

Improving sustainability through the 21st century workplace, and IBM's vision of the office of the future

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Introduction

Sustainability, and particularly environmental sustainability, has now risen to the top of the business agenda. We expect it to remain there for many years to come with key pressures including:

- Energy costs, which in turn are in direct proportion to carbon emissions
- A downturn in the economy: the “sustainability lens” can highlight opportunities for efficiency that will improve performance and competitiveness
- Increasing regulation: the imminent Carbon Reduction Commitment in the UK will affect some five to six thousand organizations directly, and many more through their extensive supply chains, notably those concerned with the built environment
- The rising importance of brand risk management as scrutiny from investors, customers, pressure groups and the media increases

Effective Facilities Management plays a key role in improving the sustainability of the office environment. However, benefits are maximized when FM, Real Estate, IT, HR and operational processes are coordinated in an integrated approach. Industry-leading organizations understand both the possibilities available today and the likely evolution in all of these areas over the coming years.

Overview

A truly sustainable office environment focuses not just on a building's fabric and systems, but increasingly on the accommodation needs of its occupiers and the evolving requirements of their roles. Staff is rapidly becoming more mobile, supported by a range of technologies allowing flexible collaboration through high-speed “work anywhere” connectivity.

Facilities managers need to understand the impact of these changes, working more closely with their colleagues across the business to play their part in supporting these new styles of working. To do so they need to collate, contextualize and exploit data on the built environment and the activities taking place within it. Managed properly, such “sustainability intelligence” forms the basis for reduced costs and carbon emissions while providing a productive working environment.

This paper discusses how organizations can optimize sustainability of the workplace environment today, and how they can prepare for the changes in the “office of the future.”

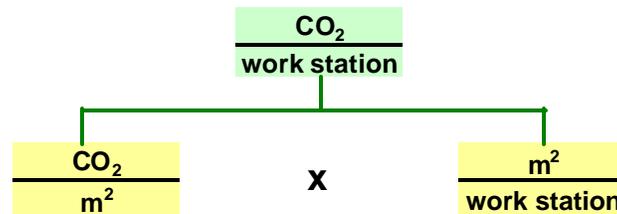
It covers three key areas:

1. Enhancing sustainability through the provision of workplace facilities best suited to different roles and work styles
2. Understanding the importance of data management to support sustainability related decision-making and reporting requirements
3. What the office of the future could look like, and why it is important to consider this now

Workplace facilities to optimize sustainable working

The “IBM Property Carbon ratio”

Within IBM, we have focused on carbon dioxide emissions as one of the key sustainability metrics. In an office environment, kilograms of CO₂ emitted per work station per year are therefore a useful measure in the benchmarking of different properties within our portfolio. This ratio can be broken down into two important factors, as illustrated below:



It is immediately obvious that the ratio of CO₂ / m² reflects how energy-efficient the building itself is. On the other hand, the ratio of m² / work station is a measure of space efficiency. We find that the simple separation of these two “levers” helps clarify thinking when setting out strategies for improving workplace sustainability.

Facilities managers are perfectly positioned to influence both of these key metrics, which are as applicable to other environmental issues – such as waste volumes and water use – as they are to carbon emissions.

Building sustainability

The sustainability performance of an office “envelope” is determined by a host of factors. Some of these are largely fixed, including its location, orientation, construction type and structural design.

Other factors can be adjusted, but at a certain cost, generally in the context of a wider refurbishment exercise. Examples are the insulating properties of doors and windows and the efficiency of mechanical and electrical plants, including washroom facilities and other consumers of water. These are issues that fall firmly within the remit of the facilities manager and in which the maintenance regime – including the lifecycle replacement of key components – can play an important part in optimizing the building's performance.

The most basic, but in some ways the most complex, way to influence sustainable performance is through user behavior, whether this be energy and water use, waste reduction or recycling. Again, facilities managers have an important role to play in raising awareness and devising practical ways to encourage occupants to behave in an environmentally responsible way.

Outsourced providers can lead by example, by delivering FM services in an environmentally sustainable manner. Examples include:

- Minimising their impact on the office environment, such as cleaning within office hours rather than at other times that would require lighting and air conditioning to remain on
- Use of non-polluting consumables
- Minimizing travel in their own operations
- Managing asset lifecycle for minimal environmental impact, rather than the lowest direct cost to the maintainer

This brings us to a fundamental point: for the outsourced facilities manager to maximize his contribution to the sustainability of the workplace, an equitable alignment of incentives is required. For example, it is

all too common for occupiers to assume energy risk, while there is nothing in their hard FM contract to specify a maintenance regime that minimizes energy use.

Our experience is that leading facilities managers have the knowledge and experience to significantly contribute to enhancing the sustainability of their clients' workplace but that their contracts do not necessarily encourage such behavior. Incentives, whether financial or simply in terms of contract length, may be too small, or indeed penalties for poor performance too weak.

