number of FTEs) but the very nature of its business may mean that most employees are often out of the building and may have a high ratio of persons to workspaces. Therefore, reporting performance against either FTEs or workstations would produce significantly different results.

Unintended consequences pose the third concern when using occupational density, as higher density does not automatically equate with improved sustainable performance. There are certainly cost and energy gains to be made though greater utilisation of floor space. However, there are likely to be ceilings to such gains, and beyond a certain threshold of people-density the design and operation of a building can be compromised, especially to meet peak demand. Energy demand is driven not only by the number of users, such as lighting and ventilation which are driven by floor areas and volumes as well as number of people. Finally, while there is emerging evidence that a more sustainable working environment can improve employee productivity[2], there is a point at which high density will impact occupier productivity, and by doing so reduce the attractiveness of a building to potential occupiers.

Comparing and benchmarking performance

In order to compare performance across properties on a like-for-like basis, buildings need to be categorised into similar peer groups and special uses should be considered.

Categorisation of buildings

In defining the parameters for benchmarking, it is fundamental to establish categories of buildings in order to enable comparison between assets of similar characteristics. Typically, categorisation in the UK has been based on the type of HVAC systems in place, technical specifications and level of servicing. The main UK references are ECON 19 guide for offices and OSCAR for managed retail properties (see Figures 1 and 2, Appendix 3). However, there is a debate, particularly in the office sector, whether incentivising more 'sustainable' behaviours requires a move beyond this type of characterisation to take into account the usage of the buildings and how intensively they are being used.

For instance, an alternative option within the office sector would be to categorise offices by density of occupation rather than the type of HVAC system in place. A benchmarking assessment based on a CO_2 emissions per floor area indicator can then be carried out for various bands of density of occupation (See Figure 3, Appendix 3).

However, whilst there are undoubted benefits, there needs to be an agreement on a standardised indicator for density of occupation before it can become a robust and accepted approach. Until further work has been carried out in this area, the density of occupation approach can only be complementary to the existing categorisation of a buildings based on HVAC systems.

2 In the bricks research summary - The business benefits of low carbon buildings, Carbon Trust (2009).

Such an approach is not suitable in the retail sector, as energy consumption is less driven by numbers of people than by floor area and even volume (though customer visits can be a suitable way to normalise water consumption). The current approach to categorising retail assets based on the type of HVAC system in place seems to be appropriate.

Based on these findings, in its first year of data collection, the BBP classified buildings into three categories for offices: non air-conditioned; air-conditioned standard and air-conditioned prestige, and three categories for retail: open retail, non air-conditioned retail and air-conditioned retail, see Figures 1 and 2, Appendix 3. However, the BBP is keen to incorporate density of occupation in the comparison of assets performance for offices as it believes this can have a positive impact on influencing improved sustainability performance, see Figure 3, Appendix 3.

Special uses

In addition to the above, special uses, such as server rooms, trading floors, catering areas and car parks are important characteristics of properties that impact on their sustainability and carbon performance. The option of itemising and separating the consumption of such uses for benchmarking is of benefit when comparing buildings with different 'special uses'.

However, ignoring these special consumption areas when reporting would not support the objective of influencing the right behaviour. A better approach to promote improved property management would be to utilise 'special uses' categories to differentiate peer groups and compare assets that have similar areas, in particular server rooms and catering. Whilst this would involve significant effort to obtain the data set to develop and refine such an approach, it may prove of significant benefit for improving performance of the buildings.

3. Best Practice Principles for Sustainability Benchmarking

A 'Graduated Approach' to sustainability benchmarking
Key data collection principles
Accounting for Change
Incentivising the right behaviour
Partnership between occupiers and owners
Sharing knowledge and experience

Sustainability benchmarking can be a challenging exercise, and it is not usually possible to implement a detailed and wholly comprehensible system immediately from the outset. There is always much to learn and the BBP would suggest that a Graduated Approach is best employed. This approach is presented below, along with other complementary and supporting principles for best practice.

A 'Graduated Approach' to sustainability benchmarking

A 'Graduated Approach', developed by the Usable Buildings Trust, advocates that the benchmarking process should start off simple and build in complexity over time. This allows for further sophistication to be introduced as a greater understanding of how a building operates and the key factors influencing occupier behaviour develops.

Essentially, as data collection becomes more accurate, reliable and routine, the process can be refined to collect further data which gives a greater understanding of how a building functions. This data may be at a greater level of granularity or of additional building characteristics. For example, once it has become standard for a building's energy consumption to be monitored on a half-hourly basis, greater granularity can be introduced by collecting half-hourly data at the level of each individual tenant.

