

Establishing the Ground Rules for Property:

Industry-wide Sustainability Metrics

Acknowledgements

Special thanks go to the participants of the Working Group which produced this paper for their contributions and critical comments:

- Paul Edwards, Hammerson (Chairman)
- Tatiana Bosteels, Hermes
- Stuart Bowman, CoreNet
- Patrick Brown, British Property Federation (Secretary and Researcher to the Working Group)
- Keith Bugden, Better Buildings Partnership
- Daniel Cook, Royal Institution of Chartered Surveyors
- Louise Ellison, Investment Property Forum
- Richard Francis, Gardiner & Theobald
- Andrew Green, Faithful + Gould
- Elizabeth Hinde, British Retail Consortium
- Philippa Latimer, British Council of Shopping Centres
- Jenny MacDonnell, British Council for Offices
- Martin Print, Amazia
- Anna Surgenor, UK Green Building Council
- Matthew Tippet, Upstream Sustainability Services, Jones Lang LaSalle

We would like to thank also the many individuals who have commented on the paper, and who attended the industry workshop which we ran in February 2010 to test early-stage findings.



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Foreword by Paul Edwards (Hammerson), Chairman of the Working Group

Almost one fifth of all UK carbon emissions come from commercial and other non-domestic buildings. Improving the sustainability of this stock, therefore, is central to meeting national carbon reduction targets and tackling climate change. But progress is currently hamstrung by the lack of consistency in the way in which the sustainability performance of buildings is measured. Metrics are the key.

“What can be measured can be evaluated, improved, directed – in short managed.” (Lord Kelvin)

Both the Property Industry Alliance and its sustainability-focused off-shoot, the Green Property Alliance, recognised the need to get to grips with this issue and asked me to lead a Working Group set with the task of developing a set of sustainability metrics which could be commended to the industry.

The research that the group undertook revealed the huge complexity which surrounds the whole issue of measuring the sustainability performance of buildings. Our remit was to look at whole buildings in their use phase (as far as was possible given the split responsibilities of landlords and tenants). For reasons of practicality we chose to focus on energy, carbon, water and waste but we recognise that there are other areas, such as transport, which we may need to address in the future.

“Not everything that can be counted counts, not everything that counts can be counted.” (Albert Einstein)

We hope that this work will help build a consensus within the sector about the most appropriate metrics to use and the way in which they are applied and responsibilities allocated. I am delighted that all of the bodies who have contributed to this work have agreed to recommend the use of these metrics to their memberships.

Finally the property industry can speak with one voice when asked how it measures these critical components of sustainability. This work should provide a solid base from which more sophisticated interrogation of building resource intensity can be undertaken. This should lead to improved information sharing between landlords, tenants and wider stakeholders and improved performance.

I would like to thank the members of the Working Group and all others who have contributed to this important work which I am delighted to commend to you.

Introduction

The Green Property Alliance¹ (GPA) has identified the need for greater consistency and clarity in the way in which the sustainability performance of buildings and wider property portfolios is measured and reported upon. Reaching agreement on a common set of metrics is seen as helpful in generating:

- a better understanding of how buildings operate and perform in practice
- more soundly based public policy initiatives by making comparable data available on building energy performance
- greater comparability of sustainability performance across and within portfolios over time
- data which can highlight areas where Government interventions should be made, and where the market is best placed to deliver improvements alone.

In order to progress this agenda, the GPA commissioned a group of experts to identify the opportunities for and the barriers to convergence, of sustainability metrics and to make recommendations to the industry.

The focus of the group was upon actual, in-use and (so far as was possible) whole building sustainability performance and which took account of the commercial relationship between landlords and tenants.

This paper represents the interim recommendations of the group, which are:

- a set of metrics for energy, carbon, water and waste which are consistent with the majority of major measurement frameworks in use by the property industry
- mechanisms for classifying building types and norms of operation (this will require further refinement in light of experience)
- a practical method of assigning responsibilities for measuring and reporting resource use in rented buildings (this will require further refinement in light of experience)
- practical methods for normalising resource use so as to allow interpretation and meaningful comparison (this will require further refinement in light of experience).

Methodology

To determine whether common measurement standards might be possible, the group compared the measurement methodologies employed by leading sustainability frameworks (e.g. IPD Environment Code, Global Reporting Initiative Core Indicators) and examined how major property owners measure and report.

