Sustainability Metrics for Commercial Real Estate Assets – Establishing a Common Approach

As sustainability has become more central to property industry thinking a multitude of tools, using many different metrics have emerged, designed to measure and assess the sustainability of real estate assets and their owners and managers. This profusion in tools has been healthy in helping the industry to address sustainability in practical ways. However, it is increasingly apparent that a coherent, common set of metrics focused at asset level, needs to be established by the industry to consolidate the progress that has been made and move forward. To this end a group of UK industry bodies brought together under the Property Industry Alliance* has been working with industry to establish a set of metrics that can be adopted by industry as a common approach to measuring sustainability at property asset level. To ensure compatibility with existing practice the work took a review of metrics currently used as its starting point. Consultation with practitioners and a cross-industry workshop including representatives from property companies, investors, occupiers, consultants and Government has enabled a distilled set of metrics to be produced. This paper sets out the progress that has been made, presenting findings for wider discussion and debate.

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- The Property Industry Alliance includes Investment Property Forum, British Property Federation, RICS, British Council for Offices and British Council for Shopping Centres

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Introduction

This paper presents the findings of an initiative established by a group of UK based property sector organisations with the aim of bringing greater clarity to the reporting of sustainability performance by establishing a common framework for measuring and reporting sustainability for property assets. The property industry has found the measurement of sustainability performance of buildings challenging since it began to grapple with this issue in the early 2000's. Some sectors of the industry have made greater advances than others. The construction side of the industry, particularly through Constructing Excellence, has been notably successful in developing environmental key performance indicators to monitor the management of waste, water, energy, transport, pollution and biodiversity within construction projects. Such initiatives are further supported by environmental benchmarking tools such as BREEAM and LEED which have become established means of assessing sustainability in new build projects.

The demand side of the industry – the owners, investors and occupiers - has been less successful at developing a coherent package of measures. That is not to say they have not been active. A substantial number and range of benchmarking tools and toolkits have been produced over the last 10 years. A relatively quick trawl through the internet produces 30 plus different sustainability benchmarking tools and toolkits for commercial real estate, many of which target property occupiers and owners. Numerous property companies and investors also measure sustainability within their real estate portfolios for their own purposes including for internal reporting, annual report and accounts, marketing and investor relations.

With so many tools and reports available it would be reasonable to expect that the industry is becoming rich with data enabling us to understand how sustainable is the existing stock. However this is profoundly not the case. Recent work commissioned by the IPF to develop a sustainable property investment index (IPF, 2009) found the greatest hurdle in completing the work to be the lack of available building level data. It was notable in that work that there were examples of property investment funds keen to participate in the project but simply unable to because they could not make the required data available. It is also worth noting that the required data was relatively high level and non-technical.

Whilst the proliferation of benchmarking systems and reports suggests a healthy pre-occupation with making commercial property more sustainable, it seems to have done little to generate a set of data by which the industry can coherently compare and monitor performance. Rather it has created a discrete set of often proprietary systems that use a range of different variables to assess sustainability and a variety of different metrics to measure each variable.

Previous research has made comparisons of the different benchmarking systems (see for example Levy and De Francisco, 2008). These studies reveal a lack of consistency that is inevitable in systems designed by different organisations across different countries for similar purposes but normally with a slightly different emphasis or focus. The business opportunity such systems represent as companies look for support in monitoring their sustainability, serves to further encourage differentiation rather than similarity of product, suggesting this problem is unlikely to resolve itself. This lack of reliable, robust sustainability data is weakening the property industry's ability to respond to the sustainability agenda.

Such variation in assessment systems potentially has two impacts. Firstly it makes the potential for any form of comparison between properties, portfolios or organisations extremely limited. This in itself limits the effectiveness of one of the key drivers of change in the sustainability arena – competition. With no clear means of comparing one building or real

estate portfolio with another on sustainability issues it is difficult to make any judgement between assets on the basis of sustainability performance.

Secondly it makes it difficult for any organisation embarking on a data collection exercise to work out the best approach to adopt. This is likely to act as a deterrent to data collection particularly given the resource intensive nature of the task, simply by making the process more difficult. Once a particular system is adopted it is difficult and expensive to change if it turns out to be the wrong one.