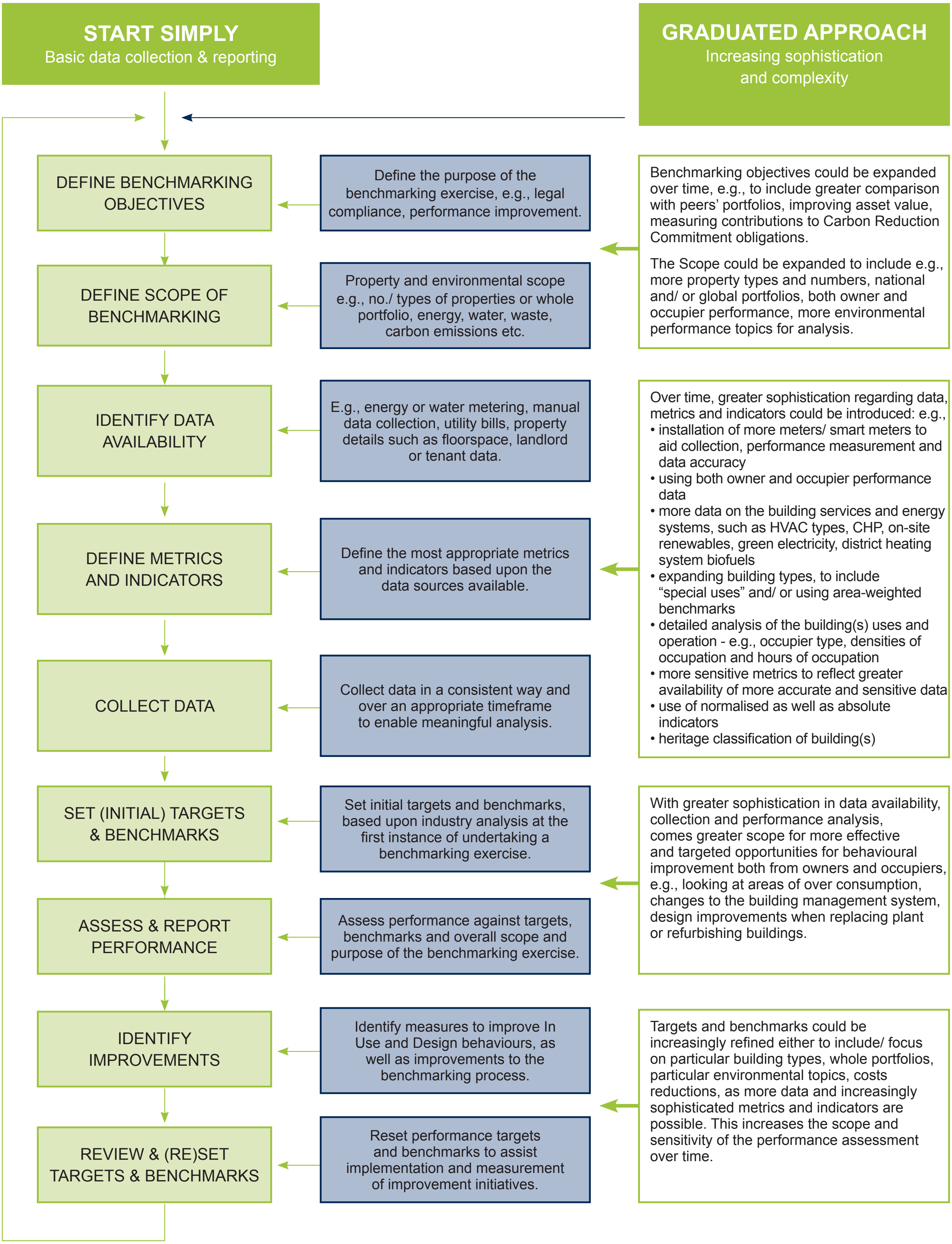
Additional aspects to incorporate within the benchmarking process over time may include:

- Data collection regarding the physical description of the building.
- Additional sustainability characteristics e.g., waste, water, transport etc.
- Increasing levels of detail e.g. different fuel and energy supplies for energy consumption; or the collection of information for individual floors.
- Increased frequency of measurement e.g., move to the use of smart metering.
- Different or additional normalisation metrics:
  – Floor area
  – Hours of occupation
  – Density of occupation
- Building use and operation.
- Accounting for changes in portfolios and intensification of buildings operation.
- 'Special uses', e.g., server rooms, trading floors, catering equipment, car parks.

Employing a graduated approach to sustainability benchmarking has a number of advantages:

- It enables existing relevant data and data collection mechanisms to be utilised from the outset, whilst bearing in mind requirements to improve the scope and quality of data over time.
- It enables and promotes the introduction of necessary increasing sophistication in tandem with improved understanding of detailed particulars of buildings' performance.
- It provides a framework for the progressive adoption of absolute and normalised indicators and near-peer categories, to encourage improved performance and more meaningful comparison with peer performance.
- It facilitates the collection of more sensitive and sophisticated data, such as density of occupation and 'special uses' in order to provide more accurate information about building performance.
- As sophistication increases, it helps inform both owners and occupiers about where best to focus effective changes in behaviour and performance.