From this evidence base, and associated discussions at a workshop in February 2010 attended by owners, occupiers, advisors and professional bodies/trade bodies, the group has suggested a range of metrics which are set out in brief overleaf. The technical underpinnings and associated research which support the recommendations are set out in technical annexes to this paper.

1 The BBP, BCO, BCSC, BPF, BRC, CoreNet, IPF, RICS, UK GBC collaborate on sustainability issues as the Green Property Alliance

Recommendation 1: Building Classification and Context

Collecting information about a building can help to ensure that the sustainability data which is collected can be set in context. This can help, along with normalised performance indicators (using driving factors as denominators), to convey improvements in the reduction of the intensity of sustainability impacts as well as absolute reductions. This is crucial in relation to commercial property, since portfolios can grow or reduce, properties can lie empty awaiting new tenants, or the nature of tenancies themselves can change.

Acquiring and maintaining the following information may be helpful to permit reporters to compare assets in-use:

Type of building – different types of building have differing patterns and intensities of use, and so comparisons of, for example, offices and shopping centres can be misleading. In the absence of commonly agreed, sophisticated building typologies for sustainability measurement, reporters should make reference to existing tools such as:

- Energy Star's typology for space uses
- Valuation Office Agency Code
- Investment Property Databank classifications.

Hours/days of operation of the building – comparison of buildings should take account of the periods in which the building is in operation. Patterns of use may vary by type of building, or the nature of the occupier's business.

Date of last refurbishment – collecting data on when a building (or part of building in the case of tenants) was last refurbished can give insights as to how a space should be performing, given the Building Regulations performance levels of the time, and can also highlight to portfolio managers where opportunities may lie for limited resources to be employed. Reporters should register the year of the last refurbishment.

Weather adjustment – when fuel or electricity is used for space-heating and cooling, demand will tend to vary according to how hot or cold the outside climate is. This matters, since a particularly hot summer or cold winter can lead to uncharacteristic energy demand patterns which cannot be explained save by reference to ambient climate. Degree days are a methodology designed to permit such variations to be accommodated and articulated. **Carbon Trust Good Practice Guide 310**² and/or **CIBSE Guide TM41**³ give a solid grounding in the appropriate use of degree days.

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'. **CIBSE Guide TM39**⁴ suggests good practice in the sub-metering of special uses. Initial reporters may wish simply to record whether or not the building is air-conditioned, and the capacity of the system, as it is a common and significant energy demand in non-domestic buildings (if the building is only partially air-conditioned, the percentage of floor area which is air-conditioned should be recorded).

2 <http://www.carbontrust.co.uk/Publications/pages/publicationdetail.aspx?id=CTG004&respos=0&q=degree+days&o=Rank&od=asc&pn=0&ps=10>

3 <http://www.cibse.org/index.cfm?go=publications.view&item=356>

4 <http://www.cibse.org/index.cfm?go=publications.view&item=347>

Clearly, these contextual factors are only a starting point and reporters should not be discouraged from maintaining or developing more innovative approaches. As with the normalisation section of this paper, it is important that reporters explain their approach, and any changes in approach, year-on-year.

Recommendation 2: Common Metrics⁵

The final recommended metrics of the Working Group are set out below. Further supporting information, including the relationship the following metrics hold with major measurement frameworks, is set out in the technical annexes which accompany this paper.

	Criterion	How measured	Metric	Performance Indicator
Building energy	Electricity	Energy for landlord services and any tenant supplies	kWh	kWh / m ² Net Lettable Area (NLA) ⁶ or occupancy / year
	Fuels	Energy for landlord services and any tenant supplies	kWh	kWh / m ² NLA or occupancy / year
	Imported thermal heating or cooling	Energy for landlord services and any tenant supplies	kWh	kWh / m ² NLA or occupancy / year
Carbon (associated with building energy)	Greenhouse gas emissions	By reference to Defra Reporting Factors ⁷	Metric tonnes/ CO ₂ e ⁸	kg CO ₂ e / m ² NLA or per occupant / year
	Emissions saved	By reference to Defra Reporting Factors	Metric tonnes/ CO ₂ e	kg CO ₂ e / m ² NLA or per occupant / year
Water	Total water used	By reference to bills	Cubic metres (m ³)	m ³ / m ² NLA or occupancy / year ⁹
	Water saved	By reference to bills	Cubic metres (m ³)	m ³ / m ² NLA or occupancy / year
Waste	Total waste produced	Direct measurement or survey	Tonnes	Tonnes / by reference to occupancy or m ² NLA / year
	Waste disposed to landfill ¹⁰	Direct measurement or survey	Tonnes	As a ratio of total waste
	Waste disposed by other routes	Direct measurement or survey	Tonnes	As a ratio of total waste

