

Global Sustainability Perspective – July 2011

Green Buildings and Office Worker Productivity

Overview

In this edition of the Global Sustainability Perspective, we focus on the following topics:

- **CDP Cities: A World Winning Partnership** – We look at how cities around the world are tackling the challenge of climate change and what the economic opportunities are for them to do so.
- **Latest on Sustainability Legislation** – We cover the UK Energy Bill, China's measures for greening its buildings, Canada's certification requirements for federal buildings and India's Renewables Purchase Obligations.
- **Green Buildings and Office Worker Productivity** – We assess the drivers of office productivity, what we can learn from research and how we can create offices that increase health and wellbeing for our employees.

CDP Cities: A World Winning Partnership

Cities are hubs of global economic activity and innovation - 34 of the world's 100 largest economies are cities. Cities are responsible for consuming approximately 60%-80% of the world's energy production and are exposed to significant risks linked to climate change. Yet, to date, there has been little reliable data on how these hubs of economic activity and population growth are tackling climate and carbon risks.

CDP Cities has been created to help solve this challenge. As lead sponsor to CDP Cities, Jones Lang LaSalle has an exceptional opportunity to contribute to this effort. In this edition of the Global Sustainability Perspective (GSP) we wanted to provide our first view on what CDP Cities means for real estate investors and occupiers around the world. This will be followed by further reflections over the next year as the initiative builds momentum and impact.

What is CDP?

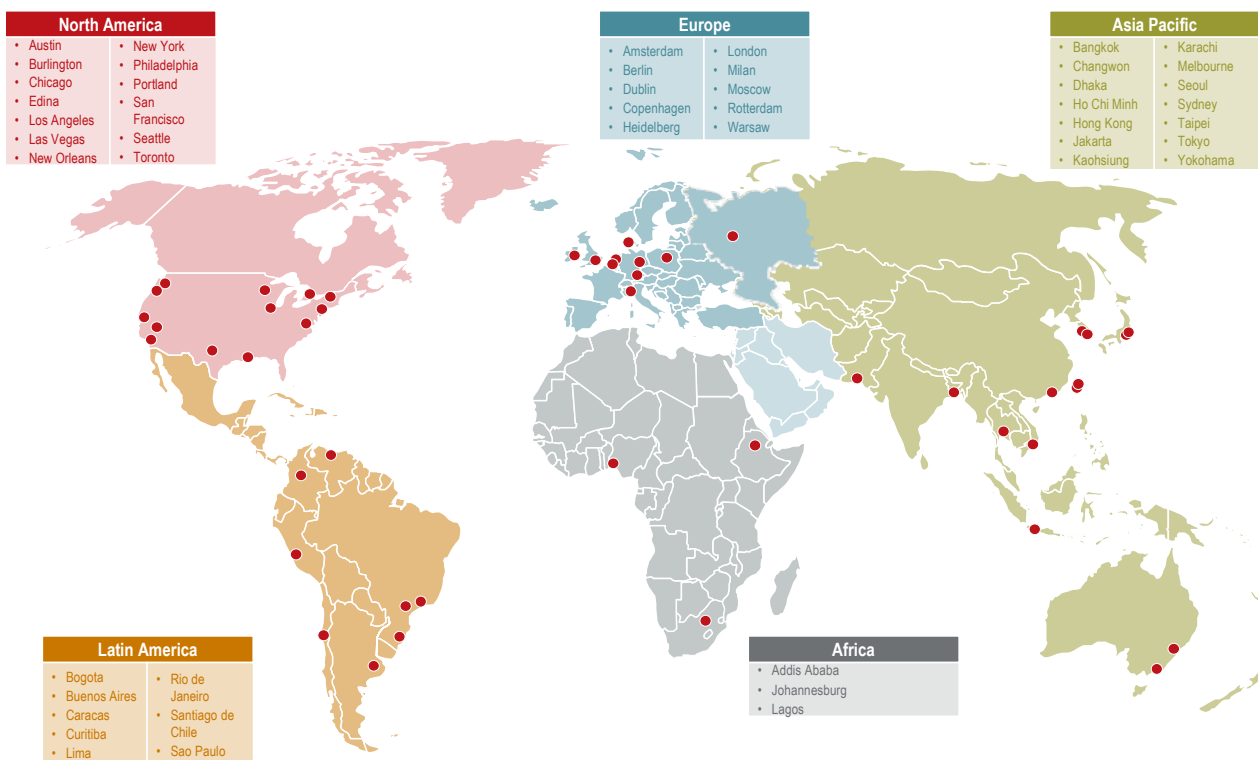
The Carbon Disclosure Project (CDP) is a global not-for-profit organization, which accelerates solutions to climate change by putting high-quality data at the heart of business, policy and investment decisions. CDP encourages organizations worldwide to disclose their greenhouse gas emissions and their water management and climate change strategies through its online reporting system. CDP gathers the information and publishes yearly analytical reports.