A 'Graduated Approach' to benchmarking



Key data collection principles

The success of the benchmarking process will be dependent upon collecting data which is accurate, consistent, replicable, verifiable, comparable and gathered over a sufficient time period to be able to discern trends. It is also important to ensure that data is collected over consistent time periods to enable the benchmarking process to take account of aspects such as seasonal variations in weather, which may influence the sustainability performance of a building. To ensure successful data collection, it is important that owners and occupiers engage and co-operate. Finally, the data collection requirements should be realistic, achievable and practical.

Accounting for Change

Benchmarking needs to account for changes in portfolio size and composition (whether increasing or decreasing) to ensure that positive progress in sustainability performance at building level is properly reflected in the reporting process, and not masked by such portfolio changes. For example, the acquisition of further buildings, or increase in the number of occupiers may lead to an increase in an organisation's overall carbon emissions footprint and mask existing improvements in performance at individual building level already present in the portfolio.

In addition, some organisations may rationalise their occupation levels from several buildings into one or two, which may improve their overall carbon footprint, but result in a higher emissions ratio per unit of floor area, as more people occupy fewer buildings. Absolute metrics or emissions relative to floor area will not reflect this overall strategic improvement. Careful selection of indicators will be important to ensure that changes in portfolio and building occupation levels are appropriately accounted for in the benchmarking process.

Incentivising the right behaviour

Care needs to be exercised in the development and employment of metrics, indicators, targets and benchmarks to ensure that they drive the desired behaviour to achieve improvements in the sustainability performance of buildings while minimising unintended consequences.

It will, therefore, be important at the outset to have absolute clarity about the intended purpose, whether that is to influence behaviour in terms of design or use, or a combination of the two. Organisations should use the benchmarking process and its results to identify those properties that are underperforming and inform their property management strategy to improve them.

Partnership between occupiers and owners

For benchmarking to succeed in assessing performance and incentivising behaviour and improvements, data collection should ideally cover the whole building, i.e. both owner and occupier consumption data. It is therefore important that owners and occupiers engage and co-operate on data collection and on the implementation of performance efficiency measures. This can be formally achieved through the implementation of Green Leases and Memoranda of Understanding, such as those found in the BBP Green Leases Toolkit[3].

3 Green Lease Toolkit, Better Buildings Partnership, (2009) www.betterbuildingspartnerhsip.co.uk

Measuring and reporting on the owner services alone will not give a full picture of how the building is being operated and potential improvements will therefore be limited to common areas and services, such as energy-efficient lighting, running air-conditioning systems more efficiently, and reducing the number of hours lift banks are operated at lower-use periods.

Measuring occupier areas will give a more complete picture, clarifying where efficiency savings and improvements can be made and providing an opportunity for owners and occupiers to work together, share knowledge on how the building functions, and set sustainability improvements plans for the whole building rather than for specific areas only.

Sharing knowledge and experience

Sustainability benchmarking for property can be a complex undertaking and requires time and patience to implement successfully. There are many challenges to be overcome and detailed decisions to be made. Not all in the property sector will be embracing performance measurement and benchmarking at similar speeds, though the forthcoming CRC Energy Efficiency Scheme may speed-up its uptake.

Those in the property sector who are undertaking this process, or who are about to, are encouraged to share the knowledge and experience they gain so that the property sector can collectively make a significant contribution to both the goals of reducing our industry's impact upon climate change and the environment, and of preserving and enhancing the value of property assets.

4. Moving Forward: Agreeing Industry Standards for Sustainability Metrics

One of the key findings to emerge from our work is the necessity of industry standards for sustainability metrics in the real estate sector. This would help ensure all benchmarking tools and services follow methodologies based on an agreed set of indicators and metrics. It would improve the overall efficiency of sustainability benchmarking by avoiding the duplication of data collection and ensuring that the data is compatible, comparable and portable between various tools and services.

In this paper we have highlighted key sustainability metrics requiring specific definitions. It also suggests a set of potential alternatives intended to form the basis for discussing and initiating the development of industry standards. These are presented in Table 1.

Agreement on such standards should be reached by sector wide property organisations such as the British Council of Offices, the British Council of Shopping Centres, the British Property Federation, the British Retail Consortium, the Green Property Alliance, the Investment Property Forum, the Royal Institution of Chartered Surveyors, the UK Green Building Council, as well as appropriate Government bodies.