5 Please see Note on page 9 for guidance on relating the numerator (e.g. kWh) to the denominator (e.g. per m² NLA or per occupant)

6 We are aware of work in progress under the auspices of the World Green Building Council, Sustainable Building Alliance and Sustainable Building and Climate Initiative to agree floor area definitions which are appropriate on a global scale. We will keep the use of NLA under review pending the conclusion of that work

7 We have referenced Defra carbon reporting factors as these underpin the Carbon Reduction Commitment Energy Efficiency Scheme and Defra's voluntary carbon reporting guidance. Those seeking to report carbon emissions via the recommended metrics may need to separate electricity to its components (e.g. grid average, renewables, climate change levy exempt)

8 CO₂e (the universal unit for comparing emissions of different greenhouse gases, expressed in terms of global warming potential (GWP) of one unit of carbon dioxide) rather than simply CO₂ as many gases contribute toward global warming

9 Expression in litres may be more appropriate in some cases, as it is a more readily visualised/understood unit of measurement

10 As best practice, reporters should differentiate, where able, between waste separated by route on-site and waste sent to off-site materials recovery facilities (MRFs). The proportion of waste that is eventually recycled or incinerated or landfilled varies according to the practices of the sender of waste (e.g. level of contamination) and the practices of the MRF

Recommendation 3: Boundary Setting

For owner-occupiers within non-domestic buildings, setting boundaries for the resource intensities associated with ownership, management and occupation of the building is relatively straightforward. This is because the benefits of ownership and occupation of the building are aligned, as are the risks and rewards associated with the procurement of resources. This means that the owner-occupier will have access to all the data associated with use of the building in terms of improved efficiency and cost savings.

However, owner-occupiers are not the norm, since the majority of non-domestic buildings in the UK are occupied by someone other than their owner¹¹. Moreover, office and retail buildings are frequently multi-tenanted. The Working Group has recommended that in the first instance, and at a minimum, landlords should seek to establish and measure what they are providing, and for tenants to measure what they procure directly. This crude divide can be refined through further interrogation of arrangements, in the manner of the Graduated Approach mentioned in the **Better Building's Partnership Benchmarking Toolkit**¹². Though this is primarily framed around energy procurement and use, its broader principles are useful when applied to water and waste.

The Working Group believes that, in the longer term, a more sophisticated method is required for defining these responsibilities. The working group proposes to work with organisations including the **UN Sustainable Buildings and Climate Initiative**¹³ and the **Global Reporting Initiative**¹⁴ who are examining building resource use intensity indicators, to examine the potential for further guidance in this area.

Some greenhouse gas reporting standards may seek to distinguish emissions according to whether their origins are direct/onsite (**Scope 1**), arise from imported intermediate energy such as electricity and district heating/cooling (**Scope 2**) or indirect from goods, services and activities upstream and downstream of the reporter's boundary (**Scope 3**). The metrics within this document are primarily concerned with the energy and carbon associated with building energy. Defra's Carbon Reporting Guidelines, which may become mandatory from 2012, encompass emissions associated with an organisations broader activities and segregate emissions into Scopes 1, 2 and 3. However, the approach within the Guidelines toward attributing emissions responsibility within rented buildings does not map well with patterns of energy provision, control and procurement. Organisations wishing to measure and report on emissions in situations involving leasing should consider referring to **ISO14064**, the **Greenhouse Gas Protocol's Appendix F**¹⁵ and/or emerging thinking from the **Greenprint Foundation**¹⁶, which give some further guidance in this regard.

Recommendation 4: Presenting Data

Absolute reductions in resource use and emissions are undoubtedly important as a means of understanding the impact of an organisation upon the environment. However, property owners follow cycles of acquisition, improvement and disposal of properties, which means that portfolios fluctuate over time. This can mean that if a significant number of properties are sold or acquired, the organisation can register an overall increase or reduction in its absolute impact.

