



WORLD GREEN BUILDING COUNCIL

SIX CONTINENTS, ONE MISSION

How green building is shaping the
global shift to a low carbon economy

November 2009

FOREWORD

The great challenges of our time, such as climate change and sustainable economic development, are global in nature and will require global solutions.

The building sector, which consumes more than one third of the world's energy and, in most countries, is the largest source of greenhouse gas emissions, is a major contributor to this global problem.

Fortunately, the building sector can be an even bigger part of the solution, providing some of the most cost-effective and expedient ways to tackle climate change.

According to the Intergovernmental Panel on Climate Change (IPCC), building-related greenhouse gas emissions could almost double by 2030. However, the IPCC's Fourth Assessment Report has also found that, with proven and commercially available technologies, energy consumption in both new and existing buildings could be cut by an estimated 30-50 per cent without significantly increasing investment costs.

Today, a global network of green building councils is at the forefront of galvanising action – within industry, government and the community. This coalition of more than 50 green building councils is transforming the global property market and building industry through green building rating systems, education and advocacy.

A number of independent studies confirm that buildings certified by green building councils can consume 85 per cent less energy and 60 per cent less potable water, and send 69 per cent less waste to landfill than non-certified buildings. This document highlights case studies on the growing portfolio of green certified buildings around the world.

Buildings must be central in any post-Kyoto framework, given their unique greenhouse gas abatement potential and the readiness of the global property and construction industries to act.

Now is the time to lay the foundations of a low carbon economy, and secure a sustainable built environment for generations to come.



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Tony Arnel Chair, World Green Building Council

THE WORLD GREEN BUILDING COUNCIL

The World Green Building Council (WorldGBC) is committed to accelerating the transformation of the built environment towards sustainability and drives the global green building agenda by facilitating the development of new Green Building Councils (GBCs), while supporting the work of its current member organizations.

The mission of the World GBC is to:

Advocate the important role of green buildings in mitigating global climate change; facilitate effective communication, share best practice, and promote collaboration between councils, countries, and industry leaders;

Create successful Green Building Councils' (GBCs) and ensure they have the resources needed to prosper within their respective markets;

Support effective building performance rating tools and promote the development of mandatory minimum standards for energy efficiency in buildings; and

Develop the capacity of the next generation of green building professionals by designing a unique internship program and innovative university-credited course.

Over the course of the past seven years since its establishment, the WorldGBC has witnessed outstanding growth in its global network, currently reaching more than 55 countries. Since 2002, there has been a greater than six-fold increase in the total number of national GBCs. The WorldGBC global network includes GBC representation in the following countries:

Established (Full) Members: Australia, Argentina, Brazil, Canada, Emirates, Germany, India, Japan, Mexico, New Zealand, South Africa, Taiwan, United Kingdom, and USA.



Emerging Members: Colombia, Israel, Italy, Netherlands, Poland, Romania, Singapore, Spain, Turkey, and Vietnam.

Prospective Members: Chile, Costa Rica, France, Hungary, Indonesia, Jordan, Qatar, Saudi Arabia, and Uruguay.

Associated Groups: Albania, Austria, Bahamas, Belgium, Bulgaria, Cayman Islands, China, Croatia, Czech Republic, Egypt, Georgia, Greece, Hong Kong, Kenya, Malaysia, Mauritius, Montenegro, Paraguay, Panama, Philippines, Russia, South Korea, Sweden, and Thailand.

The WorldGBC advocates the unified message of energy efficiency and green building principles on behalf of GBCs around the world at international forums such as the upcoming United Nations Framework Convention on Climate Change meetings that will be taking place in Copenhagen this December.

THE FIRST WORLD GREEN BUILDING DAY

23 SEPTEMBER 2009

On the 23 September, the green building industry launched a campaign on World Green Building Day urging governments to recognise the importance of carbon savings from buildings in the Copenhagen climate change negotiations. The call came as world leaders gathered in New York to discuss climate change. In a series of synchronised events around the world, industry representatives joined GBCs to urge radical action on addressing carbon emissions from buildings.



Events included:

Australia: The GBC of Australia celebrated World Green Building Day with Bob McMullan MP, Parliamentary Secretary for International Development Assistance, as it launched the World Green Building Council Asia Pacific Network.

Canada: The WorldGBC hosted a Leaders Summit and Reception, which brought together world industry leaders and policy makers to hear from experts about the enormous potential green buildings offer nations as they work to reduce their carbon emissions. Speakers included Karan Grover, world-renowned architect, Frank Biden, Founder and President of Cygnus International LLC, and Andrew Bowerbank, Executive Director of the WorldGBC.

Germany: On World Green Building Day, certified buildings opened their doors to the public. Visitors got an 'inside-view' into built examples of sustainability. Guided tours through the buildings were offered to demonstrate to the visitors how sustainable construction can be realized.