“Over 3,000 participants in 60 countries. CDP is the largest worldwide database of primary corporate climate change information.”

What is CDP Cities?

CDP Cities is a recent development of CDP, and its vision is bold. The aim is to significantly improve climate change information disclosed at a city level. After a successful pilot project undertaken in 2008, the CDP Cities programme was launched in 2010. 58 cities were invited to participate in the project and 42 cities responded positively, reporting their climate change-related data to CDP. A further 6 cities chose to disclose voluntarily, bringing the total number of respondents for the first year to 48 cities.

Responding cities



Note: (C40 disclosing cities and voluntary cities)

The reasons for cities' interest in the programme is that disclosure will enable them to identify opportunities to increase their economic competitiveness and to potentially communicate the 'societal value' of energy and carbon efficiency to citizens and business, as well as to improve their climate and resources risk management.

Cities are also keen to attract global investment, and realise that in order to do so, city spaces and buildings must be vibrant and varied, well connected and well built. One of the lessons learnt by the private sector is that measuring and reporting on carbon emissions helps identify cost savings in the management of buildings. The same should be true for city authorities and the real estate they occupy. City spaces also, increasingly, need to be adapted to environmental risks such as flooding and droughts.

Finally, cities want to flex their economic muscles in the new low carbon economy. For example, the Mayor of London announced the creation of a 'Green Business District' last year, estimating that a low carbon marketplace could generate between £40 billion (US\$64 billion) and £140 billion (US\$224 billion) of investment and create 200,000 new jobs by 2025. CDP Cities enables its participants to compare their aspirations for green investment and green collar jobs, and to see which cities are achieving their goals for the growth of a low carbon economy.

Who is involved?

CDP Cities is working in partnership with the Clinton Climate Initiative and the C40 - an organization of 40 major cities and 19 affiliate cities around the world that have committed to tackling climate change. As well as these partnerships, CDP Cities is sponsored by Autodesk – a leading company in 3D design, engineering and entertainment software - and by Jones Lang LaSalle.

Jones Lang LaSalle is providing CDP with input and assistance in the evolution of the questionnaire for municipal governments to report data relating to global climate change issues as well as sustainability policies and trends in urban areas. Jones Lang LaSalle will support CDP Cities in its education efforts through seminars, webinars and city events. Our intention is to bring expertise in the built environment and an in-depth understanding of the effects of climate change on the sector. We also want to use the data collected by CDP Cities to inform and develop expert advice, building it into decision making for our own client base.

“CDP is delighted to welcome Jones Lang LaSalle as a partner on the program, with its knowledge in property sustainability, global reach and strong track record in environmental action”

Conor Riffle, Head of CDP Cities

“The Carbon Disclosure Project plays a tremendous role in increasing the prominence of environmental factors in business and investment decisions.

With the CDP Cities program, they have already shown that reliable, transparent information can guide cities to environmental policies and priorities to reduce their risk exposure and drive economic growth. Jones Lang LaSalle is fully committed to helping CDP take its Cities program to the next level.”

Lauralee Martin, Chief Operating and Financial Officer of Jones Lang LaSalle

What does the first CDP Cities Report talk about?

The 2010/2011 information request covered four main climate change related areas – governance, greenhouse gas (GHG) emissions, adaptation and strategy. Cities could choose to report separately on emissions linked to their municipal operations and/or on city-wide community emissions. It allowed cities to disclose both quantitative climate change data and qualitative information that contextualised the unique characteristics of each city.