It should also build on work done at international level, such as the work being carried out by the UNEP Sustainable Buildings & Climate Initiative (SBCI) (see Appendix 1).

Table 1: Metrics Requiring Industry Standards	
1. Floor Area	Benchmarking on a per m^2 basis is common practice within the property sector. However there is no defined standard as to which measurement of floor area to use. The following are different types of definitions that exist within the industry.
Net Internal Area (NIA)	Net Internal Area is unambiguous and is defined in the RICS Code of Measuring Practice. It is the usable space within a building measured to the internal finish of structural, external or party walls, but excluding toilets, lift and plant rooms, stairs and lift-wells, common entrance halls, lobbies and corridors, internal structural walls and car-parking areas.
Gross Internal Area (GIA)	The RICS definition of GIA from the 6th Edition of the Code of Measuring Practice is the area of a building measured to the internal face of the perimeter walls at each floor level.
Total Useful Floor Area	DECs – ratios which convert GIA and NLA to TUFA
2. Occupational Density	Benchmarking buildings using occupational density is receiving increasing interest. However, there is currently no agreed standard definition for measurement.
Full Time Equivalent	The industry standard definition could be based on the IPD Cost Code and Environment Code approach. The number of personnel is calculated in terms of full-time equivalents. Non-payroll staff, such as staff consultants, contractors, and other outsourced staff, is converted to full-time equivalents on the following basis: – Personnel working on a regular basis >30 hours per week – 1.00 – Personnel working on a regular basis 20-30 hours per week – 0.75 – Personnel working on a regular basis 15-20 hours per week – 0.50 – Personnel working on a regular basis <15 hours per week – 0.25 To qualify as a member of staff working in the premises, staff must use the premises as their main base and expect to work there for part of a typical working week.

Workplaces or Workstations	The IPD Space Code definition is widely used in the UK. The definition varies between open workstations, semi-open workstations and enclosed workstations. Our definitions are below. **Open Workstations** – occupy the work floor area for activities requiring high communication and/or little concentration, such as open offices and touch downs: – Open office – An open space for more than ten people, suitable for activities demanding frequent communication or relatively little concentration. – Touch down – An open space for one person, suitable for short-term activities that allow little concentration and low interaction. **Semi-open Workstations** – occupy the work floor area suitable for activities with medium communication and/or medium concentration – e.g., cubicles, team spaces or work lounges: – Cubicle – A semi-enclosed space for one person, suitable for activities requiring medium concentration or some confidentiality. – Team space – A semi-enclosed space for two to six people, suitable for teamwork that demands frequent internal communication and medium concentration. – Work lounge – A semi-open space for two to six people, suitable for short-term activities that demand collaboration and allow impromptu interaction. **Enclosed Workstations** – cover the work floor area suitable for activities with low communication and/or high concentration – such as private offices, shared offices, team rooms and study booths: – Private office – An enclosed space for one person, suitable for confidential activities requiring high concentration or include many small meetings. – Shared office – An enclosed space for two or three people, suitable for semi-concentrated work and collaborative work in small groups. – Team room – An enclosed space for four to ten people, suitable for teamwork that can be confidential and demands frequent internal communication. – Study booth – An enclosed space for one person, suitable for short-term activities that demand concentration or confidentiality. The Australian Green Building Rating (ABGR) has the following terminology: a workplace is based on computers (desk/ laptop) in regular use, excluding computers in low-use training, meeting and boardrooms. This approach requires a site count in each functional space within a defined timescale. It also sets-out specific treatment for special cases.
Workplace Density	BCO defines 'occupation density' as a measure of the number people within a given total area of space and is usually expressed as m^2 per person. IPD's measure for 'space efficiency' is calculated as the average ratio of net floor space per full-time equivalent employee, across the whole portfolio being analysed, and expressed as Net m^2 NIA per FTE. The industry standard definition could be based on an analysis of the IPD, BCO and BBP definition of workplace density: a measure of the number of discrete work points within a given total area of space, the Net Internal Area (NIA) divided by the number of workplaces. IPD's measure is calculated as the average ratio of net floor space per workstation, across the whole portfolio analysed, and expressed as net m^2 NIA per workstation. IPD, BCO and the BBP have carried out analysis to define categories for high, medium and low density of occupation buildings: IPD defines the average occupation density range as m^2 (NIA) per workstation or FTE: – High density of occupation: <10 m^2 NIA/workstation or <10 m^2/FTE – Medium density of occupation: 10 to 12 m^2 NIA /workstation or 10< to < 12 m^2/FTE – Low density of occupation: >12 m^2 NIA /workstation or >12 m^2/FTE