India: IndiaGBC undertook a wide range of activities including: holding GBC Chapter meetings around the country, discussion forums and awareness programmes, tours of green buildings, media activities and encouraging members and associates to "take the pledge" to build green.



New Zealand: New Zealand GBC hosted an event focusing on innovation and celebrating World Green Building Day.

Taiwan: More than 300 volunteers took part in training courses for their Green Tour program.

United Kingdom: The UK-GBC hosted a World Green Building Day Reception at the House of Commons, Westminster. The event was hosted by Emily Thornberry MP with speeches from David Kidney MP, Under Secretary of State for Energy and Climate Change and Stephen Hale, Director of Green Alliance.

United States: 75 advocates from all over of the United States attended the USGBC “Congressional Advocacy Day” at the U.S. Capitol Building in Washington, DC. Summit attendees discussed a range of green building policy topics, and exchanged ideas on incorporating green building into long-term climate change mitigation legislation.

As part of World Green Building Day, GBCs promoted the UN Environment Programme’s *Call to Action*,¹ developed by the partners of the UN Environment Programme Sustainable Building and Climate Initiative. The *Call to Action* recommends that Copenhagen’s climate change framework should facilitate greenhouse gas emissions reduction in the building sector by:

1. Recognising the building industry as a top priority for achieving greenhouse gas (GHG) emissions reductions.
2. Enabling market based measures that can support investment in building projects that are energy efficient and reduce GHG emissions.
3. Building capacity and transfer technology to enable improvements in energy efficiency of buildings.
4. Supporting reform of flexible mechanisms to encourage investment in projects that improve energy efficiency and reduce GHG emissions from new and existing buildings.
5. Encouraging UNFCCC to establish working groups to develop specific measures for the building industry prior to the next commitment period.
6. Encouraging governments to inventory and set performance goals for GHG emissions from national building stocks.





ASIA PACIFIC AUSTRALIA

Emissions from Buildings

Australia has a very high carbon content of grid energy, over 1kg CO₂/kWh due to use of coal in generation. Residential and commercial buildings are responsible for 23 per cent of Australia's total GHG emissions – the equivalent to 130 megatonnes of GHG released into the atmosphere each year.

Government Policy

The Australian government has had a range of policies in place for some time, that cover topics of climate change, green building, and sustainable growth more broadly. The Australian government's emissions trading scheme, the Carbon Pollution Reduction Scheme (CPRS), has been a major component of the strategy and represents the 'first plank' of the Australian government's policy response, with energy efficiency representing the 'second plank'.

The CPRS was rejected by the Australian Senate in August 2009, and is currently undergoing amendments before being tabled again in November 2009. In it, the government outlines a long-term target of a 60 per cent reduction in GHG emissions from 2000 levels by 2050. It also commits to a medium-term national target to reduce Australia's GHG emissions by between 5 per cent and 15 per cent below 2000 levels by the end 2020.

However, the proposed CPRS does not include buildings, and so complementary measures will be required to achieve the emissions reduction potential in the very sector where emissions are both significant and most easily achieved – Australia's built environment.

The Australian government has also introduced policy requiring a minimum environmental performance for buildings that are occupied by government employees. Almost all state governments have similar policies that

require any building that the government occupies, constructs or owns to meet minimum environmental standards including a Green Star certification. In several states, this applies to schools and hospitals, as well office buildings.

Recent developments include a big push for home refurbishment. Launched early in 2009, government will fund the insulation of 2 million homes, which is estimated to save 49 million tonnes of CO₂ by 2020.

Green Building Council of Australia



The Green Building Council of Australia (GBCA) is Australia's leading authority on green building.

The GBCA was established in 2002 to develop a sustainable property industry in Australia and drive the adoption of green building practices.

The GBCA has more than 750 member companies who work together to support the Council and its activities. The GBCA promotes green building programs, technologies, design practices and processes, and operates Australia's only national voluntary comprehensive environmental rating system for buildings – Green Star.

While the GBCA is focused on the delivery and administration of Green Star, it also has a strong advocacy role. Since its establishment, the GBCA has engaged with all tiers of government in Australia to improve government's understanding of green building as well advocating particular policy positions. Most state governments in Australia, for example, require any publicly owned or tenanted building (schools, hospitals, and government office buildings) to have a Green Star certification – a direct result of the work of the GBCA.

Green Star

The GBCA launched the Green Star environmental rating system for buildings in 2003. Green Star evaluates the green attributes of building projects based on nine categories, including energy and water efficiency, indoor environment quality and resource conservation. Since 2003, the GBCA has certified more than 190 projects, with more than 400 registered to achieve Green Star certification. Today, 11 per cent of central business district (CBD) office space is Green Star certified.

