Drivers for sustainable construction

Sustainable building and construction

Summary
The potential impacts of changing to sustainable construction are related to construction industry demands, needs and drivers and to the acceptance of sustainability concepts. These impacts will differ from one country to another. In this article consideration is given (in terms of an increasingly broader perspective) to activities in the main sectors where the construction industry is called upon to make a difference: infrastructure, commercial property and housing. The challenge for the industry is to identify – in both developed and developing countries – aspects of sustainable construction that can realistically be addressed and areas where action can make a significant contribution to achieving sustainability. Clients increasingly recognize the positive economic outcomes of sustainability as a driver for investment decisions.

Drivers for sustainable construction

The industry has a responsibility to minimize fair equally between the private and public sectors. In the developing world this demand relates mainly to new infrastructure (schools, hospitals, roads) and housing. In the developed world it relates mainly to housing, roads and non-residential fixed investment.

The construction industry’s “cradle-to-grave” activities in the built environment lead to important, well documented global environmental impacts and demands on natural resources – especially for housing, infrastructure and utility servicing provision, which are very resource-intensive.

The industry has a responsibility to minimize negative environmental and social impacts and maximize positive contributions. It is potentially the main single-sector contributor to achieving sustainable development.

The potential impacts of change are different in different countries. Developed countries could devote greater attention to creating more sustainable assets through upgrading existing facilities using innovative technologies for energy and material savings. Developing countries are still under construction. They have a low degree of industrialization, so that construction activities are among the main factors affecting the biophysical environment. These countries are more likely to focus on the social equality and economic sustainability of infrastructure provision.

The challenge for the construction sector is to identify those aspects of sustainable construction that can realistically be addressed and where action might have a significant impact on sustainability.

Industry activities concerned with sustainability
The impacts of most construction projects begin well before the conventional project cycle and end well after the cycle is over. Activities are linked to allied sectors and industries, starting with the extraction and processing of raw materials, extending through the supply of inputs such as water, energy and construction components and equipment, and terminating in demolition and the disposal of wastes.

These activities are loosely grouped into what we might call a hierarchy of perspectives, starting with operations and maintenance, on-site and off-site activities, and moving to sector-wide activities and activities involving the broad range of processes for realizing the built environment.

The two industry subsectors responsible for managing activities are physical construction and knowledge-based construction services. The former, generally undertaken by contractors, brings together labour, material and equipment in order to translate specifications produced by knowledge-based service suppliers into physical activities. The design and specification side of the industry includes architectural and engineering design services used throughout the project cycle. These services require general and specialized engineering and other technical, scientific and economic skills needed to optimize investment in all its forms: its choice, its technical process of execution, and its management. For the sector as a whole, the challenge is to translate the benefits of sustainability into a project approach that clients can appreciate and support.

In general terms, the permitting requirements for construction activities are becoming more comprehensive on a worldwide basis, and implementation of sustainability concepts at the more operational levels of the industry’s activity is relatively straightforward.

It becomes much more difficult to identify pragmatic drivers for change as one moves from operational and off-site project activities towards the sectoral and built-environment perspectives of sustainable construction.

At present, the construction industry seems unaware of its potential to reshape demand through product redesign. This is largely because the industry is preoccupied – and rightly so – by the enormous unsatisfied demand for basic infrastructure, and by the fact that in the current system it is the clients and owners who decide.

Sustainable procurement
National governments and contracting authorities together constitute the construction industry’s largest client, especially for infrastructure supply. The regulatory framework that controls the market for engineering and design activities, and the
accompanying national strategies and action plans (notably national and Local Agenda 21 processes) are being adjusted to address the public’s desire for sustainable development. National priorities and rules now generally require integration of sustainable development when clients formulate a demand for services. For example, environmental impact assessments are carried out for an increasingly wider variety of investment projects, and environmental codes now place a greater responsibility on property owners.

Regulations governing public procurement aim to guarantee fair and transparent competition to obtain the best quality-price ratio with optimum use of public funds. Policy considerations, important as they may be, should generally not be a factor in decisions concerning the award of procurement contracts.