Workplace Density continued	The latest BCO Guide to Specification defines the average occupational density range as m^2 (NIA) per workspace: – High density of occupation: < 7 m^2 NIA /workspace – Medium density of occupation: 8 to 13 m^2 NIA /workspace – Low density of occupation: > 14 m^2 NIA /workspace The BBP is currently using the following density bands based on work carried out by Upstream Sustainability Services for the BBP in its data collection and assessment project. The three bands of occupation density are defined as m^2 (NLA) per FTE. – Higher density: <12 m^2/worker – Medium density: 12 -16 m^2/worker – Lower density: >16 m^2/worker
Effective Workplace Density	The BCO refers to effective workplace density as the function between workplace density and utilisation, expressed as NIA (m^2) per person based on estimated effective density utilisation rates.
3. Special Uses	
	The definition of special uses within a building could be based on Display Energy Certificates (DECs) Alternatively, use could be made of the LES-TER's definitions which identify special areas and end uses as: trading floors, servers, call centres, catering, car parks, etc.
4. Adjustment for Hours of Occupation	
	The following categories require common definitions: – Core Hours – Hours – Week days: 9h/5h or 24h use – Week end or separate data for Saturday and Sunday
5. Adjustment for Weather	
	There are issues surrounding the adjustment for degree days e.g., whether this includes both heating and cooling or includes both gas and electricity consumption.
6. Adjustment for Voids / Vacancy	
	Average vacancy rate is the proportion of the property over the year that has been vacant and unoccupied. This can be calculated in terms of floor area (or potential rent or market rent). Ideally, the figure should reflect how much of the building was unoccupied (as usually this area would not be provided with energy-consuming services whilst unoccupied). For example, if 50% of the lettable floor area was unoccupied for 6 months of the benchmarking period, the average annual vacant & unoccupied rate would be 25%. If this data is consistently of high enough quality amongst almost all participants, it may be used to adjust key performance indicators. In any case, it will be used to assess changes in consumption between years.

Appendix 1 – UNEP Sustainable Buildings & Climate Initiative (SBCI) – proposed sustainability indicators

No.	Issue	Indicator	Unit	Measurement
1	Energy and GHG	Annual greenhouse gas emission	kg CO_2 eq./m^2	Calculation/ simulation/ LCA
2	Water	Storm and sanitary water harvested and treated/used on and off site (recycling water use)	Mltre/m^2/yr	Simulation/ Measurement
3	Material and resource use	Use of recycled materials in construction	% by mass	Environmental product declaration/ LCA
4	IEQ	Indoor air pollutants level	Pollutant level/m^3	Sample measurement/ simulation
		Lighting for suitable task	Lux	
		Noise	dB	
		Thermal comfort	PMV Index	
5	Waste	Waste to landfill	Kg/m^2/yr	Direct measurement or annual survey
6	Air and Water emission	Emissions of polluting substances through life cycle	Pollutants level/m^2/yr	Estimated calculation
7	Land use and ecology	Land site previously built on and avoided green field site	Yes/no	Observation
8	Management	Annual reporting for energy, environmental and waste management and improvement	Yes/no	Direct check
9	Service life	Service life of a component of, or the whole, of the building	Years	Expected service life calculation
10	Adaptability	Technical adaptability – Ease of movement of partitions	–	Estimation/calculation/ design assessment
		Climate adaptability – Resilience and dynamic building		
		Functional adaptability – Ease of building change in use		
*	Life cycle costing*	Annualised total life cycle cost	US$/$m^2$/yr	Calculation

* Not included in the set of ten "core" global issues but considered for economic purpose

Source: Foliente et al, 2009, in UNEP Sustainable Buildings & Climate Initiative (SBCI) – benchmarking think tank.

Appendix 2 – Summary of existing sustainability measurement, benchmarking and reporting tools in the UK

