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Architecture & Quality of Life

Work Group Environment and Sustainable Architecture

ACE Policy on Architecture and Sustainability - May 2009

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Energy Efficiency and the Built Environment: Proposal for an action strategy

Introduction and Background

The building industry has a key role to play in any agenda for sustainable development for the 21st century. The built environment represents a substantial and relatively stable environmental resource. Most buildings survive for several decades, and very many survive for centuries. As the community's principal physical asset, getting good value requires that the building's full life cycle be considered, avoiding short-sighted attempts to merely minimise initial cost. A strategy on sustainable development will seek to prolong the life of existing structures, and indeed to prolong the utilisation of the materials with which they were originally constructed. Adaptation is usually preferable to new building, and upgrading of performance usually represents an efficient deployment of resources.

Buildings impact upon the environment at several levels, including the city and region, the estate and neighbourhood, the individual building and in relation to the materials, components, and systems of which buildings are made. It is important to consider the full life-cycle dimension, as noted already. For instance, there are consequences following on choices in relation to materials: the extraction, processing, manufacturing impacts; their energy 'intensity'; the emissions associated with certain materials; and maintenance, demolition, recycling, and disposal of construction products. Again, in relation to design decisions which affect fuel usage, consider: pollutant emissions to the atmosphere; the amount of primary energy consumption; fuel extraction/harvesting, processing, and distribution - all have far-reaching impacts.

A sustainability ethos in building will require the consideration of environmental implications associated with design, construction and operation of buildings. The appropriate use of local construction materials will be indicated as first choice. The logic at the macro level lies in the conservation of fossil fuels and the avoidance of associated pollution and global warming. At the local level, favouring indigenous production helps to sustain livelihoods, crafts and trades. Generally speaking, the use of local resources also contributes to a regional expression of buildings, thus fostering a sense of place in the built environment.

Energy is a key part (though only part) of the sustainability issue. Buildings account for close to half of all energy consumption in the EU. Very considerable opportunities exist to improve the energy performance of European buildings. Many of the opportunities will not be exploited (especially in existing buildings) if primitive market forces alone are relied upon to determine the optimal investment in energy saving and the full costs of external impacts remain un-stated. Pressures for change include security of supply, fuel prices, environmental considerations and consumer demands. This is resulting in more stringent and more extensive building performance standards, among other responses designed to ensure that the EU will meet international treaty obligations to limit greenhouse gas emissions and for other reasons of public policy.

But national and local building legislation and regulations are minima and can often, in practice, represent a series of barriers to minimalist adaptation of existing buildings to new uses. For instance,

flexibility of standards imposed with regard to the loading of floors and the fire performance of traditionally-constructed ceilings and solid joinery could make it possible to extend the useful life of sound existing construction, with the additional advantage that pleasant proportions and details can be retained. It is crucial that regulations are intelligently designed.

The design and construction of a building which takes optimal advantage of its environment need not impose any significant additional capital cost, and although it may require somewhat increased resources to design compared to more highly-engineered ‘conventional' buildings it should be significantly cheaper to operate.

Energy and sustainability issues cannot be considered only in their technical dimensions as of their nature these approaches and systems can have profound architectural implications. A criticism which can fairly be levelled at many early solar buildings, for instance, is that sometimes practically all other considerations were made subservient to energy 'collection'. It must be emphasised that energy efficient architecture and sustainable building is not a style, as will be evident from consideration of successful case studies. The spatial experience in a more sustainable architecture is not necessarily distinctive: except in so far as passive solar buildings, buildings designed to be responsive to climate and ambient conditions, may generate interiors with a dynamic quality informed by changes in daylight and the sun's availability and position, with spaces featuring a sense of the diurnal and seasonal changes in the surrounding environment.

The process of moving towards more sustainable forms of development might be treated in a way analogous to biological systems, not only in terms of their complexity but also the process of evolution of ecologies. Complexities develop and the system as a whole moves over time towards greater diversity and develops a symbiotic and sustainable relationship with its environment. It is not that biological organisms find environments and either adapt themselves to the environment or die. They actually construct their environment. Likewise, the relationship of buildings to the environment is not one of adaptation, but more of construction. The environment in which one builds is itself built to design, and goes beyond building solely in response to the existing conditions of a given site or situation.