11 Mitchell. P 2010. Property Data, Property Industry Alliance: London

12 <http://www.betterbuildingspartnership.co.uk/working-groups/sustainability-benchmarks/sustainability-benchmarking-toolkit>

13 http://www.unep.org/sbci/pdfs/Common-Carbon-Metric-for_Pilot_Testing_220410.pdf

14 www.globalreporting.org

15 http://www.ghgprotocol.org/calculation-tools/downloads/downloads-registration?referred_from=/downloads/calcs/Appendix_F_Leased_Assets.pdf <http://www.ipd.com/Default.aspx?tabid=996>

16 <http://www.greenprintfoundation.org/CarbonIndex.aspx>

The group established that there were two main ways to account for fluctuating portfolios over time:

- like-for-like comparisons (i.e. where only the same consistent set of buildings are included over the defined time frame)
- performance indicators with appropriate denominators (e.g. per unit of floor area).

Reporters should clearly state the criteria used for excluding assets in like-for-like analysis. One of the key advantages of a like-for-like assessment of absolute impact is that a meaningful trend can be seen without the issue of missing data in multi-let scenarios (i.e. the tenant-obtained from the landlord perspective and the landlord-obtained from the tenant perspective). Further, over short time periods (e.g. 2 to 4 years) like-for-like analysis enables the effect of management action to be assessed whilst removing the effect of acquisitions and disposals. However, over longer periods of time, the sample size of assets in the assessed portfolio may be too small. Like-for-like analysis is thus complemented by using performance indicators with appropriate denominators to represent the snapshot of the aggregated portfolio as it stood in each year.

Note: Performance indicators with appropriate denominators are useful in that the performance and trends can be assessed across years for portfolios whose composition has changed. However, care must be taken to avoid presenting misleading analysis, due to the the issue of missing data in multi-let scenarios. For example, in the kWh per m² indicator, if the aggregated kWh of a landlord portfolio is missing tenant-obtained consumption from three-quarters of the portfolio in one year and half of the portfolio in the next – yet the whole building lettable area is used as the denominator in both years – this will be highly misleading. Thus, reporters should consider representing data grouped by property type and should ensure that the numerator and denominator in intensity indicators are as well matched as possible, whilst clearly stating what methodology has been used and any assumptions which have been made.

Normalisation via occupancy can be problematic, not least as there is no commonly agreed definition of metrics to measure occupancy. Methodologies used by reporting organisations are diverse and can include reference to numbers of visits (in the case of shopping centres), number of workstations and by reference to ‘full-time equivalents’. As an interim measure, the group has not sought to impose convergence where convergence does not currently exist. Our recommendations are therefore that those seeking to measure and report should:

- always disclose and reference the methodology used for normalisation
- use square metres of net lettable floor area as the default denominator, complementing this with indicators using ‘number of occupants’ only as these become sufficiently robust (subject to the points made in the **Note** above)
- for those wishing to denominate by ‘occupants’, reference should be made to CIBSE’s work looking into density of occupation in relation to Display Energy Certificates, by reference to the **BCO’s Guide to Specification**¹⁷ or via reference to the **IPD Space Code**¹⁸.

17 <http://www.bco.org.uk/research/researchreports/detail.cfm?rid=135&cid=0>

18 <http://www.ipd.com/Default.aspx?tabid=996>

In any update to these metrics, the Green Property Alliance would take account of emerging methods. The Royal Institution of Chartered Surveyors (RICS) has commenced its **New Rules of Measurement (NRM)**¹⁹ programme of construction measurement standards. The first volume of NRM provides a data structure for building measurement. RICS has committed to working with the Green Property Alliance to embed common sustainability metrics within the next volumes of NRM, which are currently in development: 'Procurement - Build and Maintain' followed by 'Whole Life Costing - Operation and Environmental' measurement standards.

