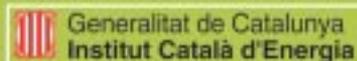


Volume 2

Sustainable Building

Design Manual

A Project co-financed by



Sustainable Building Design Manual

Volume 2

Sustainable Building Design Practices

A project co-financed by



 Generalitat de Catalunya
Institut Català d'Energia

© ICAEN (Institut Català d'Energia), 2004

ISBN 81-7993-053-X

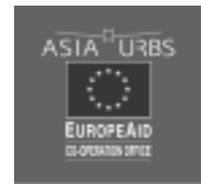
All rights reserved. No part of this publication may be reproduced in any form or by any means without prior permission of ICAEN (Institut Català d'Energia).

Published by

The Energy and Resources Institute
Darbari Seth Block
IHC Complex
Lodhi Road
New Delhi – 110 003
India

Tel. 2468 2100 or 2468 2111
E-mail teripress@teri.res.in
Fax 2468 2144 or 2468 2145
Web www.teriin.org
India +91 • Delhi (0) 11

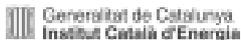
Printed by Multiplexus (India), C-440, DSIDC, Narela Industrial Park, Narela, Delhi – 110 040



The Asia Urbs Programme

The EU (European Union) adopted a strategy in 1994 to improve the relationship between the EU and Asian countries. The Asia Urbs Programme was launched in 1998 as a practical way of strengthening links among those engaged in urban development. To ensure that the communities who are to benefit from this initiative provide some inputs into the planning and implementation of local projects, the programme operates on the basis of decentralized cooperation and relies on local governments for its success. The programme offers funding for up to six months for studies or for two years for information sharing or development projects. The studies and projects can address any urban issue – whether it is the rehabilitation of buildings for living accommodation, the development of facilities for street children, the building up of a computerized system for collecting local taxes, or the introduction of water treatment systems where contamination of the water supply is a problem. The information sharing projects help people from different backgrounds and contexts exchange their knowledge and ideas so that urban planners do not have to keep reinventing the wheel in different parts of Asia. The Asia Urbs Programme can fund only local governments but businesses and NGOs are encouraged to join the project teams to raise the chances of success and ensure long-term sustainability.

Project Partners



Institut Català d'Energia, Spain



INSTITUT CERDÀ, Spain



London Borough of Merton, UK



Sustainable Energy Action / Renewable
Energy in the Urban Environment, UK



Haryana State Energy Development
Agency (HAREDA), India



The Energy and Resources Institute

Disclaimer

'This document has been produced with financial assistance from the European Union. The views expressed herein are those of the above-mentioned (listed) project partners under the leadership of ICAEN and can therefore in no way be taken to reflect the official opinion of the European Union.'

Contents

<i>Foreword</i>		<i>vii</i>
<i>Preface</i>		<i>ix</i>
<i>Acknowledgements</i>		<i>xi</i>
Chapter		
1	Introduction: sustainability and building design	1
2	Climatic data	5
3	Site planning	17
4	Efficient water management and waste water treatment techniques	35
5	Solid waste management	47
6	Passive solar design	57
7	Building materials	91
8	Building technologies	113
9	Energy systems	159
10	Case studies	223
11	Checklist for sustainability	285
	<i>Bibliography</i>	291
	<i>Index</i>	299

Promoting the progress of mankind without depleting our world's resources while safeguarding the evolution of the future generations is one of the principal challenges today. The consumption of resources, such as fossil-based energy, is continuously rising, just like the demand for energy-based comfort. Developed nations of the world are largely expected to account for the increment in world energy consumption. In particular, energy demand in the emerging economies of developing Asia – including China and India – is projected to more than double over the next quarter-century. In the developing world as a whole, primary energy consumption is projected to grow at an average annual rate of 2.7% between 2001 and 2025.

The introduction of sustainable building design measures can make an important contribution to minimize the impact of this evolution. For example, the entire building sector (production, construction, and use) accounts for 40% of the European Union's energy requirement. It is the single largest sector with a potential for achieving energy efficiency. More than one-fifth of the current energy consumption could be saved by 2010 by applying more ambitious standards to new and refurbished buildings. This represents a considerable contribution to meeting the Kyoto targets (up to 30–45 million tonnes of carbon dioxide per year).