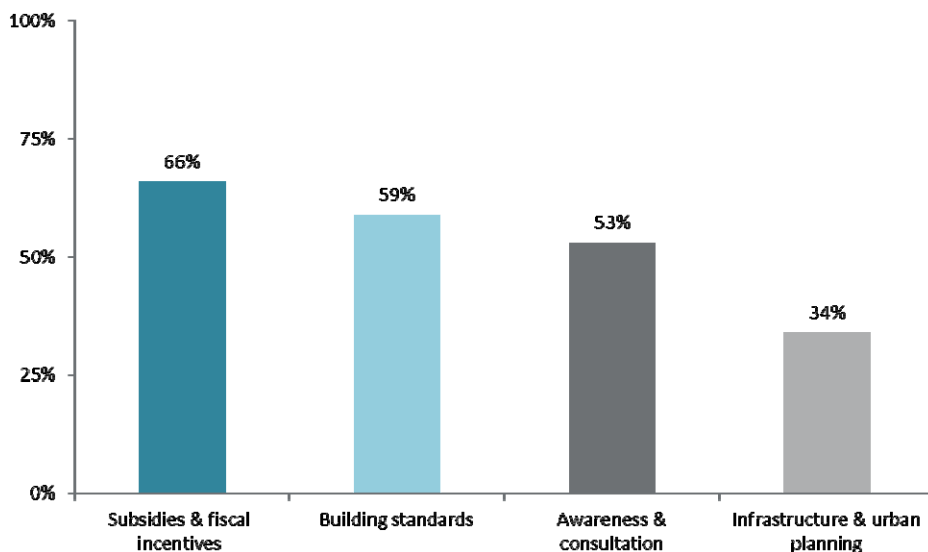
The first findings were released in the CDP Cities Report 2011 at the C40 Cities Mayors' Summit in São Paulo in June 2011. Fabio Maceira, Head of Jones Lang LaSalle Brazil, attended the conference and you can hear his thoughts on the event in our Green Room.

The overall impression from the report is that many cities are already embracing the carbon disclosure and management challenge. Over 90% of responding cities reported that responsibility for climate change sits at the highest level within the city structure (mayor or other chief executive). In addition, nearly 65% of the responding cities already report on city-wide community GHG emissions and 45% report on their GHG emissions from municipal activities. This trend is likely to intensify both among respondents and among other cities, as they try to emulate C40 cities. A number of respondents have adopted stringent GHG reduction targets - two cities have even set a 100% reduction target. The city-wide community targets they have adopted are generally long term (over 20 years) and aim, on average, for a 30% reduction in GHG emissions.

What are the implications for real estate players?

Interestingly, the most cited measures for community-wide actions are subsidies and fiscal incentives, building standards, awareness raising and consultation.

Main measures to reduce community city-wide emissions



Source: CDP Cities 2011: Global Report on C40 Cities

With building standards emerging as such a priority, we can safely assume that the property sector can expect more regulations linked to a building's energy performance. This will be the case for both the renovation of existing buildings and the construction of new buildings. Building standards may also be enforced as a prerequisite to transactions, where cities have the power to do so. Where they do not, cities will seek to strictly enforce national building regulations.

The two other most cited measures are likely to bear no cost to businesses. On the contrary, the subsidies and fiscal incentives could help businesses make the necessary investment in carbon saving measures. They can help reduce the payback period through direct funding or through a tax rebate, for instance. The awareness raising and consultation

measures are likely to target behavioural change and can be on a voluntary basis. They could present an opportunity for businesses to contribute to public policies and to raise staff awareness on climate change issues.