Estimated Carbon Savings from Green Star (Australia) Offices:

- Office buildings in Australia are estimated to contribute 8.5m tonnes of CO₂ / annum (1990 AGO). The average CO₂-e emissions from Green Star certified buildings is 62kg/CO₂-e/m² per annum which is a 60 per cent saving on the emissions of an average Australian Office Building.
- Around 11 per cent of Australia's CBD office space is currently Green Star certified.
- Green Star Office space saves on average 159,300 tonnes CO₂-e per annum when compared to the average Australian office buildings or 72,000 tonnes CO₂-e per annum when compared to the minimum building code compliant buildings built today.
- 159,300 tonnes CO₂-e per annum is equivalent to the emissions from 11,375 average Australian homes or taking 37,000 cars off the road.
- 72,000 tonnes CO₂-e per annum is equivalent to the emissions from 5,143 average Australian homes or taking 16,744 cars off the road.



CASE STUDY AUSTRALIA

*The Gauge, Melbourne 6 Star Green Star
– Office As Built, built 2008, (new build)*



The Gauge represents a milestone for the Australian property development industry. It achieves environmental leadership through reducing consumption, on-site generation and recycling and a 6 Star Green Star rating at a price point accessible to the majority of the market. The Gauge responds to the two significant environmental challenges facing Australia: greenhouse gas emissions and water supply. The Gauge's features include a black water treatment plant which recycles 92 per cent of water each year; it is anticipated that water saving initiatives in The Gauge's design will reduce potable water consumption by a further 30 per cent when compared with typical existing 5 Star Green Star rated buildings. Similarly, the focus on energy efficiency coupled with the on-site cogeneration system will reduce greenhouse gas emissions by over 30 per cent when compared with typical 5 Star Green Star buildings.

The name 'The Gauge' reflects the idea of measurement and, after becoming the first building in Australia to receive a 6 Star Green Star – Office As Built v2 certified rating, it is now the yardstick for the industry to gauge its progress on environmental sustainability in new commercial developments. It also sets a new benchmark in design features that encourage occupant health and wellbeing. For instance, a carbon dioxide monitoring system and 'single pass' air conditioning provide 100 per cent fresh air supply to all occupants, while glare control, optimisation of artificial lighting levels and individual task lighting controlled by workers are reducing headaches and fatigue. The Gauge has won numerous environmental and design awards, because, as Lend Lease Project Director, Chris Carolan, says, "The Gauge is not just a building with clever ideas. It is not an experiment and it is not a one off. The Gauge will influence the mainstream in Australia because it demonstrates that the highest level of environmental performance can be achieved in a building that the industry considers 'normal'. When sustainability becomes normal rather than an ambition, we are on course to make real progress."



ASIA PACIFIC NEW ZEALAND

Emissions from Buildings

New Zealand's greenhouse gas emissions profile is unique in its make-up, as compared to other developed economies. The two largest impacts are from the agricultural (48 per cent) and transportation (20 per cent) sectors, both of which face considerable difficulties in reducing their share of emissions. By comparison, 17 per cent of total emissions can be attributed to the built environment, a substantial emissions total with significant cost-effective reductions possible. The built environment is also one of the only sectors where reducing emissions actually saves money rather than costing the taxpayer.

Government Policy

The government has announced a national 2020 emissions reduction target range of 10-20 per cent below 1990 levels by 2020, and a 2050 target of 50 per cent below 1990 levels.

The New Zealand Emissions Trading Scheme (NZETS) is designed as a legislative measure to provide a price signal, leading to benefits for the environment through the reduction, and accountability, of emissions. The NZETS, as it stands now, does not single out the built environment, but impact will be felt from the flow-on costs following the inclusion of stationary energy, liquid fuels and industrial processes in July 2010. NZETS in its current form will have a slow and delayed effect on the market, as it is unlikely to respond rapidly to the price signals. This is because the introduction of both intensity based allocations and a cap on the price provides distortions that will delay the impact of the full price of carbon, thereby delaying a drive towards actual emissions reductions. Consequently this will delay investment in the upgrading of the basic infrastructure we spend 95 per cent of our time inside- our built environment.

It is therefore critical that a range of complementary measures are developed to kick-start emissions reductions now. The built environment provides New Zealand with its most immediate opportunity to establish best practice examples of emissions reductions that deliver substantial cost benefits and accelerate action to compensate for this delay. Work is needed to quantify the opportunities and set priorities immediately, as stakeholders in the built environment demonstrate leadership with a desire to develop solutions that stimulate economic activity as well as deliver cost and emissions savings in the long term.

New Zealand Green Building Council



The New Zealand Green Building Council (NZGBC) was established in July 2005 and in 2006 became a member of the WorldGBC.

It currently has around 400 member companies. The successful Australian Green Star building rating has been adapted for New Zealand, with 50 per cent of new and major refurbished office buildings undergoing Green Star NZ certification.