For procurement by tendering (the most common practice) the choice of the winning bid is simple in principle: the most economically advantageous offer that is responsive is awarded the contract. Award criteria other than price (e.g. quality, performance, time, ingenuity and environmental effects) should be expressed in monetary terms to the extent practicable.

When a design and construct responsibility is contracted out against a design specification that defines “fitness for purpose”, there are some measurable parameters. However, many parameters that respond to quality (e.g. durability and maintenance) and to function and environment remain subjective, difficult to measure, and thus difficult to award profit against. These considerations require continuous discussion to set actionable but balanced standards and specifications combining the objectives of public procurement with environmental and social policies.

European legislation already accepts that environmental issues can be used as an award criterion in a contract, provided there is economic advantage. Some argue that procurement directives should go much further by allowing the contracting authority to use as criteria aspects linked to general social or environmental objectives (e.g. unemployment campaigns) provided the criteria are consistent with legal principles, notably non-discrimination.

However, it is not the role of a contract between two parties that is enforced by each party to incorporate the sustainability obligations of the two parties with respect to a third party, namely society at large.

First, the parties are bound by law to respect environmental and social obligations independent of the contract.

Second, public authorities can opt for environmentally sound requirements by specifying what is required in the call for tenders. They can procure services on the basis of the economically most advantageous tender, balancing price, quality and life-cycle costs, for which quality assessment criteria include sustainability factors. Local authorities, for example, are encouraged to apply the principles of ecological land-use planning. Similarly, expectations are placed on the military, the health sector, and other services areas controlled directly by government. However, even life-cycle costs are often left out of the equation, let alone sustainability considerations.

**Innovative methods of project delivery**

Experience has shown that attempts to secure sustainability goals by imposing constraints and requirements on a particular aspect of the project cycle are ineffective and generally resisted.

At the same time, the construction industry (aware that traditional project delivery by competitive tendering is not necessarily the most efficient method) is moving away from the simple and confined goals of cost and time for construction to focus on the macro issues of overall project outcomes, where the outcomes are used as goals for all project participants. This shift comes from strictly commercial reasons (e.g. elimination of disputes) and the understanding that it should be possible to take a more global view.

It was initially felt that contractual relationships could be replaced by long-term relationships based on the outcome (determined by clear measurement of performance) of a process involving sustained improvements in quality and efficiency. Such arrangements are not sufficiently rigorous, so other methods based on outcome-based delivery are being tried. In the partnering of project teams, project delivery focuses on a project business plan and compares this to the project outcome, apportioning profit to the delivering parties according to their ability to exceed the plan’s requirements. The aim is for team members to share in success, in line with the value they add for the client. However, partnering has had limited success because it relies on best endeavours and acts of faith; partners simply tell each other that they will act reasonably and fairly while expressly disavowing any legal obligation to do so. Instead, it has opened the way to consideration of more efficient project delivery methods for complex projects based on aligning incentives.

Among the most widely used methods are alliance contracting (alliance) and engineer-procure-contract-manage, a producer-controlled turnkey undertaking that provides greater competition over costs at the physical construction stage as the client works in close cooperation with a project management team. It is believed, but not yet proven, that alliancing and similar types of contracts should facilitate proper recognition of sustainability performance in the selection process.

It is also felt that the same global approach to implementing sustainability, using new modes of project delivery, is needed for smaller, community-based projects that seek increased public and stakeholder participation in the planning, implementation, monitoring and review of projects. These new modes will not be based on alliancing and the like, which focus on relatively large-scale projects in developed countries. Public-private partnerships (PPPs) are being explored as a possible delivery mode. PPPs aim to help meet infrastructure needs by promoting private sector involvement. Experience has repeatedly shown the overriding importance of contractual terms, regulations, bidding procedures and market structure. Thus it is likely that developing new modes will require very careful evaluation of all phases of the project delivery cycle. Progress is slow, indicating that it will be an enormous challenge to implement broad PPP concepts on a relatively small scale with relatively unsophisticated partners. In addition, private funding of infrastructure still only represents 10% of the total in developing countries, so there is little momentum for exploiting fully the possibilities.