We believe that appropriate FM contracts, which fairly reward providers for taking on an appropriate level of responsibility and risk in managing sustainability, are key to unlocking innovation within the industry and maximizing the potential within the workplace. These contracts need to explicitly address the financial and sustainability interdependencies between FM, capital projects, utilities and real estate strategy and operations to maximize environmental benefits.

Reliably consistent data at an appropriate level of detail, as discussed later, is required to underpin the sustainability performance regime and provide the basis for both internal and external reporting. The latter will become increasingly important as it forms the basis for carbon pricing and trading, notably under the new Carbon Reduction Commitment framework.

Space use efficiency

The key to space use efficiency is to provide a comfortable environment conducive to efficient working, but only for those staff that actually need to be in the building.

Traditionally, each office worker had their own desk, a large proportion of which could be vacant at any given point in time as their occupiers were in internal meetings, travelling or with clients, off sick or on leave. While the concept of "hot desking" has been with us for many years, an optimal, sustainable workplace solution calls for much more to maximize operational efficiency while minimizing environmental impact.

The first step is to ensure that the offices themselves are in the right place and with the right capacity as far as existing leases. This will involve a review of current and future business needs as well as a detailed analysis of staff accommodation requirements by role type. A key premise of this analysis is that workspace should be as flexible as possible with desk sharing being the default. Staff should work in the most convenient location for their business needs, whether this is "home" or "away" offices, customer sites, at their own home or on the move. The possible implications for travel emissions, both from staff commuting and from business trips, should be explicitly considered when reviewing office locations as part of a holistic environmental impact study.

Once accommodation requirements have been determined by site, the workplace design, allowing the flexible use of desk space and including space for meetings and informal contacts, should be reviewed and corporate space standards established. As well as providing limited storage for personal effects, this design needs to assess how office-based technology supports "non-territorial" styles of working. At a minimum, this will require an open-plan environment; "follow-me" telephony, where staff can log into phones at any desk; as well as the ability to connect to IT networks at each workspace, which might be wirelessly. Many organizations are also adopting a "global printing" approach, whereby multiple at-desk printers are replaced by fewer, high-capacity, multi-functional devices (MFDs) that allow scanning, faxing, copying and high-speed printing. MFDs are also more energy efficient than multiple machines, each of which are largely idle but which consume significant electricity each time they warm up prior to printing a document.

None of the above is possible without the individual information and communication hardware and software to facilitate mobile working and thus free up valuable office space. Laptops are not only more energy efficient than desktops but can be carried around by workers. These require connectivity outside

of the office, typically through home-based broadband and 3G technology when on the move. They also require robust and secure systems architecture and the capability to access centrally held data when working remotely.

Mobile phones are needed for remote working, although voice-over Internet protocol (VOIP) will become increasingly important for “virtual meetings” when sharing data interactively.

Both the use of such technology and the management challenges of remote, mobile and flexible working require appropriate HR policies and processes. For example, how will managers manage when they no longer have constant line of sight to their staff? How will their reports cope with different working environments? This human element, often overlooked, is the key to successful mobile working and thus in maximizing workplace space use efficiencies and the associated environmental benefits.

The role of the facilities manager

In maximizing the inherent efficiency of office buildings, client and supplier facilities managers need to identify areas of mutual benefit as they forge more strategic, long-term partnerships. Informed clients have a responsibility to influence their colleagues in the procurement function to look beyond lowest first cost when selecting FM suppliers, focusing instead on long-term financial and environmental value.

While some of the mobile working considerations of maximizing space efficiency go clearly beyond the remit of most facilities managers, the FM function has a key role to play. It may be handed responsibility for driving workplace transformation programs, particularly if they are seen as largely a property matter. FM professionals should ensure that such initiatives include the full breadth of IT and HR expertise necessary for project success, and thus to achieve the associated sustainability benefits.

Effective data management for optimal decision-making

The need for sustainable performance data

As noted earlier, accurate data on utilities use and hence carbon emissions will be increasingly needed for external reporting which, with many thousands of pounds riding on these figures, will require a rigorously auditable framework. Within an organization trying to improve its sustainability, this emissions data will not be sufficient, since waste and recycling volumes, water use and other factors will also need to be recorded and managed from a holistic perspective.

Typical data challenges

Occupier organizations are increasingly centralizing the management of property, treating buildings as strategic, rather than local assets. At the same time, as we know well in the FM community, the associated estates, projects and facilities management services are typically being outsourced, often as part of a wider program of eliminating non-core activities.

This trend towards outsourced property service delivery means that a client organization may no longer hold detailed information about its own property portfolio’s performance, particularly its sustainability performance, while in many cases no single supplier has an overall view either. This is a serious enough problem in the effective day-to-day management of an estate. However, it can become a major barrier to sustainability improvement programs if the data on which initiatives are to be developed, selected and measured against is not readily available.

We find that many organisations are still working from *ad hoc*, often locally held and inconsistent spreadsheets to manage environmental data. If that data is available at all in the future, such processes will simply not be acceptable.