Measurement	BBP	IPD Environment Code	LESTER	DECs	Upstream Sustainability Benchmarking	BREEAM In Use	GRI
Frequency	**Annual**	**Annual**	**Annual**	**Annual**	**Annual**	**Annual**	**Annual**
Building details							
Area	Net Lettable Area (m^2)	Net Lettable Area (m^2)	Net Lettable Area (m^2)	Total usable floor area (m^2)	Net Lettable Area (m^2) Gross Internal Area (m^2)	Gross Internal Area (m^2) Net lettable Area (m^2)	
Air conditioned	Yes/No Extent of HVAC provision	Yes/No	Yes/No	Yes/No	Yes/No Extent of HVAC provision	Yes/No	
Occupancy	Number of employees as FTEs, Number of workstations, hours of occupancy	Full time equivalent employees	Hours of occupancy	Number of occupied days and hours of occupancy	Number of employees as FTEs, hours of occupancy, total number of visitors/ customers	Number of employees as FTEs, hours of occupancy, total number of visitors / customers	
Asset rating (EPC)	Yes if available	×	×	Yes if available	Yes if available	Yes if available	
Number of floors	✓	✓	✓	×	✓	yes	
Number of rooms	×	✓	×	×	×	×	
Refurbishment information	Date of last refurbishment	Date of last refurbishment	Date of last refurbishment	×	Date of last refurbishment	Date of building services renewal	
Energy							
Mains electricity	kWh/annum	kWh/annum	kWh/annum	kWh/annum	kWh/annum	kWh/annum	GJ/annum
Oil	kWh/annum	kWh/annum	kWh/annum	kWh/annum	kWh/annum	kWh/annum	GJ/annum
Gas	kWh/annum	kWh/annum	kWh/annum	kWh/annum	kWh/annum	kWh/annum	GJ/annum
LGP	kWh/annum	kWh/annum	kWh/annum	kWh/annum	kWh/annum	kWh/annum	GJ/annum
Solid fossil fuels	kWh/annum	kWh/annum	kWh/annum	kWh/annum	kWh/annum	kWh/annum	GJ/annum
Onsite renew-able energy generation	kWh/annum	kWh/annum	kWh/annum	kWh/annum	kWh/annum	kWh/annum	GJ/annum
District Heating	kWh/annum	kWh/annum	kWh/annum	kWh/annum	kWh/annum	kWh/annum	GJ/annum
District Cooling	kWh/annum	kWh/annum	kWh/annum	kWh/annum	kWh/annum	kWh/annum	GJ/annum
Carbon calculations	DEFRA grid mix standard & fuel emission factors	DEFRA grid mix standard & fuel emission factors	DEFRA grid mix standard & fuel emission factors	DEFRA grid mix standard & fuel emission factors	DEFRA grid mix standard & fuel emission factors, IEA emissions factors, GHG Protocol	DEFRA grid mix standard & fuel emission factors	Greenhouse Gas Protocol
Carbon emissions	Tonnes	Tonnes	Tonnes	Tonnes	Tonnes	Tonnes	Tonnes
Optional							
Communal electricity	kWh/annum	kWh/annum	kWh/annum	kWh/annum	kWh/annum	kWh/annum	
Separable energy uses where separately metered	kWh/annum	kWh/annum	kWh/annum	kWh/annum	kWh/annum	kWh/annum	
Green energy supply from the grid	kWh/annum	kWh/annum	kWh/annum	×	kWh/annum	×	
Water							
Mains water consumption	×	m^3/annum	×	×	m^3/annum	m^3/annum	m^3/annum
Harvested water	×	m^3/annum	×	×	m^3/annum	m^3/annum	m^3/annum
Recycled Water	×	m^3/annum	×	×	m^3/annum	m^3/annum	m^3/annum
Waste							
Total non recycled waste	×	Tonnes/annum	×	×	Tonnes/annum	Tonnes/annum	Tonnes/annum
Recycled waste	×	Tonnes/annum	×	×	Tonnes/annum	Tonnes/annum	Tonnes/annum

1) This summary is based on a short analysis of existing tools and does not represent the breadth, depth nor quality of the tools reviewed. What is more, the list of tools may not be comprehensive.
2) BREEAM and Upstream Sustainability Services do not currently give credit for using green tariffs as no energy supplier currently meets their obligatory target for renewable energy generation.
3) GRI does not specify measurement units to use when reporting but sets out a list of principles and indicators that orgnaisations can use to measure and report their environmental performance against.

Appendix 3 – BBP approach to benchmarking: supporting information

RETAIL

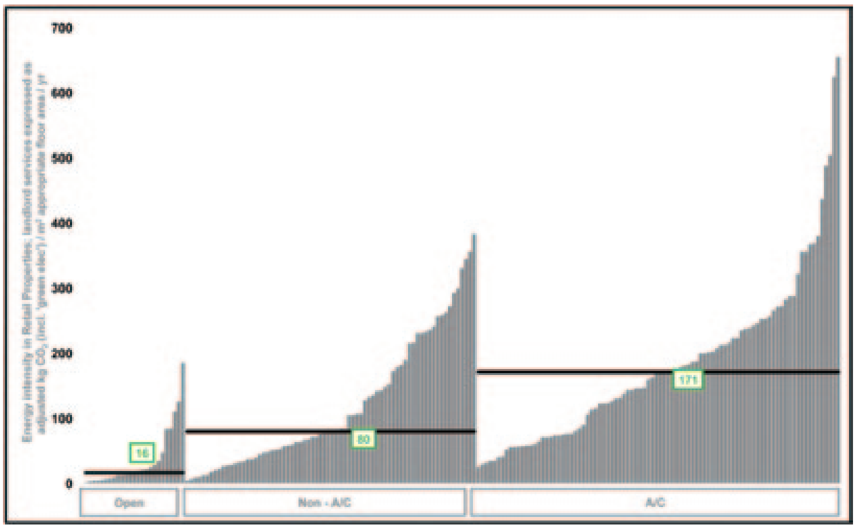


Fig 1: BBP retail carbon benchmarking - carbon per floor area indicator (kgCO_2/m²/year), categorised into three bands based on type of HVAC system (OSCAR).