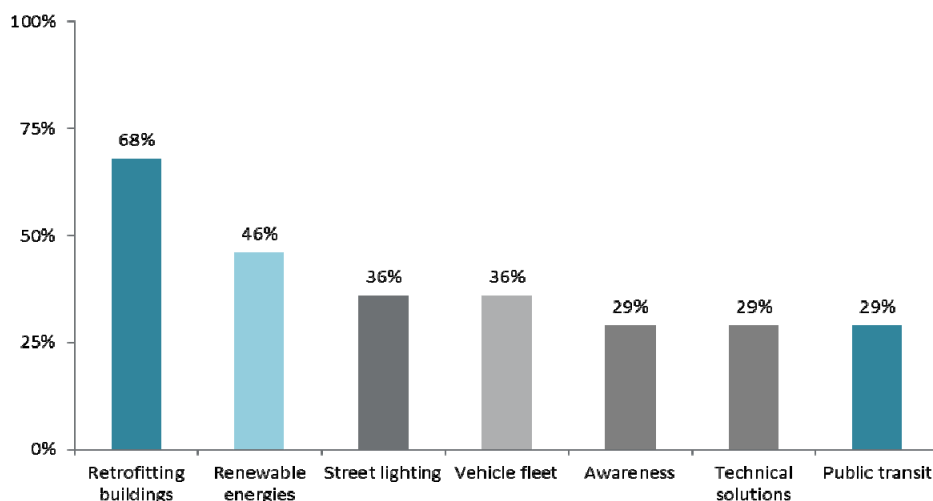
Nearly every city government stated that climate change could affect the ability of businesses to operate successfully in their city, and over 50% noted that they were already experiencing the effects of climate change or were expecting to in the near future. As we have seen from recent flooding in Brisbane, the impacts of these events on the business continuity can be very significant. We think that both occupiers and landlords will increasingly consider a city's resilience to climate change in their location and investment decisions. CDP Cities makes this information more transparent and available for the first time.

The following table presents a snapshot of anticipated implications of the CDP Cities programme for real estate players:

Snapshot: Implications for real estate players	
Owners/investors	<ul style="list-style-type: none"> • Improved transparency of local climate change risks and related public initiatives. This information can be used to inform investment and new development decisions. • National or local building regulations are likely to become more stringent – covering both renovations of existing assets and construction of new assets. • There will be opportunities to access government funding and/or subsidies for carbon emission reductions, including energy efficiency and renewable energy. • Increased public scrutiny about investors' own emissions and related reduction initiatives.
Occupiers	<ul style="list-style-type: none"> • Improved transparency of local climate change risks and related local public policies and initiatives. This information can be used to inform location decisions. • Opportunities for sharing in the benefits of carbon reduction measures carried out by the landlord.
City institutions	<ul style="list-style-type: none"> • Increasing emphasis on measurement and disclosure of city-wide and local council emissions. Systems and people will need to be put in place to make this happen. • Greater enforcement needed for building and planning regulations – both national and local. • Creative consideration about how to regenerate and develop city areas while responding to the challenges of climate change and resource scarcity.

And finally, what are the city institutions doing to improve their own performance?

Main measures to reduce city government operational emissions



Source: CDP Cities 2011: Global Report on C40 Cities

When asked about the most common GHG reduction measures that cities were undertaking, retrofitting public buildings came top of the list. Renewable energy strategies were the second priority. For instance, the city of Seattle stated that it has undertaken 30 municipal energy audits and is planning to retrofit 14 municipal buildings to improve their energy efficiency.

Some cities provided further detail on these retrofitting programmes but, notably, only a small proportion of responding cities had estimated the level of investment required to meet their targets, with investment estimates ranging widely between cities. This would suggest that much thought is needed into channelling tight public finances to achieve maximum carbon abatement with the best return on investment.

References

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- Kamal-Chaoui, L. and A. Robert (2009), "Competitive Cities and Climate Change", OECD Regional Development Working Papers n.2, 2009, OECD publishing, <http://www.oecd.org/dataoecd/30/36/44232251.pdf>

Legislative Update

Since our last edition of the Global Sustainability Perspective on sustainability legislation for the property sector, there have been a number of changes for the countries that we covered. You will be able to find an update in the section below. Most changes apply to legislation for energy efficiency and carbon emissions, although there is also one important potential change for corporate reporting legislation.

Global / United Nations

In preparation for December's global Climate Summit in Durban, South Africa, participants in a recent meeting in Bonn, Germany, concluded that the current commitment levels of countries worldwide will still exceed the 2°C limit on global warming over the coming decades. What is more, recently published calculations by the International Energy Agency (IEA) forecast a rise in global warming by over 3° C over that period. This puts additional pressure on nations to agree to prolonging the current Kyoto Protocol for a second period, after 2012, or to find a successor instrument that obliges countries to decrease their carbon emissions and to help fund developing countries finance their efforts in combating climate change.