Sustainable data management solution

Traditionally, there have only been two ways for an occupier to access detailed environmental data in an outsourced environment. The first was to impose a particular software solution on its service delivery partners, locking those suppliers into a defined technology and the ways of working that go with it. This allowed strategic property data to be kept in-house, but only at the expense of property managers having to provide applications for their suppliers who then have to maintain multiple, and often complex, operational systems for their various clients. –This potentially stifles their ability to innovate and therefore increases costs.

Other client organizations have allowed their delivery partners the freedom to use their own preferred systems, but as a result, suffer restrictions in their ability to extract the data that they need in the first place along with challenges in collating it across the various sources. This meant that even key traditional management metrics such as total cost of ownership were difficult to derive, let alone the relatively recent requirement for environmental reporting.

Fortunately, there is a third way, with the emergence of property “performance management” solutions. While extracting the key data from systems used by in-house and external service delivery organizations, these do not attempt to replicate the detailed transactional processes and business rules functionality that drive operational systems. Instead, both internal users and suppliers can retain their existing IT systems while providing a tailored, strategic information summary to suit the particular needs of individual users.

Property performance management systems draw on data from all property-related activities, including estates, FM, utilities and capital projects. Typical data sets include:

- Address and tenancy, from estates systems
- Associated costs, from finance packages
- Building-level staffing details, such as headcount, occupancy levels and associated access times and dates from security and HR systems
- Space planning/stacking plans
- Utility consumption, at as granular a level as possible
- Asset condition and maintenance plans and records
- Building management systems data on plant activity

IBM has successfully used such a system on 800 of its own properties across 10 countries for a number of years.

This approach allows property and FM environmental sustainability issues to be managed at a strategic, portfolio-wide level, rather than being a last-minute addition once major decisions have already been taken.

The Office of the Future

As with the issue of mobile working, three main disciplines are involved in what we at IBM are terming the “Office of the Future.”

- Property
- Technology
- People

This often means not working in an office, as we know it, at all! As before, all three elements have to be addressed to maximize both operational and sustainability benefits. However, in this instance we are considering more fundamental changes to the way we all work.

Property

The starting point for the Office of the Future is that today's emerging property management best practice is already a reality:

- Office space use is optimized for its occupants' needs, and what is provided has a high level of occupancy.
- "Smart" building management systems exercise a degree of control, such as lighting and air handling, currently only present in the most modern offices.
- The structural design of buildings is itself optimized for minimal environmental impact, with the appropriate use of thermal mass and natural ventilation eliminating the need for air conditioning in most instances, and natural lighting reducing the need for artificial sources.
- The asset maintenance regime is specifically tailored to minimizing carbon emissions.
- Energy use is actively managed at a granular level with regular reporting.
- Staff accepts a wider range of ambient temperatures, to reduce the need for cooling and heating.
- Office locations favour low-carbon travel.
- Facilities services are provided through genuine long-term partnerships.

Technology

The supporting technology will feature, as a matter of routine:

- Data, and often software, held in "cloud" environments
- Limited computing power at fixed workstations
- Ubiquitous high bandwidth networking technology
- High-speed personal computing devices with constant connectivity

People

From a cultural perspective, we believe that mobile working will become the norm for many organizations. There will be less travel, and hence face-to-face contact, but more collaboration overall through appropriate technologies. The "Facebook" generation will embrace new technologies and prove to be highly adaptive. The mitigation of climate change will be of increasing importance to employers and employees, while adaptation to extreme weather events will become a necessity.

Future directions

Having implemented all the techniques with which we are currently familiar raises the prospect of fascinating new ways of working.

For example, there could be far greater geographic dispersion of teams, working collaboratively and virtually, that are currently co-located in the same building. Indeed, working from home could become the default location, with new houses being equipped with two studies, one for each adult in a household.

This could lead to a much-reduced need for traditional office space. These could be largely replaced by high-quality drop-in offices, rented by the hour by colleagues living in the same area and traveling at off-peak times to reduce time and emissions.

Technological advances could stretch this vision further. Head-Up Displays (HUDs) could replace PC screens to offer a genuinely realistic alternative to travel, building on the growing acceptance of meetings in "Second Life" environments. When roads become impassable due to flooding caused by climate change, virtual reality meetings could become the only feasible option for certain interactions that we currently perform face-to-face.

The importance of the Office of the Future

Given the current advances in technology, the urgency to mitigate climate change and the increasing need to adapt to it, the “office of the future” may really not be that far away.

However, decisions that we in the FM industry make today could either accelerate this process, or else hinder it, for our organizations as well as our clients. In turn, this will affect the delivery of the associated sustainability benefits. Being alert for opportunities to improve the current situation while preparing for possibly radical new ways of working will characterize leaders in the industry.

Conclusion

This paper has discussed how sustainability can be improved through:

- The provision of appropriate workplace facilities
- Effective data management
- “The office of the future,” and our thoughts as to what this could look like.

FM managers, whether within occupier organizations or their suppliers, have a key role to play. This not only ensures that the environmental impact of the properties for which they are responsible is minimized, but also that these buildings support innovative new ways of working which are themselves truly sustainable.

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