CASE STUDY NEW ZEALAND

21 Queen Street – Auckland CBD
(5 Star- Office Design)

Estimated Carbon Savings from Green Star NZ assessments

- A total of 343,000m² of office space is undergoing Green Star NZ certification. This equates to 11.4 per cent of New Zealand's building stock.
- The CO₂-e emissions from average NZ office buildings are about 48kg/CO₂-e/m² per annum, average new office buildings release about 23kg/CO₂-e/m² per annum. The average Green Star NZ certified office building CO₂-e emissions are about 16 kg/ CO₂-e/m² per annum.
- One of the reasons New Zealand emissions are so low is that significant proportions of our electricity is produced by Hydro, consequently we have an electricity CO₂-e factor of 0.18kg CO₂-e/kWh.
- Green Star NZ Office space saves on average 2,200 tonnes CO₂-e per annum when compared to average New Zealand new office building and 11,000 tonnes CO₂-e per annum when compared to the average New Zealand office building.
- 2,200 tonnes CO₂-e p.a. is equivalent to taking 516 cars off the road.
- 11,000 tonnes CO₂-e p.a. is equivalent to taking 2600 cars off the road.



AMP NZ office Trust (ANZO) is New Zealand's largest provider of premium A grade commercial office buildings and is committed to providing office accommodation that balances tenants' needs for a high quality, flexible and efficient space with conservation of resources and environmental sustainability. In redeveloping 21 Queen Street, ANZO was seeking a well-managed project with a lower environmental impact than a new construction. The project team, through careful strategic procedural planning of the works, ensured that the environmental impact of the redevelopment was minimized through the recycling of almost all construction waste, the retention of the existing structure, and the use of sustainable materials such as natural stone from environmentally-friendly certified quarries. Other features that contribute to the overall environmentally-sustainable design include double glazing, which maximizes the use of natural light, and a chilled beam air-conditioning system.



ASIA PACIFIC CHINA

Emissions from Buildings

By 2030, roughly 60 per cent of the Chinese population will be urban, compared to under 40 per cent in 2005. China is the world's largest construction market and is home to half of the new buildings built around the world every year. China is expected to add twice the amount of current US office space between 2000 and 2020.

42 per cent of total energy use is attributed to buildings.

By 2015 half of all the buildings in China will be less than 15 years old. However the energy standards for these new-builds are low – four times more energy is required per m² for heating and cooling in China compared to Europe.

Government Policy

In November 2004, the National Development and Reform Commission (NDRC) issued the China Medium and Long Term Energy Conservation Plan (Conservation Plan), which stressed energy conservation as the key principle for sustainable socio-economic development in China and an urgent issue to address. In the Conservation Plan, energy saving targets for buildings have been emphasized:

1. During the “Eleventh Five-year Plan” period, new buildings should strictly be subject to the design standard of 50 per cent energy conservation. Several major cities such as Beijing and Tianjin shall take a lead in implementing the 65 per cent energy-saving standard.
2. Energy saving retrofit for existing residential and public buildings shall be conducted in combination with urban reconstruction. Large cities are expected to improve 25 per cent of building areas, medium cities 15 per cent and small cities 10 per cent.²
3. By 2020, all the new buildings will be expected to reduce energy use by 65 per cent.

China Green Building Council

The ChinaGBC was established on March 31, 2008, under the leadership of China's Ministry of Housing and Urban-Rural Development (MOHURD).

The main focus of ChinaGBC is to set up Chapters across the country. ChinaGBC efforts are supported by the Chinese government. They have a fully engaged system with all the ministries on board as well as support from green building professionals.

In 2006, China Green Building Evaluation Tool was created on a voluntary basis. This established rating system applies to both residential and public buildings. Green Construction Guidelines were also developed by China's Ministry of Commerce (MOC) September, 2007.



NORTH AMERICA

USA

Emissions from Buildings

In the United States, buildings account for 72 per cent of electricity consumption, 39 per cent of energy use, and 40 per cent of all CO₂ emissions. By transforming the built environment to be more energy-efficient and climate-friendly, the building sector can play a major role in reducing the threat of climate change.

Government Policy

The United States government at the federal, state, and local levels is helping considerably to advance the green building movement. Currently, 12 federal agencies, 34 states, and over 200 localities promote and/or require green building practices and policies. These policies are aimed at improving minimums through codes and standards but also at incentivizing leadership through tax credits, property tax abatement, expedited permitting, loan guarantees, and other credit enhancements.

The American Recovery and Reinvestment Act of 2009 also included more than \$80 billion in clean energy investments including \$4.5 billion to green federal buildings and cut federal energy bills. The U.S. has a commitment to ensure that all federal facilities are carbon neutral by 2030. Additionally, over the past four years home retrofitting and improvement have been the main focus in various pieces of U.S. energy legislation. Two energy bills and the stimulus bill have delivered a range of incentives for the use of more energy-efficient appliances, windows, and heating and cooling systems, to name a few. These incentives are driven towards accelerating behavior and spreading the reach of sustainable practices to the building industry.