UK

A piece of legislation with significant implications for the commercial and residential property sectors is currently going through parliament – the Energy Bill. As at the end of June two new developments had taken place:

- The Bill now contains a duty on Government to bring forward regulation which will prevent the letting of the worst performing property from 2018. The detail is not prescribed in primary legislation but Ministers have indicated that “worst performing property” will mean all properties which are EPC-rated F or G, and therefore landlords will need to invest in energy efficiency improvements to upgrade them.
- Zac Goldsmith, member of the UK Parliament, tabled an amendment to the Bill, which, if accepted, would require the UK Government to legislate to make Display Energy Certificates (DECs) mandatory for all commercial buildings within 12 months of the Energy Bill becoming law. DECs provide the actual energy consumption and performance of a building. While this amendment still faces the challenge of being agreed during Report stage, it is a significant development.

The UK Department of Energy and Climate Change hopes that the Energy Bill will achieve Royal Assent in July 2011. We will provide a full update on the implications of this legislation in the next edition of the Global Sustainability Perspective.

In another important development, the corporate reporting of greenhouse gas emissions may also become mandatory by 2012. Moving a critical step towards this decision, in May 2011 the UK Government opened a consultation on the different mandatory reporting options for greenhouse gas emissions

Option 1: Enhanced voluntary reporting

Option 2: Mandate under Companies Act for all quoted companies: around 1100 companies would be covered by this option.

Option 3: Mandate under Companies Act for all large companies: this will include large private companies as well as quoted companies, i.e. between 17,000 and 31,000 companies in the UK.

Option 4: Mandate under Companies Act for all companies whose UK electricity consumption exceeds a threshold: this would potentially be linked to the qualification criteria in the Carbon Reduction Commitment Energy Efficiency Scheme (CRC).

The consultation is due to end on 5 July 2011 and Jones Lang LaSalle will be submitting a detailed response to the consultation and impact assessment. Jones Lang LaSalle favors Option 3 as we consider that it will deliver an enhanced understanding of carbon liabilities by finance teams, is fairer for public and private entities and will drive the greatest aggregate carbon reductions in the UK.

France

As part of the French “Grenelle” Environment Laws, every building permit application will require the developer to provide certification that the new, and very strict, building energy code has been fully integrated into the building design. This obligation enters into force on 28 October 2011 and applies, initially, to all commercial office and education buildings. Further certification will also need to be provided on completion of the building. Under current regulations, the authorities had assumed that applicable building energy requirements were respected without confirming that this was the case.

China

To improve the energy performance of existing buildings, the Chinese Central Government will provide a subsidy of 20 Yuan (US\$3) per square meter to revamp public buildings in selected cities to reduce energy consumption by more than 20% in five years.

The Beijing Municipal Government is inviting international organizations to participate in drafting the “Beijing Green Building Design Standard”. The standard will be completed in early summer 2011 and officially released by the end of this year.

India

The Central Electricity Regulatory Commission under the Government of India is introducing Renewable Purchase Obligations applicable to various utilities. For example, for the state of Maharashtra (capital city Mumbai), utilities that fall under this obligation will need to generate at least 9% of their electricity from renewable energy sources by 2014, of which 0.5% will have to be from solar energy.

Canada

The Canadian Government published its Sustainability strategy in its recent report “Planning for a Sustainable Future” and targets greening its government operations. One of the key measures that will come into force from 1 April 2012 is aimed at new construction, build-to-lease and major renovation projects. These buildings will need to achieve LEED NC “Gold” or Green Globes Design “3 Globes” performance levels.

Green Buildings and Office Worker Productivity

Do Green Buildings help you work?

Over the past editions of Jones Lang LaSalle's Global Sustainability Perspective, we have largely focused on environmental issues covering regulatory analyses, renewable energy opportunities and the energy performance of commercial real estate. In this issue of the GSP we will turn our attention to the effects on employee productivity of working in certified green buildings.

Occupant health and safety has always been one of the key concerns for employers and is largely defined by regulations and overseen by public agencies. Today, organizations are – once again – looking at occupant needs and are going beyond compliance levels. They are interested in proactively linking employee wellbeing to the office work environment. Green buildings and their attention to high-quality indoor environments therefore provide an ideal playground for such considerations. This is because current main green building certification systems require building designers and managers to consider the impact of the indoor environment on the health and wellbeing of the office worker.

It is this interplay between indoor environmental quality in green buildings and office productivity that we explore in the sections that follow.

What are the drivers of office productivity?