In Catalonia, energy consumption in the building sector rises by about 3% every year. The main reasons for this are higher comfort demands by the end-users, rising energy consumption through more electric devices in households, especially air-conditioning installations.

However, sustainability in the sector of building design is a complex concept of a multidisciplinary character. Its operationalization requires the joint efforts of architects, builders, planners, and all other key stakeholders involved in the process of designing, planning, and constructing buildings. A key role is also played by the end-user, not only through his/her responsibility to use the building efficiently, but also through his/her demand for the integration of sustainable building design aspects as additional quality elements, thus influencing and orienting, by doing so, the future building sector.

Technology is the principal instrument that will facilitate more rational use of resources during the entire life cycle of a building: through the phases of construction, use, and demolition.

In this sense, this manual – the result of a European Union co-funded ASIA-URBS project under the leadership of Institut Català d'Energia (Spain), in collaboration with teams of experts from Institut Cerdà (Spain), The Energy and Resources Institute (India), Haryana Renewable Energy Development Agency (India), and Merton Council (the UK), intends to demonstrate the available knowledge and technologies to contribute to the design of better, more efficient, and more sustainable buildings.

Ignasi Nieto i Magaldi
Subdirector
Institut Català d'Energia (ICAEN)

In response to visible evidence of environmental damage and rising fuel prices on one hand and the impossibility to meeting the demand for water and energy faced by urban municipalities on the other, terms like ‘sustainable building’ or ‘green building’ are being popularized as an attempt to bring about awareness of the mindless depletion of natural resources and a reversal of unsustainable trends in the field of building design and construction.

Until the late 19th century, before the widespread dependencies on electricity for heating cooling and illumination, buildings were naturally more climate-responsive and architects were familiar with and excelled in what are today termed ‘passive’ techniques in combination with mechanical devices to illuminate and ventilate the interior spaces of complex buildings, whether high-rise or long span. The early skyscrapers of Europe and America or the long-span of train stations and exhibition spaces provide endless examples of how architects responded to the need for taller and larger buildings while also meeting the comfort levels of the users and providing for the necessary light and ventilation.

With the advent and widespread use of air-conditioning systems, architecture gradually moved away from these ‘passive’ techniques and a skyline with smooth reflecting glass boxes emerged where even the windows ceased to be operable. William McDonough mentions his astonishment that the *Wall Street Journal* devoted an entire front page to an office building designed by his firm, because it had windows that could actually be opened!

As architecture manages to reach a total disconnection with the natural world and environment, human beings are subject to living and working in environments that even may not be provided with natural illumination, in spite of acknowledged consequences such as the ‘sick building syndrome’. Modern buildings seem to look alike regardless of where they are situated and what their climatic context is. Moreover, the influence of these trends established in the developed world, on the emerging developments in developing countries, is resulting in an apparent affordability of such new buildings, with a total lack of awareness of the real costs of fossil fuel depletion, not only in terms of money.

The ‘green architecture’ movement began around the 1960s with mostly single homes and small-scale buildings, but soon expanded to address public buildings. The past decade has seen a synergy of effort from professionals from related fields in bringing about the awareness of sustainability issues, and the term ‘sustainable building design’ – though still considered as ‘alternative’ – has become widespread, with many architects the world over dedicated to a new approach.

Gurgaon, a satellite town located 32 km south of New Delhi, is among India’s fastest growing urban centres. With only 20% of its total plan implemented, Gurgaon already faces acute water and power shortage. With large multinational companies moving their offices there to be away from the overcrowded business districts of New Delhi, and upper and upper-middle class families preferring to live there, there has been a burst of construction of glitzy high-tech commercial buildings and multiplex apartments, creating infrastructure demand that can be no longer met. Further, 80% of Gurgaon is yet to be built and could serve as an ideal context to suggest an alternative approach.

Sustainable Building Design Manual : Volume Two : Sustainable Building Design Practices



Publisher : **TERI Press**

ISBN : 9788179930533

Author : **TERI**

Type the URL : <http://www.kopykitab.com/product/6059>



Get this eBook