19 www.rics.org/nrm

Annex - Comparison Matrices

Energy Metrics used by Major Measurement Frameworks

Tool	How measured?	Compatible?
BBP Minimum Data Requirements	Energy source separated by kWh	Yes
IPD Environment Code	Energy source separated by kWh	Yes
LES-TER	Energy source separated by kWh	Yes
Display Energy Certificates	Energy source separated by kWh	Yes
Upstream / JLL Sustainability Benchmarking	Energy source separated by kWh	Yes
BREEAM In-Use	Energy source separated by kWh	Yes
Global Reporting Initiative	Energy source separated by GJ	Yes (with conversion)
Defra Carbon Reporting	Energy source separated by kWh	Yes
Carbon Reduction Commitment	Energy sources use different metrics	No
ISPI	Qualitative information collected	N/A but not incompatible
Sustainable Buildings and Climate Initiative	Energy converted straight to carbon	Yes, but complementary rather than directly applicable
Dow Jones Sustainability Index	Energy sources separated by GJ	Yes (with conversion)
FTSE4Good	Quantitative data in unspecified units	Yes

Water Metrics used by Major Measurement Frameworks

Tool	How measured?	Compatible?
BBP Minimum Data Requirements	N/A (due for incorporation 2011)	N/A
IPD Environment Code	m ³ / annum for mains water used	Yes
LES-TER	Water not included	N/A
Display Energy Certificates	Water not included	N/A
Upstream / JLL Sustainability Benchmarking	m ³ / year by source	Yes
BREEAM In-Use	m ³ / year for mains water used	Yes
Global Reporting Initiative	m ³ / year for mains water used	Semi-congruent (GRI also wants to know water extracted by all sources)
Defra Carbon Reporting	Water not included	N/A (though some carbon calculations for water use if material)
Carbon Reduction Commitment	Water not included	N/A
ISPI	WAT1 assesses water recycling in place	No
Sustainable Buildings and Climate Initiative	m ³ / annum storm and sanitary water harvested and treated	No
Dow Jones Sustainability Index	Mains water consumption only (m ³)	Yes
FTSE4Good	Quantitative data in unspecified units	Yes

Waste Metrics used by Major Measurement Frameworks

Tool	How measured?	Compatible?
BBP Minimum Data Requirements	N/A (due for incorporation in 2011)	Yes
IPD Environment Code	Tonnes non-recycled waste and tonnes recycled waste	Yes
LES-TER	Waste not included	N/A
Display Energy Certificates	Waste not included	N/A
Upstream / JLL Sustainability Benchmarking	Tonnes of waste by immediate and final destination	Yes
BREEAM In-Use	Tonnes non-recycled waste and tonnes recycled waste	Yes
Global Reporting Initiative	Total weight by type and disposal method	Yes
Defra Carbon Reporting	Tonnes of waste treated by waste type	No
Carbon Reduction Commitment	Waste not included	N/A
ISPI	WST1 measures whether there is sufficient equipment or space to support the recycling of waste	Complementary
Sustainable Buildings and Climate Initiative	kg	Yes
Dow Jones Sustainability Index	Total waste in metric tonnes	Yes
FTSE4Good	Quantitative data in unspecified units	Yes

Carbon Metrics used by Major Measurement Frameworks

Tool	How measured?	Conversion Factors	Compatible?
BBP Minimum Data Requirements	Tonnes CO ₂	Standard Defra factors	Yes
IPD Environment Code	Tonnes CO ₂ e	Standard Defra factors	Yes
LES-TER	Tonnes CO ₂	Carbon intensity reflected in 'weighted energy'	Complementary
Display Energy Certificates	kg CO ₂	Standard Defra factors	No
Upstream / JLL Sustainability Benchmarking	Tonnes CO ₂ and CO ₂ e	Standard Defra and IEA factors	Yes
BREEAM In-Use	Tonnes CO ₂	Standard Defra factors	No
Global Reporting Initiative	Total emissions by weight	Greenhouse Gas Protocol	Yes
Defra Carbon Reporting	Tonnes CO ₂ e	Standard Defra factors	Yes
Carbon Reduction Commitment	Tonnes CO ₂	Standard Defra factors	No
ISPI	N/A	N/A	N/A
Sustainable Buildings and Climate Initiative	kg CO ₂ e	Greenhouse Gas Protocol	Yes
Dow Jones Sustainability Index	Metric tonnes CO ₂ e	Unknown	Yes
FTSE4Good	Tonnes CO ₂ e (plus sector metrics)	Greenhouse Gas Protocol / ISO14064 / GRI indicators acceptable	Yes

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