There are clear business drivers for collecting sustainability data at the asset level. As Muldavin points out in his extensive work on the relationship between sustainability and property appraisal (Muldavin, 2010) "Measuring property sustainability is critical to financial analysis and valuation" (p.38). But there are also strong barriers to its collection, not least of which is cost. Data collection and storage is notoriously expensive. It is also most easily collected at asset level by managing agents who are less engaged with the drivers to which Muldavin refers. Sustainability has yet to emerge conclusively as a factor in the open market value of an asset (see Sayce et al 2010) so has less significance for the agency community than for the investment community. Work carried out by the Better Buildings Partnership (BBP, 2010) has established a toolkit to support managing agents in this area. However it has to be acknowledged that there is an additional cost attached to collecting this data which it would be unreasonable to expect the managing agents to bear alone.

Data collection and the quality of data collected relies heavily on the holder of the data being willing and able to supply it in a consistent and objective form, potentially on a regular basis. This is less likely to be achieved where data is requested for similar reporting and measurement systems using different formats and metrics. Here again, however, it could be argued that lack of a coherent strategy, accepted by both clients and consultants, as to the format in which the data should be collected and stored, is hindering progress.

Significant efforts have been made through IPD, Pisces, Global Investment Reporting Standards (GIPS) and other organisations to standardise investment performance data and reporting systems for property but this has yet to filter through to sustainability. The Global Reporting Initiative (GRI) is currently working with property organisations to develop a Real Estate Sector Supplement that will provide standard reporting guidance at the corporate level. Whilst this will be welcome it does not solve the issue of variation in metrics at the property and portfolio level.

For the demand side of the property industry to make effective progress in understanding, measuring and improving the sustainability of commercial real estate a common set of metrics through which sustainability performance can be measured is required. This paper sets out just such a series of metrics that can be adopted by industry and used within benchmarking tools and toolkits as the starting point for a common framework for measuring and reporting on sustainability at the property level. It is the product of a joint initiative set up by the Green Property Alliance (GPA).

As a cross industry forum the GPA[1] is well placed to carry out this work. It is a subgroup of the Property Industry Alliance and hence includes IPF, BCO, RICS, BCSC and BPF within its membership. It also includes UKGBC and has input from property companies and fund managers. The objective was to achieve cross industry agreement on a standard set of sustainability metrics that allow for comparison, benchmarking and reporting of sustainability within existing commercial buildings. The work does not purport to define sustainable property and has quite specific limitations. It is largely UK based and focuses very specifically on the existing stock. The focus is on a narrow range of sustainability indicators that relate to environmental performance. It specifically does not look at indicators of social sustainability.

The metrics have been identified and debated with people currently active within the industry; property companies, investors, fund managers and the occupiers. These are the parties who

[1] See appendix A for a full list of the GPA membership

gather and supply much of the data and are therefore logically the parties to identify what they can reasonably measure and how, in response to what is being requested.

The current position

Evidence suggests the property investment community is increasingly alert to sustainability, particularly as a risk issue. Research by GVA Grimley has tracked investor engagement on this issue over the last three years. Their most recent survey found that the proportion of investors who had carried out a sustainability assessment for the majority of properties within their portfolios had more than doubled since 2008 from 21% to 53%. 42% of respondents included sustainability explicitly within their investment appraisals and 40% undertook a formal sustainability appraisal prior to purchasing an asset (GVA Grimley, 2010).

In work commissioned by three pension funds and carried out by researchers at Maastrict University (Kok et al, 2010) 198 property companies and fund managers responded to a survey examining their environmental management practices. Of the respondent group 89 had staff dedicated to environmental management and many reported having bought or developed assets with some form of environmental rating over the previous two years. This analysis found the respondents to be strong on policy but weaker on implementation. In particular only limited numbers of those surveyed could report data on energy use, water use, waste and carbon emissions.

The development of ISPI (UK), the sustainable property appraisal index commissioned by the IPF from IPD, was based on data submitted by 39 funds from 14 different IPD clients, all of whom were keen to understand the relationship between sustainability and investment performance (IPF, 2009). More clients would have been included had they been able to provide the relatively limited property specific data required for the project.