**Infrastructure demand**

Analyses of the demand for infrastructure generally focus on the main components, i.e. telecommunications, power supply, land-based transport, and water and sanitation. In Latin America, for example, power infrastructure accounts for close to one-half of total infrastructure gross investment, followed by transport, telecommunications and water and sanitation.

Structural change in an economy, and income growth, increase the demand for infrastructure. The World Bank estimates that the investments needed for Latin America should amount to US$ 57 billion, about 2.7% of Latin America’s GDP in 2000-5. Most of this amount would be before power, followed by roads and telecommunications.

The public sector’s share of gross domestic fixed investment in the region was about US$ 37 billion in 2000. Given that not all of this investment is available for infrastructure financing, infrastructure investment needs will have to be foregone or made up by the private sector. The same is true elsewhere in the developing world.

Private financing for infrastructure has surged worldwide in recent years. Annual private capital flows to developing country infrastructure projects were similar in magnitude to official development assistance (ODA) in 1990. They then grew more than eightfold, reaching US$ 120 bil-

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**Figure 1**

ODA and private capital flows to infrastructure in developing countries

![Graph showing ODA and private capital flows to infrastructure in developing countries](image-url)
Sustainable building and construction

In 1997, however, they have proved to be volatile, with 80% going to only six upper-middle-income countries. Financial crisis in the 1990s more than halved private capital flows to the infrastructure sector after 1997 (Figure 1).

Less than 1% of private capital flowed to less-developed countries, where ODA remains the dominant source of infrastructure finance (US$ 35 billion over the past decade, compared with less than US$ 5 billion of private capital).

Overall, 43% of private capital went to telecommunications, 32% to energy, 19% to transport and, and only 5% to water and sanitation. In regions such as Latin America, which are dominated by countries that attract private capital, transport and energy were inversely imported by countries that attract private capital, and energy were inversely.

More importantly, private investment covers about half the investment demands for roads and only a fraction of what is needed for power and water and sanitation. The situation is much more serious in regions that attract relatively little investment, either private funds or ODA.

In a regime of shortfall, anything perceived to be more expensive will be ignored. Unfortunately, for many of the world’s governments and private clients sustainability falls into that category.

Roads

Recent World Bank and World Business Council for Sustainable Development reports show a strong relation between the level of economic development and levels of motorization, road provision and distance traveled. Vehicle ownership increases with income, and estimated ownership saturation levels are well above currently observed levels, with little evidence that ownership slows in countries at high income levels (Figure 2). The same is true for distance traveled. Road provision at the national level is also very responsive to income, especially for paved roads, and very consistent across countries even though provided by government. In other words, overall demand for roads (ignoring the complex case of cities) invariably increases and obeys the same laws everywhere. The extent to which government can be a driver for change by moderating demand for infrastructure is probably limited if experience with roads is any indication.

Commercial property

The commercial property sector faces profound change in the developed world.

First, greater recognition of the differentiated role of buildings and space as productive assets (as opposed to crude containers) will drive demand. Second, to reduce repair and maintenance there will be an increase in investment for commercial and industrial facilities that are designed and built as an industrial product for a single purpose, and that are built to last for a limited period before major refurbishment or dismantling. Third, the combination of information technology and the growth in small companies providing business services may cause re-colonization of obsolete, low-grade space.

Fourth, to maintain profitability businesses will have to work their assets harder, including buildings and other constructed facilities; assets must deliver more value.

Finally, major firms and asset managers with significant property portfolios are increasingly requiring suppliers, contractors and professional advisors to take their sustainability policies into account when they build or manage property in order to minimize environmental impacts and to contribute positively to society. This trend is accelerated by legislation such as the UK’s 1999 Pensions Act requiring occupational pension funds to explain how they factor social and environmental issues into investments.