The Energy Independence and Security Act of 2007 set the target of a 15 per cent cut in emissions by 2020, 80 per cent by 2050 (on current levels). It also included a Commercial Buildings Initiative (CBI), the goal of which is to achieve zero-net energy for all newly constructed commercial buildings by 2030, 50 per cent of the commercial stock by 2040, and all U.S. commercial stock by 2050.

The US is the largest provider of funding for clean technology research in the world.

US Green Building Council



Founded in 1993, USGBC is an industry-led and consensus-driven organization that is as diverse as the marketplace it serves. Membership includes building owners and end-users, real estate developers, facility managers, architects, designers, engineers, general contractors, subcontractors, product and building system manufacturers, government agencies, and nonprofits, including over 700 public and provider companies from around the globe. Leaders from within each of these sectors participate in the development of the LEED certification system and the direction of the Council through volunteer service on USGBC's open committees. LEED is an internationally recognized green building certification system, providing third-party verification that a building or community was designed and built using strategies aimed at improving performance across all the metrics that matter most: energy savings, water efficiency, CO₂ emissions reduction, improved indoor environmental quality, and stewardship of resources and sensitivity to their impacts.

CASE STUDY USA

Skanska U.S.A. – New York Headquarters, 32nd Floor of the Empire State Building LEED® Platinum for Commercial Interiors July 2009

Throughout the past 16 years, USGBC has grown into a global organization with a membership comprising 20,000 companies and organizations, 78 local chapters and affiliates, and more than 130,000 LEED credentialed professionals worldwide. USGBC is the driving force in an industry that is projected to increase to US\$60 billion by 2010. Moreover, there are more than 28,000 commercial projects participating in the LEED green building certification system, comprising over 7.1 billion square feet of construction space. LEED projects are in 114 nations and international LEED projects represent 27 per cent of all LEED certified square footage. By using less energy, LEED certified buildings save money for families, business and taxpayers; reduce greenhouse gas emissions; and contribute to a healthier environment for residents, workers and the larger community.

USGBC supports a rich education and research agenda, including Greenbuild – the largest international conference and expo focused on green building. USGBC also supports an aggressive advocacy program delivered at the local level through chapters and affiliates across the U.S. and abroad. USGBC's transformation from a volunteer-based organization in 1993, to a world-leading non-governmental organization (NGO) in 2009 is indicative of the value placed on green buildings and the principles around sustainable design and smart growth. USGBC continues to transform the global building market by pursuing robust triple bottom line solutions, through cooperation and collaborative action with GBCs globally.



Skanska is a leading international project development and construction company headquartered in Stockholm, Sweden. Skanska develops offices, homes and public-private partnership projects, and in doing so creates sustainable solutions and aims to be a leader in quality, green construction.

In 2006, the iconic 102-story Empire State Building in New York began a series of modernizations, which is allowing for open office floor plans making it attractive for larger companies like Skanska to relocate here. Skanska secured a 15-year lease of the entire 32nd floor of the Empire State Building in 2008 and completed its LEED Platinum retrofit of this space in 2009. Skanska managed the design and retrofit of this 2,260-square-meter space to LEED® Platinum for Commercial Interiors, the highest ranking established in the U.S. Green Building Council's LEED green building certification system.

The Skanska New York office was redeveloped into an energy-efficient office that obtains half its energy from renewable resources. These systems include efficient cooling and ventilation systems, daylight and space occupancy sensors, and the installation of energy-rated appliances. The project also restored the floor's original interior features and retained 44 per cent of the non-structural components. This project demonstrates the positive impact that sustainable design and construction can have on historic existing buildings, while still maintaining its architectural integrity. Investments in energy efficiency are projected to save Skanska up to US\$ 300,000 throughout their 15-year lease period.



SOUTH AMERICA

BRAZIL

Emissions from Buildings

More than 80 per cent of the 180 million Brazilians already live in urban areas, so buildings are a major factor in energy use. Despite having had an energy efficiency program since 1985 and a thriving ESCO (energy service companies) industry, an estimated US\$2.5 billion in potential energy efficiency improvements remain untapped every year. One of the key players of the G8 “+5” countries, Brazil is likely to continue to rapidly develop, with emissions to match. Brazil is expected to double energy usage by 2030.

42 per cent of the total energy used in the country is from buildings, of this:

23 per cent is from residential homes;

11 per cent is from commercial buildings;

8 per cent is from public buildings.

About 75 per cent of the country’s energy supply is generated from renewable sources, mostly from large hydropower stations.



Government Policy

Climate change policy in Brazil is dominated by the issue of deforestation and biofuels. However, green building policy is developing. According to Brazil’s proposed Federal Law, all new buildings will be obligated to improve energy efficiency. Municipal laws require that builders prove the implementation of waste treatment in their projects in order to receive permission to use or sell the building. In addition, solar energy panels are incentivized and many municipalities are developing reference criteria for new construction and requiring all retrofits of public buildings to focus on sustainable construction practices. The next step is to develop administrative and fiscal incentives for green buildings in the form of rapid project approval, or special discounts on taxes related to the civil construction industry.