Since research into the drivers of office productivity began some 20 years ago, the themes it has pursued are a good indicator of the complexity of this topic and have included studies into:

- Personal factors (e.g. motivation, satisfaction).
- Organizational factors (e.g. quality of management, payment and reward systems)
- Social factors (relationships with others).
- Indoor physical environment factors (e.g. accessories, work environment).

Measuring occupier productivity within an office building in a comprehensive way would need to be based on a combination of the four main elements noted above. Even though productivity could be expressed in quantitative terms, using financial and economic measures such as sales turnover per employee, rather than assessed subjectively (based on occupant perception, there are time lags and other external factors that need to be taken into account. Due to the difficulty in defining office worker productivity in a quantitative way, the current consensus seems to be to accept subjective productivity measures. They are usually acquired by gathering and analyzing assessments of relevant stakeholders, such as office employees.

Nevertheless, the evidence base that, for example, poor air quality can decrease productivity is extensive. The US Environmental Protection Agency identifies poor ventilation as a major determinant of 'Sick Building Syndrome' (SBS) that can affect office workers and impact their health and wellbeing. The assumption that all green buildings provide healthier and more productive environments is not proven and likely to depend on building-specific and organizational factors.

Case studies and research show the critical role of indoor environmental quality

A number of case studies suggest that productivity gains through better quality office environments may be possible. While the question of a consistent definition and measurement of office productivity is still far from being solved, there is market acceptance of a relationship between an office's indoor environment, its layout and comfort factors, and the level of occupant wellbeing and resultant productivity levels. To what extent specific factors play a more or less important role is still being debated.

We have summarized illustrative findings of some past case studies in the following tables:

Study: Research results published by the California Energy Commission

October 2003: Filed study at a California utility company's call center and desk office work spaces.

Authors: Heschong Mahone Group; New Buildings Institute et al.

- Better access to outside views consistently predicted better performance in both call center and desk office spaces.
- Increase in daylight intensity resulted in improvement in performance
- A higher-quality primary view to outside areas increased performance, provided that there was no glare potential from the window
- The combination of physical comfort conditions considered (illumination, outside view, ventilation and temperature) typically provided 1/8 to 1/3 of the explanatory power of the models, while demographic factors (e.g. management, age, experience, education) provided the remaining explanations

Study: Retrofit of 500 Collins Street, Melbourne

2005-2006: Australia offices

Author: Sustainability Victoria and the Kador Group

- 44% reduction in the monthly average cost of sick leave
- 9% improvement in the average typing speed of secretaries and a significant improvement in overall accuracy
- One study found a 7% reduction in headaches but another study found a 20% reduction. These two studies also revealed improvements in other health indicators such as the incidence of colds and flu, sore eyes, fatigue and poor concentration, but the findings varied depending on the study
- In one study there was no change in productivity but a different study found a 12% increase in self-reported productivity

Study: Building Research published by Carnegie-Mellon University

2008: Misc. studies

Author: Vivien Loftness, Center for Building Performance & Diagnostics

- Improved indoor air quality shows productivity increases ranging from 0.5% to 11%
- Daylight access in offices increases individual productivity by between 5% and 15%
- 15 individual case studies analyzed
- Studies cover periods of 1985-2000

Study: A survey of 10,000 property and construction professionals about their office environments

March 2010: UK offices

Author: Development Securities with University College London and the Building Research Establishment, UK

- 55% of respondents stated unsatisfactory temperatures
- Over 38% rated noise levels as too high
- 33% were not satisfied with amount of daylight in their workplace
- More than 40% did not have a satisfactory outside view
- 45% were unhappy with the ventilation or air quality in their building.
- In summary, according to experts cited in the report, poorly planned working spaces could result in a 20% drop in worker productivity and a range of health and behavioral problems

Besides the measurement issue, the approach of taking into account only partial factors is a criticism of existing analysis of office worker productivity. It is based on the fact that in some cases only physical features such as the building, its equipment and layout, are taken into account.

Jones Lang LaSalle's perspective: Indoor Environment Features that can enhance wellbeing and health

Being fully aware that physical office features only affect one portion of worker productivity, in the following section we illustrate how the indoor environment can be used to improve workplace quality. The features we mention are typically found in green building certification systems, such as the US LEED, the UK BREEAM or the French HQE system.