The fact that the main drivers for change remain largely economic is illustrated by a recent survey of the UK property sector, which showed that firms invest in urban regeneration for the same reasons they invest in normal property. The main factors are above average perceived total returns and security of investment. Factors such as competitor behaviour, past experience, social and community involvement, and image were much less important.

The problem is currently that drivers for energy and resource efficiency and costs savings, especially in retrofitting and refurbishment, are not being translated to the less-developed world, with the exception of a handful of high-profile international companies reportedly anxious to present the right image to international investors and pressure groups. Very few companies are responding to fundamentals such as the impacts of climate change and resource limitations on the bottom line. These pioneers aim to set an example for a more radical change in thinking.

Housing

Housing investment typically accounts for 2-8% of GNP and housing services for an additional 5-10%. Some 56% of Europeans and 65% of North Americans live in owner-occupied dwellings. The remainder can be divided into the private rental sector and social housing. Every fifth apartment in Europe is rented from the social housing sector. Over half (52%) of the EU housing stock consists of one-family houses; there are slightly fewer (72 million) dwellings in buildings with more than one apartment.

The interplay of supply and demand determines the housing market. However, unlike road provision, housing conditions do not systematically improve with economic growth and development due to policy differences across cities and countries.

Reorganization of social housing provision and financing may change the balance of demand, with social housing accounting for an increased proportion of all housing. But given the tendency for reduced investment by government in areas that can be adequately supplied by the private sector, predictions of an increase in social housing are uncertain.

Historically, most financing for sustainable housing comes from individuals with high net worth rather than from banks and traditional investors. Sustainable construction at the moment is still driven by the early adopters, mostly homeowners with enough private financing to pay for alternatives not supported by the financing issues.

But a shift appears to have begun. Private homeowners in the developed world perceive most of the value of their homes in terms of their location (40%). Functionality accounts for a similar perceived value, followed by image (15%) and services (5%). The market will respond when owners accept that sustainable construction increases functional value by being more durable, economical and efficient to run, healthier and more comfortable. In the United States institutional and investor resistance to environmentally responsible housing development is reported to be eroding. It is increasingly claimed that investors can expect the same return as on any other equivalent investment. These barriers are seen to be financial, along with zoning regulations and poor acceptance by authorities of novel designs owing to unclear specifications.

Surveys suggest that there will be no substantial change in the nature of the aggregate demand for housing in the developed world in the near term, unless future changes in planning regulations severely restrict the availability of land for development or the price performance of new houses improves dramatically. The trend to sustainable construction in private housing that requires both a suitable location near transport and performance improvements will therefore be gradual.

Informal urban housing

Demand for affordable housing in the developing world has become so great that there is hardly any spare capacity to be directed to the other levels of sustainability, especially opportunities for the formal construction sector.

Low-cost urban housing in most developing countries is characterized by rapid growth of slums and unauthorized settlements (between 20-30% of new growth in cities). In low and middle-income countries, 30-70% of urban housing stock is illegal or unauthorized since either land ownership laws or building and planning laws have not been followed.

Because land suitable for settlement is scarce and/or expensive, informal settlements are often sited in hazardous locations where people experience not only threats to health due to poor quality housing, water supply, sanitation and access to social services, but also a host of other problems. Relative to developed countries, housing policies disproportionately affect the cost, availability, quality and production of informal housing since they extend to areas not normally subject to control, such as security of tenure and asset security for long-term financing.

Positive drivers for change are labour-intensive construction methods, locally sourced materials, and highly structured, internally networked and mutually supportive communities.

Low-cost urban housing

The informal sector is the main producer of housing stock in most developing countries. Much of
this stock is based on community-based delivery processes. In many developing countries families build a significant number of houses, normally with help from friends.

Public sector low-cost housing produced by conventional construction processes is generally characterized by doubtful quality, unimaginative planning and design, low market image, high client dissatisfaction, poor land management, poor siting and low expectations of profit.