This awareness of sustainability as an issue within the property investment community is hardly surprising given the attention commercial property has been given by environmental policy makers in recent years. The introduction of Energy Performance Certificates (EPC's) is of course one example of this regulatory output and affects all EU countries. Others include the introduction of Display Energy Certificates, more stringent Building Regulations and most recently the Carbon Reduction Commitment Energy Efficiency Scheme (CRC) being brought into force across the UK over the course of the next 6 months. With the exception of Building Regulations each of these policies uses some form of monitoring of performance of commercial properties. They are also designed to use competition between commercial organisations as a means of driving behavioural change. Yet none has triggered the availability of a coherent set of sustainability data even on the energy performance of buildings.

Considerable financial resource has been committed by property owners to compliance with EPC's. There was a strong expectation that their introduction would lead to some level of behavioural change and the beginnings of price differentials in the market as energy performance of buildings was compared (see for example IPF, 2007). The outcome has been rather different. EPC's are relatively inaccessible other than to the building owner although they must be available where a building is sold or a new lease is agreed. Furthermore, roll-out of EPC's has been relatively slow. One of the biggest difficulties in gathering data for the ISPI (UK) project was the limited number of properties that had an EPC. Of the 778 properties assessed for ISPI (UK), just 151 (19%) had an EPC rating. Whilst one might not expect all investment properties to have EPC's where they have not had new lettings or been sold, research suggests the number of properties on the market without an EPC also remains high in spite of it being a regulatory requirement. According to the most recent estimate by National Energy Services, 52% of commercial properties currently on the market do not have an EPC (Kennet, 2010).

Where EPC's are in place, there is no evidence of them being freely available as a means of comparing one building with another. One of the findings of the development work for ISPI was that accessing EPC's for the purposes of analysis was difficult on a practical level –

certificates being provided and stored as pdf's and therefore difficult to collate into other formats for simple analysis is just one example of this.

The current position with regards sustainability data can be characterised as one where:

i) property investors are increasingly alert to sustainability as a risk issue and therefore taking steps to monitor sustainability within their portfolios more rigorously
ii) Sustainability benchmarking systems and tools are widely available but measure sustainability using a range of different variables and metrics;
iii) Existing policy interventions have been disappointing in their ability to make sustainability data more widely available
iv) Data is increasingly required for environmental and climate change regulation but is not commonly available in a consistent, analysable format.

There are examples of investors, developers, property companies and fund managers who can be identified as leading the sector in terms of developing strategies to address sustainability within their property portfolios, but they are not yet the norm. Data is being gathered at the asset or portfolio level to support the policies and strategies being developed by both industry and regulators but it is limited, relatively inaccessible for the purposes of objective analysis and has no common format. For these and other reasons no dataset is developing against which the market can monitor progress on sustainability against any common target.

Methodology

Previous research has identified a need for greater clarity and uniformity in this area (see for example Better Buildings Partnership 2009, Ellison and Sayce, 2007, Bennetts and Bordass, 2007). The key sustainability criteria have largely become established as including energy, water, waste, and carbon. There are additional factors – transport, community engagement, biodiversity for example, but the first three are normally common to any real estate sustainability assessment and the reduction of carbon emissions is a key regulatory policy target. This work has therefore focused on these four factors with a view to the list increasing once common ground is achieved in these first key areas.

Without some form of consistency in data reporting, achieving greater levels of sustainability within the commercial building stock will simply be more difficult and take longer. However the problem should not be underestimated. The sector is complex: measuring performance in new build projects is clearly different from measuring performance in existing buildings, single occupancy has different issues to multi-tenanted and the commercial sector is made up of many different building types – retail, office and industrial represents only the broadest definition of these. Then there is the occupier/owner division to consider. Occupiers are interested in different areas of building performance to investors and owners. The different stakeholders hold different data sets – no one party holds it all. Whilst this complexity is daunting it is simultaneously one of the strongest arguments for consistency of approach in measurement.

Part of the mandate for the GPA group preparing this work was to ensure that the metrics identified were consistent with those currently most commonly used across the sector. The first task was therefore to carry out a review of existing commonly used benchmarking systems. The exercise focused on the frequency of reporting, which tended to be annual, the data gathered on the physical characteristics of each building and the metrics used to measure carbon, energy, water and waste.