In response to this, the industry is already preparing for adoption of both green building and sustainable growth principles. In addressing climate change the Brazilian government has also created incentives to switch from gasoline to ethanol powered cars as well as protecting the Amazon Forest from degradation.

Green Building Council Brazil



Founded in March 2007, Green Building Council Brazil (GBC Brazil) is a non-profit organization, created to assist the sustainable development of the construction

industry in Brazil by means of market forces to drive the adoption of green building practices in an integrated process, including design, construction and operation of the buildings.

The GBC's mission is to be the main reference on sustainable construction and a leader for the effective and comprehensive implementation of its concepts through qualification of professionals in various areas, compilation and dissemination of the best practices involving technology, materials, processes and operational procedures, dissemination of LEED certification, all adapted to Brazilian market and proactive performance in association with governmental and private organizations. GBC Brazil will have certified over 147 'mega' green buildings by the end of this year and the first LEED Platinum building has been constructed.



To fight against climate change, GBC Brazil has created a global campaign, called One Degree Less. The idea is to help lower the temperature in the so-called heat islands in a quite simple way: by painting the roofs or creating green roofs. They capture less sun's heat and help to reduce the local temperature and even energy consumption. The proposal of the campaign is so practical and the results are so quick and efficient that today in Brazil we already have several initiatives implemented. The U.S Secretary of Energy, Steven Chu, is supportive of the concept of white roofs, and the Secretary of State for Housing of Sao Paulo and CEO of CDHU, Lair Krähenbühl, painted the roofs of several buildings in Ilhabela, an island in the southeast of the country.

GBC Brazil's challenge for the next few years is the consolidation of a national educational program and the establishment of strategic partnerships to strengthen its activities in domestic territory.

CASE STUDY **BRAZIL**

Rochavera Corporate Towers, Sao Paulo



Reduction of impacts during construction and minimum use of resources at the operational phase are the highlights of this development.

The Rochavera Corporate Towers, the largest office complex of a high standard in Sao Paulo, has recently received green building certification, in the Gold category, following the LEED system.

Located in one of the most sought after regions of the city, two of the four towers planned for the Rochavera are already constructed, with a third scheduled for completion by 2010. The certification obtained in August 2009 demonstrates that the development uses natural resources efficiently and has a reduced environmental impact, both during the construction and the operation period.

The project was designed using four requirements:

- 1.** Reducing energy consumption and operational costs and maintenance;
- 2.** Reducing the use of non-renewable environmental resources;
- 3.** Improvement of air quality inside the building;
- 4.** Enhancing the quality of life and health of users, optimizing the quality of the built environment.

Owned by the Autonomy Fund, the Rochavera was developed by Tishman Speyer. Construction was done by Metodo Engineering and project sustainability was the responsibility of the SustentaX.

“The achievement of this certification is important for its pioneering and its dimensions. It will serve as an example for other enterprises and is an incentive to help with the development of sustainable construction in the country,” says Nelson Kawakami, executive director of the Green Building Council Brazil.

The entire complex is designed to meet the highest international standards of major national and foreign companies.



EUROPE UK

Emissions from Buildings

45 per cent of total UK emissions come from buildings
18 per cent from non-domestic buildings
27 per cent from homes

Government Policy

In the UK, the government has driven change over the last few years by demonstrating leadership on climate change. The UK government is the first in the world to enshrine carbon reduction targets in legislation, with the introduction of the Climate Change Act in 2008, and the introduction of 5 year Carbon Budgets, to ensure that it is held to account for its policies to deliver the necessary carbon reductions. This includes setting clear targets, setting timelines and putting in place policies to ensure that they are met.

The UK government has set ambitious targets which include an 80 per cent cut in carbon emissions from the UK by 2050, all new homes to be 'zero carbon' (ie zero net annual carbon emissions from all energy uses in the home) by 2016, an aspiration that all non-domestic new building will be zero carbon from 2019 (to be consulted on in the autumn of 2009) and all existing buildings to be 'approaching zero carbon' by 2050. The government is also working to lead by example through public sector buildings, which have to meet higher targets more quickly. While it is relatively easy for the government to legislate to require high standards on new buildings, it is more difficult to do this for existing buildings, particularly homes (which are responsible for 27 per cent of the UK's emissions). It therefore is consulting on introducing a range of incentives to encourage and facilitate action in existing buildings, and has suggested that it will regulate on minimum energy standards for all buildings if the incentives do not drive action quickly enough.

Zero carbon policy has had a huge positive impact on the housebuilding industry in the UK. For the first time, government set out a clear picture of what the UK's new homes should look like in 2016 and the industry has responded with early innovation and solutions to try and succeed in meeting the absolute goal of zero carbon in the timeframe. The clarity of ambition expressed by the government has led to massive innovation across the industry and the supply chain as new low carbon building products, materials and techniques have been developed to meet the challenge.