The situation is no better in the case of private sector low-cost housing. Programmes aim at low initial cost per unit delivered, with minimal consideration of the life-cycle cost. Such properties are scarcely ever integrated into the conventional property market, as they are perceived to be of inferior quality and with high financial risks.

According to the report Agenda 21 for Sustainable Construction in Developing Countries, “it is now generally accepted that for housing to be sustainable in developing countries, programmes have to adopt a holistic perspective and include issues such as urban design, urban greening and the provision of social infrastructure such as schools and clinics. Housing cannot be seen as a product to be fabricated and delivered, but as an enabling and empowering process. The integrated concept of housing as part of the urban issue of a city is not often contemplated by the construction industry, yet it is one of the most pressing problems of the developing world.”

Innovative project delivery systems have shown themselves capable of reaching the poorest sections of the population. Among these systems are construction based on the collective and organized efforts of the community, and projects managed by housing cooperatives or associations that work on a non-profit or cost-covering basis.

The most effective participative systems have proved to be self-managed popular cooperatives, where the community has financial control of the project, and contracts for private-sector technical consulting services for the development of the building project and its execution.

The total indirect costs of building are some 45% less than the total cost of conventional construction, and the quality of construction is higher. Differences are accounted for by reduced waste and the diversity of architectural solutions resulting from participation of the cooperative workers in the planning and execution.

Motivation for improving low-income housing in the majority of developing countries relates to overcrowding, insecurity, vulnerability to disasters, poor siting, poor quality, poor ventilation and design, sluggish supply, land and housing that are unaffordable compared to income levels, and strained physical infrastructure and social services.

Governments are trying to support the low-cost housing market, but the realities of market forces are limiting adoption. Pilot projects have been mainly driven by agencies and non-governmental organizations keen to import an approach or a technology, and supported by donor aid. The focus is generally on energy efficiency, as that is where the international funding lies. Water management is of critical importance, but it is receiving considerably less attention.

The main drivers are improved health (reduced indoor air pollution) and poverty alleviation (less money spent on energy means more money to spend on education and nutrition).

Conclusions

The construction industry has a huge capacity to participate in the development of a sustainable built and natural environment. It makes pragmatic efforts to instil and extend sustainable concepts at the project level, with private and public clients, in areas of activity that it can influence. Clients are increasingly recognizing the positive economic outcomes of sustainability as a driver for investment decisions. In the developing world, adequately financed innovative project delivery systems have the potential to meet urgent housing needs on a sustainable basis. However, infrastructure shortfalls and seemingly entrenched consumption patterns challenge the development and implementation of adequate governmental procurement policies.

FIDIC (the International Federation of Consulting Engineers) represents the business interests of suppliers of technology-based intellectual services for the built and natural environment. The FIDIC Sustainable Development Task Force is charged with implementing the federation’s strategy and action plan for sustainable development.

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Not surprisingly, the majority of people around the world associate WWF and our famous panda logo with conservation of endangered species such as tigers, rhinos and pandas. Why on earth, then, would WWF be interested in people’s homes?

The answer to this question lies in the pyramid on the right, which illustrates how WWF operates. WWF recognizes that we can only achieve our vital work of protecting endangered species if we take action to protect endangered habitats like forests and oceans. To do this, WWF must address global threats to nature such as climate change, deforestation and wasteful use of natural resources. We aim to do this by working with partners to seek long-term, sustainable solutions benefiting people and nature.

Every two years WWF produces the Living Planet Report, which measures the planet’s “health.” With each update this report indicates a continuing dramatic decline in the number of species and a dramatic rise in the rate of consumption of natural resources and levels of pollution. The report also measures the “ecological footprint” of individual nations and, shockingly, tells us that if everyone around the world consumed natural resources and generated CO₂ at the rate people currently do in the UK we would need three planets to support us.