A similar desk study was then carried out using a selection of published company reports and accounts. Many companies now publish specific environmental accounts that reveal their performance against targets for a range of variables. Again, the exercise focused on the frequency of reporting and variables against which sustainability performance is measured.

Having reviewed the available literature the working group were able to identify the most commonly occurring variables and the metrics used to measure them. This provided a starting point from which a suggested list of possible metrics could be developed. However, a complicating factor in the development of any metric for real estate is the way in which it is normalised to make it applicable across a range of buildings. This to some extent goes to the heart of the difficulty in relation to measuring sustainability in real estate. A metric that works for one type of building is unlikely to work for another without some form of adjustment being made. The paper therefore also explores what normalising factors should be used for each metric.

The next stage of the research was to consult with industry practitioners as to which of the identified variables and metrics would be the most effective. The findings from the literature and data review were presented to a workshop of practitioners[2]. Three groups discussed each of the variables and issues relating to their collection, their value and their viability. A plenary session was then used to review the findings.

The output of this process has been the identification of a series of variables, metrics and normalising factors that could be routinely used for the reporting of sustainability for commercial property. The list is not final and further debate will be encouraged, particularly in relation to additional variables that could be added to the list. However, it does provide a ork list of measures with which industry can begin to work.

The data

The findings of the initial survey of benchmarking systems were revealing. The review focused on five key variables – building details (physical characteristics) energy, carbon, water and waste. Thirteen different reporting systems and 11 sets of company accounts were analysed (see tables 1 to 8 below). Not all of them captured data on all of the variables but many did.

Building details

Basic information on the asset is a key starting point for any systematic collection of metrics. Without some commonality here, comparison of results later becomes extremely difficult and any findings less than meaningful. Furthermore, building data is key to any process of 'normalising' sustainability data, i.e. transforming data for an office building in use 24 hours a day seven days a week, to one in use for more limited hours each day for example.

It was therefore quite surprising to find little overlap between building data gathered and presented within the company reports and data requested within the benchmarking tools. Data on floor area is captured by 8 of the 13 benchmarking systems and 8 of the 11 company reports. This was commonly reported on a net lettable area basis for the benchmarking systems(5/8)[3]. The company reports show less consistency with only 1 reporting NLA but four of the eight reporting total M^2.

Date of last refurbishment was captured by 6 of the tools but only 3 of the reports. This is a significant issue when comparing buildings – an older refurbishment might be expected to underperform a new one – and would be expected to be relatively easy to supply.

Building details		***metric***				
	Capture data	net lettable area	gross lettable area	total floor area M^2	total usable floor area	date of last refurbishment
Tools (13)	**8**	**5**			**1**	**6**
Reports (11)	**8**	**1**	**1**	**5**		**3**

Table 1 Building Detail Metrics

[2] See Appendix A for a list of workshop attendees

[3] One exception to this is for DEC's where net usable floor area is the criteria. This was investigated further with DEC through the workshop phase of the research where is was suggested there may be potential for DEC;s to fall in line with common industry practice if this is effective.

Other building details captured included whether or not the building has some sort of independent asset rating and whether or not it had an air conditioning system.
Occupancy levels are not captured routinely and neither are hours or days of use. Occupancy is of course a key issue for these metrics, particularly for office buildings. An empty building will show a much reduced level of energy consumption. A building that is working harder as worker/space ratios are reduced in a drive for greater efficiency may show a deterioration in energy performance per square metre, but very good energy efficiency per occupier.

Worker occupancy is a less significant metric for other types of commercial property. Nonetheless a normalisation factor is required which will allow performance to be reflected in terms of the productivity of the space.

Building type is normally divided into retail, office, industrial classifications. However this is a very broad classification system and the workshop participants raised the possibility of using a more detailed standard classification system to divide commercial stock more narrowly. Suggestions included:

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

There was some concern that normalising data on a broad classification basis is sufficiently ambitious and that classifying more narrowly increases the difficulty of the process and with it the risk of failure. However, it is clear that a broad three way division of the whole commercial building stock is insufficient to make measurement meaningful. The was broad agreement that using the IPD classification would be helpful in supporting cross referencing and comparison of sustainability performance with financial performance of the stock.