The UK Green Building Council



The UK Green Building Council (UK-GBC) was launched in February 2007 and has grown rapidly since its

inception, with around 320 members from right across the UK property and construction industry.

The UK-GBC focuses on the provision of information and sharing best practice, and has played a key role in the development of green and sustainable building policy and practice since its inception.

The UK-GBC has developed a very effective model of enabling its members to play an active role, by bringing together time limited 'task groups' to focus on a particular problem or challenge to overcome. The UK-GBC launched a task group in early 2008 to make recommendations on the definition of zero carbon, addressing concerns that the definition was unworkable at that time. Government then went on to launch a formal consultation on the definition of zero carbon, which echoed the UK-GBC's recommendations and acknowledged the important contribution of the task group to that debate.

CASE STUDY UK

Elizabeth II Court (formerly Ashburton Court)

In the case of non domestic buildings, the UK-GBC put together a task group in July 2007 which investigated the potential for government to apply a similar policy trajectory to the non domestic building stock. The recommendations of the 'Carbon Reductions in New Non Domestic Buildings' task group led to the announcement in the budget in spring 2008 that all new buildings will have to be built to zero carbon standards from 2019. All of the findings and reports of the UK-GBC task groups can be downloaded from the website: www.ukgbc.org

In addition Paul King, Chief Executive of the UK-GBC, chairs the Zero Carbon Hub, a public/private partnership vehicle which has lead responsibility for delivering the government's 2016 zero carbon homes commitment. The UK-GBC works closely with the Hub, informing government on various relevant policy areas.

Unlike many other GBCs, the UK-GBC does not own or manage a green building rating tool. In the UK, the most commonly used assessment tool is BREEAM which is owned and managed by BRE.

BRE

BRE is an independent, research-based consultancy, testing and training organisation, offering expertise across the built environment and associated industries. BRE helps clients create better, safer and more sustainable products, buildings, communities and businesses – and supports the innovation needed to achieve this. The BRE Environmental Assessment Method (BREEAM) is one of the world's leading rating tools and has informed the development of others globally over many years. It addresses a wide range of environmental and sustainability issues across the building life cycle.³



© Bennetts Associates

The recently completed refurbishment of Elizabeth II Court (formerly Ashburton Court) in the centre of Winchester represents a stunning transformation of a tired, dilapidated 1960s office block into a modern, efficient and highly sustainable working environment for Hampshire County Council in the UK.

The new building is predicted to be BREEAM 'Excellent' and to produce a very low level of CO₂ emissions based on the results of extensive early design modeling and analysis. As such it is well on the way to meeting the government's 2050 target for carbon reduction and represents a remarkable achievement given the constraints of the existing building and the challenging urban context.

The innovative design solution has reduced the carbon emissions level for the transformed building from 90kg CO₂/m²/annum to a targeted level of 30kg CO₂/m²/annum. Such levels would represent an annual reduction of around 70 per cent, equivalent to 200 average UK households. When combined with a 70 per cent increase in space utilisation and a resulting 30 per cent reduction in the headquarter office space requirement, the Council will be able to achieve major savings in running costs that can be put back into front line services.⁴



EUROPE GERMANY

Emissions from Buildings

Buildings are responsible for 35 per cent of energy consumption.

12 per cent of energy is from renewables.

A Feed In Tariff has been in place for some time, this is credited with creating 1000s of green jobs.

Germany's housing stock consists of 75 per cent built before 1975, with 17.5 million residential buildings, of which 12.5 million are one or two family households. However there is pressure on energy consumption from the building sector because of a desire for more living space.

Government Policy

Germany has committed to reduce emissions by 21 per cent during the period 2008-2012 compared to 1990 levels. The federal government has agreed that Germany will reduce its greenhouse gas emissions up to 40 per cent by the year 2020 (relating to the base year 1990), if the EU-states will agree to a reduction in European emissions of 30 per cent in the same timeframe (August 2009).

Germany was, and still is, very export driven, and as a result of heavy industrial processes and a dense population, it has had many serious environmental problems. The environment has been a big issue since the late 1970s or early 1980s in Germany, and as a result Germany has probably the highest construction standard in the world. The technology for sustainable construction is very developed in Germany and the country offers some of the best examples of energy efficient and sustainable buildings.

Compared to the international standards, sharp guidelines like EnEV have been in force for a few years in Germany. These have raised the building standard continuously, especially with new buildings. However,

the real challenge lies in the existing old buildings, which need to be refurbished in the coming years in order to reach the demanding climatic goals of the federal government.

Low interest rate loans are available for renovations from the state-owned bank KfW, which has funded €4.5 billion worth of energy saving projects.