Unfortunately, the majority of homes in the UK have significant negative impacts on the environment. These include direct impacts with respect to a number of key WWF priorities including climate change, protection of forests and freshwater environments and reducing the use of toxic chemicals. For example, typical newly built homes in the UK use three and a half times more energy than those in Denmark and Germany. In social terms, this clearly has consequences for people who have difficulty affording to heat their homes properly. According to the Joseph Rowntree Foundation: “Britain has around 40,000 more deaths during December and March… which is a larger ‘winter excess’ than in most other European countries, including Scandinavia. This is in spite of the fact that Britain has comparatively mild winters… part of the explanation may lie with Britain’s ageing housing stock, which… may provide less protection against the cold.”

In environmental terms, housing in the UK contributes around 27% of total CO₂ emissions associated with energy use. Domestic energy use is projected to rise by 6% by 2010. It is therefore essential to reduce emissions from new and existing houses if we are to mitigate some of the worst effects of climate change.

Furthermore, up to 70% of timber used in the UK goes into construction and a high proportion is used for housing. The housing industry must demand timber from well-managed, independently certified sources if we are to halt and reverse threats to forests around the world – 14.6 million hectares of natural forest are lost each year, a rate of 30 hectares every minute.

Other impacts related to construction of new homes include quarrying to provide aggregates, wasteful use of water, and widespread use of toxic chemicals in materials, which can pose significant health risks for occupants as well as having impacts on wildlife.

Some developments, however, offer a more “sustainable” alternative. A very good example is the Beddington Zero (fossil) Energy Development (BedZED) in Surrey. BedZED homes and offices are highly energy- and water-efficient (reducing space heating needs by 90% and water use by an average of 56%) and use energy from a renewable source. These homes are a mix of social, shared ownership and reasonably priced units for sale (compared to a local market average). Most materials used to build BedZED were from local, recycled or certified well-managed sources. Residents have access to a car pool and local organic food deliveries. Although it is a high-density housing development, all residents have access to private gardens and conservatories.

Mainstreaming sustainable homes

Unfortunately, developments such as BedZED are currently the exception rather than the rule in the UK. This is why, in December 2001, WWF-Uk invited the government to make a public commitment to develop one million sustainable homes in this country. WWF recognized that the government could not deliver such a commitment alone. The support of a wide range of stakeholders would be needed, including representatives of the house building and construction industry, the investment community, local authorities and planners, consumers and NGOs. WWF has a strong track record of bringing together businesses and governments to seek solutions that bring social, environmental and economic benefits. Our success in this area has been shown through our work on sustainable forestry, fisheries and rural development.

WWF initiated an independently facilitated dialogue process designed to identify the barriers to sustainable homes and ways to overcome them, to build on best practice and lessons learned to date, and to develop consensus among a wide range of stakeholders. A consultation questionnaire was sent to over 350 stakeholders, and we held a multi-stakeholder workshop with key organizations including representatives from government, building and construction, the investment community, local authorities and planners, consumers and NGOs. WWF has a strong track record of bringing together businesses and governments to seek solutions that bring social, environmental and economic benefits. Our success in this area has been shown through our work on sustainable forestry, fisheries and rural development.

In parallel with the dialogue process outlined above, WWF held meetings with a wide range of stakeholders. These included representatives from government, the house building industry, the investment community, and a range of other business interests. The feedback from the questionnaire and meetings represented an overwhelming consensus on the need for action.

As a result of this consultation, WWF identified six key barriers to development of sustainable homes. Our findings are summarized in the diagram on the following page.

Stakeholders told us that barriers to sustainable homes include:

- current planning and building regulations that do not promote sustainable homes;
- inadequate incentives for sustainable development;
lack of fiscal incentives;
perceived lack of investor support;
perceived extra cost;
lack of consensus around the definition of a sustainable home;
perceived lack of consumer demand.

One of the key barriers to progress in this area was the definition of a “sustainable home”. We discovered a plethora of existing schemes and indicators, but little clarity regarding a definition. WWF found there was a general consensus that BRE’s EcoHomes standard was a good starting point, and BRE originally developed EcoHomes in consultation with an Advisory Group.