Energy data
Energy data is critical to any assessment of a building's sustainability performance. However it's measurement is fraught with difficulty and as a sector we are still struggling to resolve key issues such as the sharing of data between owner and occupier. All of these issues would be easier to resolve, however, if a consistent metric was applied across the industry. According to the data here this is not yet the case although there is some overlap between the industry reports and the benchmarking tools.

		metric			
	number to capture data	kWh	gj	epc's	not specified
Benchmarking Tools (13)	**13**	**6**	**2**	**1**	**4**
Reports (11)	**9**	**6**	**2**		**1**

Table 2 Energy Metrics

Energy data is gathered on a kilowatt hours (kWh) basis by six of the 13 benchmarking systems studied. Two of the remaining seven collect energy use data but it is not clear on what basis, one does not collect this data but uses EPC's as an energy performance measure, which use kWh, and two were unconfirmed. Two systems specify gigajoules as the metric. It seems clear from this that kWh could be adopted relatively quickly as an industry standard reporting metric for energy.

Renewable energy data
Data on energy from renewable sources is reported in a range of different formats. Again, kWh is the most commonly used metric but gigajoules are used by 2 of the benchmarking systems and reports.

Data on energy use was relatively rich within the company reports which split data into fuel

		metric			
	Number to capture data	kWh	gj	minimum % from renewables or onsite	unspecified
Benchmarking Tools (13)	10	5	2	1	2
Reports (11)	8	4	2		2

types, the use of renewables and district systems. The metrics again vary, using kWh most frequently but also gigajoules. In relation to district systems, percentage of energy that is exempt from the Climate Change Levy and tonnes of CO_2 converted were also provided. This suggests that the driver behind the data collection is the measurement of carbon in preparation for the CRC. However even this has not brought any common discipline to the reporting metrics used.

Table 3 Renewable energy metrics

The workshop discussion identified the use of kWh as the most appropriate metric for energy use. It is the headline metric used in energy bills, relating to consumption and cost. Its use could permit ready articulation of savings (whether predicted or retrospective) to be conveyed in terms of cost as well as energy (and potentially carbon). Furthermore the translation of kWh to carbon is relatively straightforward. The metric could be normalised by analysing it on a per square metre per annum basis which could then be analysed according occupancy or productivity levels as appropriate.

Some workshop participants observed that the metrics for energy should also make it very clear to what the term 'energy' referred. It was pointed out that frameworks such as the Greenhouse Gas Protocol included emissions arising from business travel. It was suggested that any energy measured within this context should be directly associated with running the building itself.

Water
Data is required on water use for eight of the 13 benchmarking systems and provided in all 11 of the company reports examined. The eight benchmarking systems require both water used plus data on harvested water and reused and recycled water. The metrics again vary. Where specified, the most commonly used metric is M^3 per annum, but millions litres/m^2/per annum also featured. Recycled water tends to be measured as a % of the total volume used.

		metric				
	Number to capture data	M^3 or M^3pa	total withdrawn by source	millions litres	kilo litres or kl/m2	unspecified
Benchmarking Tools (13)	**8**	**4**	**1**			**3**
Reports (11)	**11**	**6**	**1**	**1**	**2**	**1**

Table 4 Water usage metrics

Reports (11)	**4**	**1**		**1**		**2**
	number to capture data	*M^3 or M^3 pa*	*millions litres/m2 p.a.*	*% total volume recycled*	*facilities in place*	*unspecified*
Benchmarking Tools (13)	**8**	**3**	**1**	**1**	**1**	**2**

Table 5 Water recycling metrics

All the company reports reviewed collect data on water consumption but only 4 reported on water recycled. The most commonly used metric is M^3 but this again varies and millions of litres (Ml), thousands of litres (kl) and kl/m^2 are also used. Recycled water is again commonly measured in M^3 but is also monitored in terms of percentage of total volume used.

This would appear to be one of the easier sustainability factors for which to establish a common metric. Industry is clearly able to monitor usage and recycling rates and there is some overlap between benchmarking systems and reports with regards metrics used. The most appropriate metric here is clearly cubic metres (m^3) of water used and of water recycled as a proportion of the total used, allowing normalisation on a per square metre or per occupant per annum basis. The workshop discussion supported this but also raised further points. In particular the differing affects of climate and climate change in different regions, manifesting itself potentially through both flooding and rising temperatures makes it important that water use becomes contextualised. The location of a building will ultimately have a significant impact on its water usage.