The present environmental and energy situation and the need for sustainable urban development demands an approach to planning and architecture that addresses both the city and the individual building as complex interactive systems which have symbiotic relationships with their wider surroundings, and which utilises methods such as ecological footprinting to make explicit the relationships between urban resource use and the available supporting productive land.

The Context for European Architects

For several years the ACE has been actively involved in a process of analysis and action at the European level that, among other things, has been aimed at promoting architecture as an important part of European citizens' quality of life, through diverse economic, social and cultural elements. Another purpose of these actions has been to reassert the central role of architects in helping to ensure sustainable, high-quality construction that satisfies the aspirations and needs of clients while preserving the public interest. The action strategy proposed below is directly related to the approach taken through the publication of the ACE policy book ‘Architecture and Quality of Life' (2004), the ACE's commitment to various research and demonstration activities, and in particular in this context the important publication ‘A Green Vitruvius', available in several languages.

Among the key messages of ‘*Architecture and Quality of Life*' is:

The sustainability of public and private buildings and the security of public spaces strongly influence the well being of citizens and thus the social structure of society. It is therefore necessary to ensure that all aspects of sustainability - socio-economic, cultural and environmental - are taken into account in the development of the living environment.

In 1993 the global architectural profession made a commitment in the 'Declaration of Interdependence for a Sustainable Future' at the UIA World Congress in Chicago. More recently some ACE Member Organisations have adopted important policy initiatives with regard to sustainability and architectural practice. One example is the adoption, in October 2006 by the RIBA Council of Contraction and Convergence (C&C) as the basis for the Institute's policy to guide targets for reductions in emissions. The concept of Contraction and Convergence is an internationally supported philosophy for countering climate change and requires a global agreement on the levels of annual global emissions required to remain within safe levels of greenhouse gases in the atmosphere. By adopting Contraction and Convergence as one element of a four-part policy proposal the RIBA aims to achieve greater public awareness of the threat that climate change poses and it is using the policy to lobby influential organisations and government. Another example is the recent production, by the Conseil National des Ordres des Architectes (CNOA) in France of an informative and instructive DVD on the topic of sustainable development. The DVD sets out the policy of the CNOA and provides documentaries on several examples of good practice that will permit its members to learn in detail about the benefits of adopting a sustainability-oriented approach to their work.

Several important developments at the European Union level over recent years offer a favourable context for the launch of specific actions in the EU and in individual Member States.

The European Context

In its Green Paper of 8 March 2006, "A European strategy for sustainable, competitive and secure energy" [COM(2006) 105 final] the European Commission proposed a common European energy policy to enable Europe to face the energy supply challenges of the future and the effects these will have on growth and the environment. The EU must act quickly and effectively in six priority areas, according to the European Commission, to ensure that it has an energy supply, which is sustainable, competitive and secure. The internal market, energy efficiency, research and an external policy will all contribute to making Europe a strong player on the international stage. The Commission asks the Member States to do everything in their power to implement a European energy policy built on three core objectives:

- **sustainability** - to actively combat climate change by promoting renewable energy sources and energy efficiency;
- **competitiveness** - to improve the efficiency of the European energy grid by creating a truly competitive internal energy market;
- **security of supply** - to better coordinate the EU's supply of and demand for energy within an international context.

The first is of special relevance to architects and the construction sector.

The EU has formulated a long-term strategy to dovetail the policies for economically, socially and environmentally sustainable development, its goal being sustainable improvement of the well-being and standard of living of current and future generations. In the Communication from the Commission of 15th May 2001 "A Sustainable Europe for a Better World: A European Union Strategy for Sustainable Development" (Commission's proposal to the Gothenburg European Council) [COM(2001) 264] and the Communication from the Commission of 13 December 2005 on the review of the Sustainable Development Strategy - A platform for action (COM(2005) 658] a strategy for sustainable development is outlined, which adds a third, environmental, dimension to the Lisbon strategy, and is designed to be a catalyst for policy makers and public opinion, to change society's behaviour. It is built around cross-cutting proposals, measures to attain long-term objectives and effective preparation and monitoring of policies.

All of these may be seen as contributions to the European Commission's package of measures, published in 2007, to establish a new Energy Policy for Europe to combat climate change and boost the EU's energy security and competitiveness. The package of proposals set a series of ambitious targets on greenhouse gas emissions and renewable energy and aimed to create a true internal market for energy and strengthen effective regulation. The Commission believes that when an

international agreement is reached on the post-2012 framework this should lead to a 30% cut in emissions from developed countries by 2020.