The feedback from stakeholders was that while EcoHomes is not perfect, it does begin to address the fundamental impact of housing on the environment. And BRE is committed to developing and improving the standard over time. The assessment covers areas of energy, transport, pollution, materials, water, ecology and land use, and health and well-being. WWF supports the EcoHomes “Very Good” and “Excellent” standards as a good measure of new and refurbished homes that have significantly less impact on the environment.

Next steps

WWF has secured commitments from a wide range of organizations, including house builders, developers and investors. We have now convened a “Sustainable Homes Task Force” comprising key partners from across a wide range of sectors responsible for overseeing the different strategies needed to overcome the barriers to sustainable homes.

These strategies include:
- ensuring that planning and building regulations facilitate the development of sustainable homes;
- ensuring that a range of fiscal incentives are introduced;
- demonstrating strong investor support for sustainable homes;
- ensuring that the cost of sustainable homes is competitive;
- developing the EcoHomes standard;
- building consumer awareness and demand for sustainable homes.

WWF believes government must show vision and demonstrate a lead in making sustainable homes the norm. WWF has recommended a number of tax incentives that could be introduced to encourage house builders and consumers to see the benefits of sustainable homes. Government also needs to revise planning and building regulations to ensure that these critical forms of regulation support sustainable development rather than hinder it.

Government must lead by example as a construction client. It can do this by ensuring that all new homes for which it has responsibility meet at a minimum the EcoHomes “Very Good” standard. Finally, government should support communication of the social, economic and environmental benefits of sustainable homes to accelerate the step change that is needed in the way we design, develop and refurbish homes throughout the UK.

Conclusion

WWF does not support the “predict and provide” mentality for new developments, but it does accept that there is a housing shortage in the U.K. Wherever possible, this should be met by refurbishing and renovating derelict and empty houses and other buildings, but where there is a real and justified need for new building, such developments should meet at a minimum BRE’s EcoHomes “Very Good” standard.

One thing is clear: we only have one planet to live on, and this means that wherever new homes are genuinely needed they must be developed in a way that minimizes their impact on the global environment while optimizing social and economic benefits for occupants and the region.

Notes

4. WWF (2002) Forests for Life. Working to protect, manage and restore the world’s forests. August (www.panda.org/about_wwf/what-we-do/).
5. www.bedzed.org.uk.
6. Meetings were held with No. 10, DTI & Millennium Communities, DEFRA, DTI, Scottish Executive, ACCPCE (Advisory Committee on Consumer Products in the Environment), and Rethinking Construction (Housing Forum and Sir John Egan).
7. For more information about EcoHomes, see www.bre.co.uk.
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Solar energy and eco-design in the tourism sector

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Accor is Europe’s largest travel, tourism and corporate service group. It has 150,000 staff in 140 countries. There are nearly 4000 Accor hotels (443,000 rooms) in 90 countries.

Accor implements its environmental policy in hotel-building and renovation, notably by promoting solar energy. Within the Group, Accor also identifies and promotes innovative projects such as the Sydney Olympic Park Novotel and Ibis hotels, which have gone a step further in terms of improving environmental performance.

Solar energy in hotels

Since 1998 Accor has been involved in a programme to use solar water-heating technologies in its hotels. The Group has already undertaken several successful operations. In 1998 its Environment D epartment launched a programme with the Technical D epartment to study the use of solar power to produce hot water for bathrooms. This project involved hotels in France, the French West Indies and Spain. By December of that year, the first installation had been set up at the Novotel Gosier Bas-du-Fort, which is equipped with 96 m² of solar panels. Today 14 installations have been completed, including eight in France. This programme will continue both nationally and internationally.

As of March 2001, Accor was the company that had installed the greatest area of thermal solar panels in France (1300 m²).