Waste and recycling of waste
Existing regulatory policy such as the landfill tax has focused attention on reducing waste and measurement is relatively common. Nine of the 13 benchmarking systems require data on waste and all the company reports reviewed provide it.

The common metric is tonnes with 5 companies reporting on tonnes sent to landfill and 2 reporting waste disposal by route.

Waste	*number to capture data*	*tonnes to landfill/ incineration*	*net waste to landfill*	*total waste in tonnes*	*kg/m2/ year*	*Waste by route*	*unspecified*
Benchmarking Tools (13)	**7**	**1**		**2**	**1**		**3**
Reports (11)	**9**		**1**	**3**		**2**	

Recycling	number to capture data	waste by route	tonnes by waste type	facilities in place	total in tonnes	recycled as proportion of total waste	unspecified
Benchmarking Tools (13)	**7**		**2**	**1**	**2**		**2**
Reports (11)	**9**	**3**			**2**	**2**	**2**

Table 6 To ics

Table 7 Waste recycling metrics

Where waste data is required by the benchmarking systems this is also largely on a metric tonnes basis with two specifying that it is separated by waste type and disposal route. So here again it is possible to see overlap between what the companies can and do report and what the benchmarking systems request. Formalising this into an accepted industry practice would be a logical next step forward. The workshop discussions suggested that waste should be routinely measured in metric tonnes allowing for monitoring of recycling as a ratio of that total.

The workshop attendees were aware of waste and its management being a key sustainability issue and broadly agreed with the metric suggested. However, the act of measuring waste to understand its source was identified as being extremely challenging. The landlord and tenant issues associated with measuring waste are almost as pronounced as those raised in measuring energy. Waste is routinely measured by survey or direct monitoring at the point of disposal where it is difficult to identify whether the waste derived from the landlord or a tenant within the building. Whilst practices such as the use of barcodes at the point of weighing can

be used to resolve this these were not common practice. The finding of the workshop was that a more sophisticated means of measuring waste needed to be explored by industry.

Carbon
The reduction of carbon emissions is central to most government sustainability policy at both national and international levels. This is reflected in the regularity with which data on carbon emissions is requested within the benchmarking tools and provided within the company reports. Ten of the 13 benchmarking systems request carbon emissions data and nine of the 11 company reports provide it.

Measuring carbon emissions from the existing building stock raises many issues including those relating to the treatment of embodied carbon and the point at which you start or stop attributing emissions to the building. However it would undoubtedly be helpful if the industry adopted a standard basis on which to report carbon emissions and on which to convert fuels to carbon equivalency.

Of the ten benchmarking systems that require data on carbon, five use the Department for Environment, Food and Rural Affairs (DEFRA) grid mix standard and fuel emissions factors to translate energy into carbon emissions (DEFRA 2009). Three of the ten use the GHG protocol (WRI/WBCSD, 2005) and the other two do not specify. Of the nine company reports reviewed that provide data on carbon emissions seven use the GHG protocol and the other two use the DEFRA grid mix standard and fuel emissions factors to convert fuels to a common carbon metric. Emissions are then reported in tonnes of CO_2, kg of CO_2, kg of $C0_2/M^2$ and GHG emissions in tonnes/year. There is clearly some overlap between what is requested and what industry feels able to provide but the current variety of reporting methods and bases makes meaningful comparison between assets or portfolios impossible.

Carbon		***metric***		
	Number to capture data	defra grid mix standard and fuel emissions standards	ghg protocol	not specified
Benchmarking Tools (13)	**10**	**5**	**3**	**2**
Reports (11)	**9**	**2**	**7**	

Table 8 Carbon Metrics

The recommendation to emerge from this work is that data on carbon should be calculated using the Defra Carbon Reporting Guidelines. These provide guidance on scope and boundaries, i.e. which types of activity should be included. It is also recommended that the standard Defra electricity and fuel factors be used since these are most commonly used in measurement frameworks, and underpin the Defra Voluntary Reporting Guidance. For this reason too, we have proposed CO_2e[4].