OFFICES

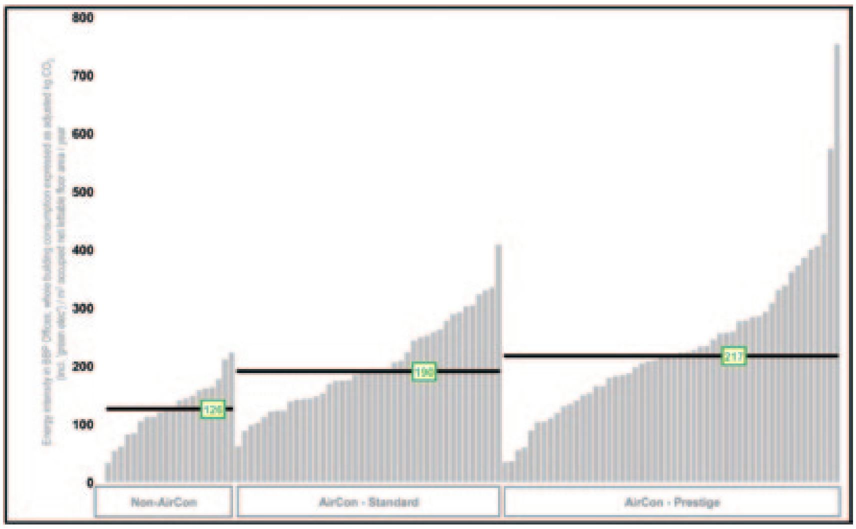


Fig 2: BBP office carbon benchmarking - carbon per floor area indicator (kgCO_2/m²/year), categorised into three bands based on type of HVAC system (ECON 19).

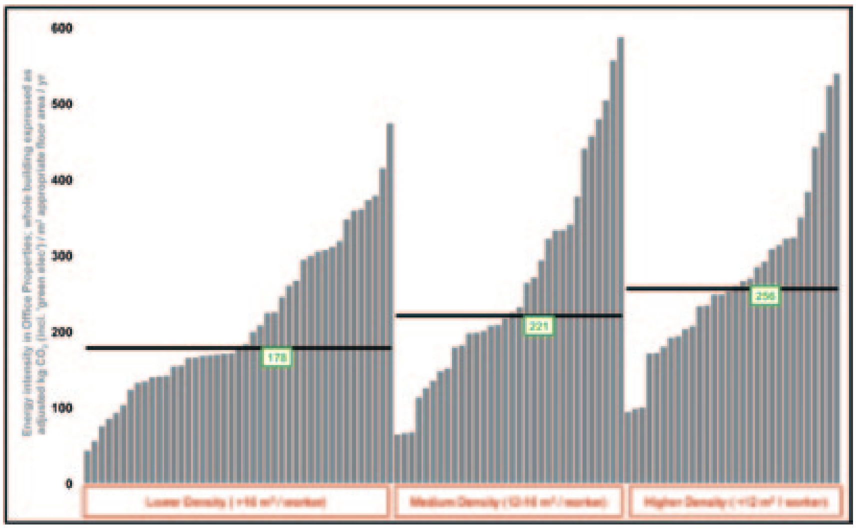


Fig 3: BBP office carbon benchmarking – carbon per floor area indicator (kgCO_2/m²/year), categorised into three bands of worker density (m²/worker).