Eco-design and environmentally managed hotels

For the Olympic Games in Sydney, Accor opened a 327-room hotel complex in 1999 comprising Novotel and Ibis hotels at the Olympic site, Homebush Bay. In selecting the Accor project, Australian authorities were influenced by its full compliance with the environmental directives implemented by the International O llympic Committee. The consortium involved had committed consultants to prepare a strategy to maximize ecologically sustainable development principles and practices. This also involved drawing up environmental management plans for hotel design and construction and for ongoing hotel operation.

The hotels were designed with ambitious environmental objectives:

- Building materials were selected with specific requirements, e.g. low volatile organic compound paint, and flooring for the bar area and lobby staircase made of recycled graded hardwood.
- Water saving initiatives included grey water separation, treatment and reuse in toilets, irrigation, fire hydrants and the sprinkler tank, and collection of rainwater from the guttering in the garden watering storage tank for recycling.
- Energy saving: air conditioning automatically switches off in rooms if windows are opened; louvres are installed in the foyer for effective and natural airflow and energy saving; external awnings fitted to guest rooms reduce radiated heat from direct sunlight; all guest rooms have black curtains to block out light and absorb heat.
- Renewable energy: 250 m² of solar panels on rooftops produce 60% of hot water required for hotel bathrooms.
- Waste recovery: a worm farm deals with up to 150 kg of organic fruit and vegetable waste each week, producing fertilizer for the hotel’s herb gardens.

To ensure full development of the potential of these eco-designed hotels, an environmental management system was implemented in 2000. While hotel environmental design and technical innovations are important, implementation and maintenance by staff of the environmental management system is critical to achieve significant environmental results. Environmental initiatives are integrated into operating procedures. Six months after opening, the Novotel and Hotel Ibis Sydney Olympic Park were the first hotels in Australia to obtain ISO 14001 certification.

These hotels use resources more efficiently, satisfying demand by an increasing number of clients who prefer to use businesses that reflect their own desire to care for the environment. Accor has also set up a partnership with the WWF through which one dollar is given to this organization for every room booked at the Novotel or Ibis Sydney Olympic Park.

Integrating environment in hotel management

Integration of environmental criteria in hotel design is important, but it should be completed by environmental guidelines for hotel management. Most environmental impacts occur when hotels are exploited.

In 1998 Accor created the Hotel Environment Charter (“Charter 15”) to integrate environmental management in hotels. The Charter gives each hotel the means to act locally in keeping with the specific aspects of the local business environment, while taking into account corporate guidelines. It has now been implemented in 2008 Accor hotels out of a total of 3711. The hotel Environment Charter covers waste management and recycling, water and energy consumption, local involvement, employee training and awareness-raising.

Accor’s administrative offices are also involved in waste management and recycling through separate collection of paper, batteries and printer ink cartridges for recycling.

The Charter 15 actions are presented in the Environment Guide for Hotel Managers, a training tool for hotel employees. Every year the progress of these initiatives is measured. The hotel’s report on their progress in implementing these actions. The results are published in Accor’s Annual Report.

Since 1994 Accor has had an Environmental Manager, evolving in 1997 into the Environment Department. Support is provided by a network of 53 international representatives. These contacts reconcile the challenges of international and domestic environmental policies, help adapt these policies to the tourism sector and formulate an operational strategy for the Group.

For more information, see www.accor.com/en/group/dev_durable/environment/environment.asp.

1. Novotel Gosier Bas-du-Fort, Guadeloupe, French West Indies (December 1998); Ibis and Novotel Homebush Bay, Australia (January 2000); Novotel Sophia Antipolis, France (June 2000); Formule 1 Perpignan, France (July 2000); Coralia Club L’arina Viva Porticcio, Corsica, France (July 2000); Novotel Toulouse Aeropart, France (October 2000); Novotel Narbonne Sud, France (March 2001); Novotel Avignon Sud, France (April 2001); Sofitel Porticcio, Corsica, France (June 2001); Ibis Meknès, Morocco (September 2001); Ibis Castelfels, Spain (December 2001); Hôtel M Arisso, Guadeloupe, French West Indies (February 2002); Accor Academy, France (February 2002).