The workshop participants supported this approach. However it was felt that carbon is a relatively abstract concept and it is important to retain the reporting of water, energy, waste and potentially additional resource intensive activities such as transport in particular, alongside carbon if targets for overall reduction are to be achieved.

Recommendations

The comparison of the different benchmarking systems and company reports reveals some commonality, which is encouraging, but little consistency of approach. It does suggest, however, that a more standardised industry approach is within reach. The company reports reviewed show that it is possible to gather data comprehensively at the building level and that

[4] CO_2e (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 simple CO_2 as many gases contribute toward global warming

there is an incentive for companies to do this. These reports also provide a starting point by illustrating what industry feels able to gather and report. If the eleven companies reviewed can provide this data, and this is only a small sample of the environmental reports that are published, then it would be fair to argue that many more companies could be encouraged to report in the same way. Furthermore, non-property companies reporting on corporate real estate would also have a reporting model enabling the data-gathering to extend much further. The incentive would be the ability to compare and contrast the sustainability performance of real estate portfolios, a major support for investment and other areas of decision-making, as well as being able to respond and contribute to government policy-making more effectively.

Tables 9 and 10 below set out the key recommendations to emerge from this work. We are aware that as a list of sustainability criteria for real estate assets it is short. However it is a useful starting point and if we can agree a set of common metrics for this relatively short list there will be much greater scope for agreeing something similar for others. It will enable us to move forward as an industry by stating clearly that this is how we measure these items and future requests for data will be more easily fulfilled if they reflect these recommendations.

Energy/renewable energy	***How measured***	***Metric***	***Performance indicator***
Electricity[5]	Energy for landlord services and any tenant supplies	kWh	kWh/M^2 NLA or occupancy/year
Fuels	Energy for landlord services and any tenant supplies	kWh	kWh/ M^2 NLA or occupancy/year
Water			
Total water used	By reference to bills	Cubic Metres (M^3)	M^3/M^2 NLA or occupancy/year
Water recycled/ harvested	By reference to bills	Cubic Metres (M^3)	M^3/M^2 NLA or occupancy/year as a ratio of total consumption
Waste			
Total waste produced	Direct measurement or survey	Tonnes	Tonnes/by reference to occupancy or M^2 NLA/year
Waste disposed to landfill	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
Carbon			
GHG emissions	By reference to Defra Reporting Factors[6]	Metric Tonnes/CO_2e	KG/CO_2e/M^2 NLA or per occupant/year
Emissions saved	By reference to Defra Reporting Factors	Metric Tonnes/ CO_2e	KG/CO_2e/M^2 NLA or per occupant/year

Table 9 Recommended Metrics

The work to establish this list however has also revealed how much more work is needed to improve the measurement systems we have in place. Energy reporting is relatively commonplace within the industry but the seemingly intractable problem of data sharing between landlord and tenant remains. The implementation of CRC in England and Wales is expected to encourage behavioural change in this area but whether it is successful in this regard remains to be seen.

The accurate measurement of waste again needs further examination to ensure the best available systems and technologies are being used. The use of barcodes to monitor and track waste is an available technology that may bear expansion across the sector.

[5] In translating this to GHG emissions, those measuring may need to separate electricity to its components (e.g. grid average, renewables, climate change levy exempt, etc)
[6] http://www.defra.gov.uk/environment/business/reporting/conversion-factors.htm

Criterion	*Metric*	*How measured*
Type of building	Type by use	Office/retail or mixed use
Occupancy	Number of occupants	Number of occupants plus landlord staff on-site
Vacancy rate	Space unfilled	NLA unoccupied
Days of use	Days	Days used per week
Hours of use	Hours	Hours used per day
Floor area	Net lettable area	Net lettable area measured by reference to RICS Code of Measurement
Is the building air conditioned?	Yes/no/percentage if partial a/c	State whether building is air conditioned
Is an EPC in place for the building?	Yes (and grade achieved)/no	If yes, specify rating and grade and year achieved
Is a DEC in place for the building?	Yes (and grade achieved)/no	If yes, specify rating and grade and year achieved
Is a green rating present for the building?	Yes (and grade achieved)/no	If yes, specify rating and grade and year achieved

Table 10 Recommended Normalisation metrics

The building details and normalisation factors are inevitably complicated. The list that has emerged from this exercise will provide a starting point to allow metrics to be more consistently analysed within and across portfolios, but further work in this area is undoubtedly necessary. A particular area for focus is building occupancy. More effective ways of analysing building productivity beyond occupancy levels for, for example, the retail and industrial sectors are required.