Following these propositions, the European Union committed itself, in March 2008, to cut greenhouse gas emissions by at least 20% by 2020, in particular through energy efficiency measures. In introducing the proposals, the Commissioner for Energy Policy, Andris Piebalgs said, "If we take the right decisions now, Europe can lead the world to a new industrial revolution: the development of a low carbon economy. Our ambition to create a working internal market, to promote a clean and efficient energy mix and to make the right choices in research and development will determine whether we lead this new scenario or we follow others."

The adopted package of the European Union is based on three central pillars:

1. A true Internal Energy Market
The aim is to give real choice for EU energy users, whether citizens or businesses, and to trigger the huge investments needed in energy. The EC argues that the single market is good not just for competitiveness, but also sustainability and security.

2. Accelerating the shift to low carbon energy
The Package proposes the maintenance of the EU's position as a world leader in renewable energy, by setting a binding target whereby 20% of its overall energy mix will be sourced from renewable energy by 2020. This will require a massive growth in all three renewable energy sectors: electricity, biofuels and heating and cooling. This renewables target will be supplemented by a minimum target for biofuels of 10%. In addition, the 2007 renewables legislative package included specific measures to facilitate the market penetration of both biofuels and heating and cooling.

Research is also crucial to lower the cost of clean energy and to put EU industry at the forefront of the rapidly growing low carbon technology sector. To meet these objectives, the Commission proposed, and Council adopted, a strategic European Energy Technology Plan. The European Union will also increase by at least 50% its annual spending on energy research for the period 2007-2013.

3. Energy efficiency
The Commission reiterated the objective of saving 20% of total primary energy consumption by 2020. If successful, this would mean that by 2020 the EU would use approximately 13% less energy than today, saving 100 billion euro and around 780 tonnes of CO2 each year.
The Commission proposed that the use of fuel efficient vehicles for transport is accelerated; tougher standards and better labelling be introduced for appliances; improved energy performance of the EU's existing buildings and improved efficiency of heat and electricity generation, transmission and distribution. The Commission also proposed a new international agreement on energy efficiency.

Since the adoption of these binding targets, progress has been made by the re-casting or revision of several key EU Directives on the energy performance of buildings, on the eco-labelling of energy-related products and on the eco-design of energy using products. Furthermore, the European Economic Recovery Plan, adopted in December 2008, foresees substantial investment in the construction sector and specifically in the energy efficiency upgrading of existing buildings. In this context the all actors from the construction sector have come together to establish, with the European Commission, a European Initiative in the form of a Public-Private Partnership that will steer investment in research and development in the field of energy efficiency of buildings.

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The ACE now commits itself, in terms of that which concerns it directly, as well as in conjunction with other interested organisations, to an active promotion of the principles of sustainable development and to the formulation of proposals for concrete action, and to contribute to the implementation of agreed proposals. Spheres which will be addressed by such actions will include

- At the institutional level
  European Commission and the European Parliament

Member States (joint actions at the European level), including through the Council
- At the level of the building sector
  European Construction Forum (ECF)
  European Council for Construction Research, Development and Innovation (ECCREDI)
  European Construction Technology Platform (ECTP)
  Energy Efficient Buildings - European Initiative (E2B_EI)
  Cooperation with related professional organisations (town planners, engineers...)
- At the level of the Member Organisations
  Member architects and students.

Specific early measures will include the inclusion of energy and environmental performance information as an assessment criterion in all architectural competitions and competitive selection processes, the encouragement of similar information to accompany all published architectural reviews, and a recommendation that such information form an additional criterion in selection processes for public architectural awards.

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http://europa.eu/press_room/presspacks/energy/index_en.htm

Architecture and the Quality of Life
Architects' Council of Europe - Conseil des Architectes d'Europe 2004
http://www.ace-cae.org/MemberN/Content/EN/download/polbook/polbook.pdf

A Green Vitruvius: Principles and Practice of Sustainable Architectural Design
James & James (Science Publishers) for ACE and the European Commission
Chapter 1 may be downloaded from:
http://erg.ucd.ie/pub_23.html