The German Sustainable Building Council



(DGNB – Deutsche Gesellschaft für Nachhaltiges Bauen e.V.)

The DGNB considers itself to be the central organization for exchange of knowledge, professional training, and for a raising public awareness of sustainable construction in Germany.

The DGNB together with the Federal Ministry of Transport, Building and Urban Affairs (BMVBS) has developed a voluntary certification system for sustainable buildings. It was developed by experts from the complete value chain of the construction and real estate sector and gives a clear direction for this future-oriented economical sector.

The German Sustainable Building Certificate

The German Sustainable Building Certificate was developed for use as a comprehensive tool for the planning and evaluation of buildings. As a clear and easy to understand rating system, the German Sustainable Building Certificate covers all relevant topics of sustainable construction, and awards outstanding buildings in the categories bronze, silver, and gold. Six subjects affect the evaluation: ecology, economy, social/cultural and functional topics, techniques, processes, and location.

The certificate is based on the concept of integral planning that defines, at an early stage, the aims of sustainable construction. In this way, sustainable buildings can be designed based on the current state of technology, and they can communicate their quality with this new certificate.

The internationalization of the German Sustainable Building Certificate is progressing in leaps and bounds. The first certificates for office buildings in Germany were awarded in January 2009, and initial certification procedures are currently underway in Austria and Luxembourg. The TOWNTOWN Company Building 09 in Vienna, Austria was awarded a gold pre-certificate at the Consense conference in June 2009, the DGNB's international congress which is held every year at the Messe Stuttgart.

In addition to this, pilot projects in Austria are taking place. Adaptation of the DGNB system, which was initially developed in Germany to comply with country-specific building regulations and standards, is being tested here for the first time for the Austrian Market.

The DGNB is internationally active in many areas, which underline its role as one of the leading certification systems for sustainable building.





AFRICA

SOUTH AFRICA

Emissions from Buildings

Approximately 23 per cent of total emissions come from buildings. About half of total emissions come from state-owned utility Eskom, which provides 95 per cent of the country's electricity, out of which about 90 per cent stem from coal.

Despite two energy price increases of approximately 30 per cent each in the last year, South Africa still has some of the cheapest electricity in the world, generated largely from coal. This history of cheap and plentiful electricity has resulted in a great deal of energy-inefficient design in buildings. Although this is changing fast and energy-efficiency in buildings is becoming a much greater priority due to energy shortages and increased awareness of climate change, there is a lot of work still required to green the existing building stock.



Government Policy

The view in South Africa is that government policy and leadership is crucial to ensure a country's effective, widespread and coordinated response to climate change.

The South African government has been relatively proactive in public recognition of the problem of climate change and in setting high level targets for mitigation. South Africa expects to put in place a binding climate change policy within three years to cap emissions by 2020-25.

However, detailed plans for implementation of strategies and legislation to achieve these targets have not been particularly forthcoming although South Africa plans to generate some 15 per cent of its electricity from renewable sources by 2020 and the government's draft Energy Efficiency Strategy includes a target of 20 per cent energy demand reduction by 2014. However it is debatable whether implementation is keeping pace with policy in this regard.



Green Building Council of South Africa



In a bid to decrease energy usage and carbon

emissions from buildings amongst other pressing environmental issues, the South African commercial property and construction industry took the initiative and formed the Green Building Council of South Africa (GBCSA) in September 2007.

The GBCSA has achieved phenomenal industry support since its launch, with over 500 corporate members to date. The Council has developed the Green Star SA environmental rating system for buildings, based on the Green Building Council of Australia's Green Star rating tools, started the process of certifying buildings, and run green building educational courses nationwide as well as two very successful annual conferences. Following in the steps of the more established Green Building Councils in the US, UK and Australia, the GBCSA is leading the transformation of the mainstream commercial property industry in South Africa towards environmental sustainability.

The Green Building Council of South Africa is relatively young but has launched tools for office and retail buildings and the government is seriously considering mandating a Green Star SA rating for all new government office accommodation. A similar approach is likely to be taken for the existing government portfolio once there is an Existing Building tool in place as the government is considering a project to improve the efficiency of all its buildings. Various municipalities are considering ways in which they might incorporate Green Star SA into their policies as well, however wider policy change is likely to progress very slowly.

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Notes

1. http://www.unepsbci.org/newSite/SBCIRessources/ReportsStudies/documents/UNEP-SBCI_Call-to-action_final.pdf
2. http://www.unepsbci.org/SBCINews/latestNews/showNews.asp?what=Briefing__Policies_for_Energy_Efficient_Buildings_in_China#_ftn4
3. www.bre.co.uk
4. *A New Beginning, Elizabeth II Court, Winchester*, for Hampshire County Council

The World Green Building Council (WorldGBC) is committed to accelerating the transformation of the built environment towards sustainability and drives the global green building agenda by facilitating the development of new Green Building Councils, while supporting the work of its current member organizations.



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