Appendix 4 – BBP 2009 energy data collection requirements

Question		Unit
1 Property Characteristics		
1.1	Company submitting this property for benchmarking	
1.2	Name of property	
1.3	Confirm which 12 month period data is being submitted for	Calendar/financial
1.4	Postcode	
1.5	Postal Address	
1.6	Which of the following types best describes the property?	Office/Retail
1.7	Which of the following standard sub-types best describes the property?	*1
1.8	Number of floors in the property	Floors
1.9	In which year was the property first opened (estimate if need be)?	Year
1.10	In which year did the last major refurbishment take place?	Year
1.11	Gross Internal floor Area of the Whole Building (GIA) (excludes car parks – even if enclosed)	m^2
1.12	Net Lettable Area (NLA)	m^2
1.13	Common Parts Area (CPA) (enclosed only)	m^2
2 General Annual Information		
2.1	Number of workstations in the building	Workstations
2.2	Number of workers as FTEs in the building	FTEs
2.3	Number of visitors to the building (if a retail / leisure property)	Visitors
2.4	Total core business operating hours per typical week	Hours
2.5	How many additional hours per week (in addition to core hours) can access be gained to the property?	Hours
2.6	Average annual Vacancy (unoccupied) Rate (%)	%
3 Energy		
3.0.1	Are energy sources other than grid electricity and/or mains gas consumed at the property?	Yes/No
3.0.2	Does the property have onsite Combined Heat and Power (CHP)?	Yes/No
3.0.3	Landlord-obtained Mains Electricity consumption	
	Mains – Brown	kWh
	Mains – Climate Change Levy Exempt	kWh
	Mains – Non Climate Change Levy Exempt	kWh
	Communal Electricity	kWh
	Owned off-site	kWh
	Total	kWh
3.1 Imported Fossil Fuels (Non CHP) – for building consumption only		
3.1.1	Fossil Fuel Type	
	Natural Gas	kWh
	Diesel	kWh
	Fuel Oil	kWh
	LPG	kWh
	Solid Fossil Fuels	kWh
	Other Fossil Fuels	kWh
3.1.2	Are energy sources other than grid electricity and/or mains gas consumed at the property?	Yes/No

*1 **Office: Non-AC/AC Standard/AC Prestige**
Retail: Open/Non-AC/AC

3.2	Onsite Combined Heat and Power	
3.2.1	Does the property have onsite Combined Heat and Power (CHP)?	Yes/No
3.2.2	Fuel source(s) for onsite CHP	
	Natural Gas	kWh
	Diesel	kWh
	Fuel Oil	kWh
	LPG	kWh
	Solid Fossil Fuels	kWh
	Other Fossil Fuels	kWh
	BioGas	kWh
	BioDiesel	kWh
	BioMass	kWh
	TOTAL	kWh
3.2.3	Energy types the CHP generates	
	Electrical	kWh
	Thermal Heating	kWh
	Thermal Cooling	kWh
	TOTAL	kWh
3.2.4	How much of the CHP energy produced do you consume?	
	Electrical	kWh
	Thermal Heating	kWh
	Thermal Cooling	kWh
	TOTAL	kWh
3.2.5	How much of the CHP energy produced is exported?	
	Electrical	kWh
	Thermal Heating	kWh
	Thermal Cooling	kWh
	TOTAL	kWh
3.3	Onsite Renewable Electricity	
3.3.1	Does the property have any onsite renewable electricity generation?	Yes/No
3.3.2	Onsite renewable energy produced	
	Hydro	kWh
	PhotoVoltaic	kWh
	Wind	kWh
3.3.3	Onsite renewable energy consumed onsite (kWh)	kWh
3.3.4	Onsite renewable energy exported offsite (kWh)	kWh
3.4	Thermal Energy	
3.4.1	Does the property obtain thermal energy from sources offsite?	Yes/No
3.4.2	Thermal energy types	
	Imported Thermal Cooling	kWh
	Imported Thermal Heating	kWh
	Onsite Renewable Thermal Cooling	kWh
	Onsite Renewable Thermal Heating	kWh
3.5	Renewable Fuels	
3.5.1	Are any renewable fuels consumed for building energy at the property?	Yes/No

3.5.2	Imported (sourced off-site) renewable fuel types	
	Wood	kWh
	Wood Pellets	kWh
	Fibre Fuel	kWh
	BioDiesel	kWh
	Ethanol	kWh
	BioGas	kWh
	Landfill Gas	kWh
3.5.3	Onsite (produced on-site) renewable fuel types	
	Wood	kWh
	Wood Pellets	kWh
	Fibre Fuel	kWh
	BioDiesel	kWh
	Ethanol	kWh
	BioGas	kWh
	Landfill Gas	kWh
3.6 Energy-related Characteristics		
3.6.1	Intensity Factors for Offices – Special areas and end uses	
	Dealing floors area	
	Data/Comms room(s) area	
	Catering kitchens	
3.7 EPC and DEC Certificates (as part of UK implementation of the EU Energy Performance of Buildings Directive)		
3.7.1	Unique Certificate Reference Number for Asset Rating (EPC)	
3.7.2	Unique certificate reference number for Operational Rating Certificate (DEC)	
3.8 Owner and Occupier Utility Arrangements (energy provided to Occupiers by Owner and Occupier-obtained energy)		
3.8.1	If Owner supplies any of the following utilities to any Occupiers please provide total annual consumption for each utility if metered separately (See Guidance)	
	Electricity	kWh
	Natural Gas	kWh
	Other fuels and/or Energy	kWh
3.8.2	If any Occupiers obtain any of the listed utilities directly from a supplier, please provide total annual consumption for each utility (if known by Owner).	
	Electricity	kWh
	Natural Gas	kWh
	Other fuels and/or Energy	kWh

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January 2010