Conclusion

The objective of this GPA initiative is to achieve cross industry agreement on a standard set of sustainability metrics that allow for comparison, benchmarking and reporting of sustainability within existing commercial buildings at the property level. Work so far has produced a framework of metrics for which cross industry agreement is being sought via discussion and debate. The list of variables is relatively short but includes those that are key to sustainability reporting. Further work will be required and encouraged to extend the list to take in a more wide ranging perspective on sustainability, but initially, establishing the framework for this short list as an industry standard is the priority. The benefits that would flow have been identified as significant improvements in the efficiency with which data can be collected, leading to greater quantities of data being collected and available for analysis. Greater clarity in the use of metrics is expected to encourage more engagement with measurement and reporting from a wider range of companies, again increasing the availability of data for analysis. The ability to make robust analyses across portfolios and between assets is expected to support the effectiveness of competition as a driver of behavioural change which is currently severely hindered.

The demand sector of the property industry has a significant contribution to make in terms of reducing carbon emissions and generally making more efficient use of scarce natural resources. An organised system for reporting and measuring on key factors will be a major step forward in enabling the sector both to engage with policy makers in an effective and properly informed way and to respond to the obligations that will ultimately be placed upon it.

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Appendix A: Green Property Alliance Membership

Martin Moore (Chairman)	PRUPIM
Liz Peace	British Property Federation (BPF)
Jon Lovell	British Property Federation (BPF) Drivers Jonas
Matthew Tippett	British Property Federation (BPF) Upstream
Peter Cosmetatos	British Property Federation (BPF)
Elizabeth Hinde	British Retail Consortium (BRC)
Louise Ellison	Investment Property Forum (IPF)
Miles Keeping	Investment Property Forum (IPF) GVA Grimley
Daniel Cook	Royal Institution of Chartered Surveyors (RICS)
Richard Francis	Gardner and Theobald
Patrick Brown	Secretariat
Paul Edwards	British Council for Offices & Better Buildings Partnership (BCO/BBP) Hammerson
Davinder Jhamat	British Council for Shopping Centres (BCSC)
Paul Harrington	PriceWaterhouseCoopers (CoreNet)
Stuart Bowman	Hurley Palmer Flatt (CoreNet)
Ursula Hartenberger	Royal Institution of Chartered Surveyors (RICS)
Paul Bagust	Royal Institution of Chartered Surveyors (RICS)
Sarah Jeffcote	UK Green Building Council (UK GBC)
Paul King	UK Green Building Council (UK GBC)

Appendix B: Workshop attendee list

GPA Common Metrics Workshop Attendees

First name	Surname	Organisation
Yetunde	Abdul	BRE
Quinten	Babcock	TFL
Christopher	Botten	LDA
Romin	Boulton	British Property Federation
Patrick	Brown	British Property Federation
John	Bryan	Communities and Local Government
Keith	Bugden	Hermes
Daniel	Cook	RICS
Max	Crofts	RICS
Jennifer	Decker	WRAP
Matthew	Deeks	PRUPIM
Paul	Edwards	Hammerson
Louise	Ellison	Investment Property Forum
Richard	Francis	Gardiner and Theobald
Mari	Frengstad	Hammerson
Jim	Green	Envos
Christopher	Hedley	IPD
Helen	Hensel	Drivers Jonas LLP
Ron	Herbst	Deutsche Bank
Elizabeth	Hinde	British Retail Consortium
Tom	Jennings	The Carbon Trust
Philippa	Latimer	British Council of Shopping Centres
Robert	Peto	RICS
Martin	Print	Amazia
Joel	Quintal	PRUPIM
Laura	Tapper	British Property Federation
Matthew	Tippett	Upstream Sustainability Services
Niall	Tipping	Grosvenor