A key building block of every green building certification system in today's markets is that it requires a number of features and performance levels concerning the 'indoor environmental quality' (IEQ). Air quality, lighting, daylight, access to outside views, ventilation, temperature levels, controls for such systems and acoustics typically define the IEQ of a building.

Whilst a certified green building does provide a number of such features, the overall certification does not automatically guarantee that all key features are put in place. According to the level of the certification chosen (for example 'gold' or 'platinum' for LEED or 'excellent' or 'outstanding' for BREEAM) and the profile of credits reached, the actual IEQ can vary significantly between buildings. However, due to the explicit formulation of the existing green building certification systems, the key stakeholders of a new office development, refurbishment or fit-out project will necessarily need to address these quality features. This process should help put the IEQ issues on the table.

Below, we list key actions to consider for enhancing indoor environmental quality.

- **Indoor air quality:**
 - Install individual control of indoor air-quality levels and ventilation
 - Provide high air-refresh rates and the possibility of regulating air speed
 - Offer natural ventilation where feasible
 - Avoid positioning printers/copiers adjacent to work positions to mitigate toner dust pollution
 - Use chemical-free cleaning supplies
 - Install low-emission wall and floor coverings
 - Provide air-quality monitoring
- **Lighting:**
 - Provide access to natural daylight through optimization of daylight and suitable space planning
 - Separate ambient and task lighting

- Provide optimal mix between indirect vs. direct lighting.
- Install high-quality fixtures.
- Avoid glare on computer screens from lighting and from office windows
- Provide effective controls to occupants such as task lighting, blinds and shades to reduce solar glare
- Commission automated systems such as occupancy/daylight sensors and shading systems
- **Thermal comfort:**
 - Commission temperature level set points during transitional period between hot and cold seasons
 - Provide access to control of temperature levels in shared spaces for a large portion of workstations, clustered where possible, based on defined office sections
 - Periodically monitor temperature levels, their evolution and stability
- **Access to outside views and external space:**
 - Avoid placing temporary or permanent desk workstations in interior of deep plan buildings
 - Ensure that the workplace layout maximizes access to outside views
 - Adjust office furnishings and height of partitions to favor access to outside view
 - Provide access for staff to external space for use as break-out and collaboration space, where possible
- **Acoustics:**
 - Use furniture and finishes that provide good acoustic performance
 - Locate copiers/printers to minimize noise
 - Monitor noise levels
 - Provide work areas that meet the needs of the occupant and their particular function (quiet areas, focus rooms, meeting rooms, lounges, copier rooms etc.)
 - Engage with staff to change the way they work and design workplace protocols to include awareness of potential noise issues
- **Ergonomics:**
 - Consult building users on their work preferences
 - Conduct a survey of user satisfaction
 - For computer workstations, address monitor display, peripherals (keyboard/mouse), work surface and chairs
 - Provide equipment that reduces musculoskeletal disorders
 - Deploy ergonomics education to building users
 - The way equipment, furniture and interfaces to machines, such as computers, are designed for the human body or activity in an office has only recently been introduced into green building certification systems. The LEED system, for example, will include ergonomic aspects into its 2012 revision and move it from the current “Innovation” section to the “Indoor Environmental Quality” section.

According to the type of activity performed in a given office space, floorplate layout will vary – from open plan to cellular offices to meeting spaces – and needs to take into account the provision of the above mentioned features.

Future analyses on green buildings and organizational and human performance

Employee productivity is a very complex phenomenon. It needs to be considered more broadly taking into account the organizational and management context, an individual employee's job satisfaction and the social work environment. A full assessment needs to integrate these elements, and to also include the remuneration and reward systems, location and industry and economic contexts that make these co-dependencies even more intricate.

There is no doubt that future research will need to expand its analysis from purely physical parameters to a more holistic assessment. This more comprehensive analysis should also address technology enablers, such as IT, communication equipment, connectivity and cloud computing. It could show how the office workplace is becoming a strategic tool that needs to be linked not only to the operational bottom line but also to every company's human resource strategy.

In order to go beyond only physical office features, future research needs to include the organizational (enterprise-level), psychological (human behaviour) and communications technology dimensions of this complex subject. It needs to include how alternative workspaces may change the entire equation focused on a fixed office space or workplace. An enlarged vision will also allow considering the evolution from the workplace as a purely operational factor to a strategic success factor linking human resource strategy and workplace resource policy more closely together.