

HOUSING

a roof for the world

For some, home is a sheet of corrugated iron on top of old breezeblocks; for others, it is the 25th floor of a modern tower. Housing takes on very different forms around the world, from a simple hut to a luxury second home. This sector uses 40% of the planet's total resources -materials and energy- for the construction and functioning of buildings. It also produces 40% of carbon dioxide emissions. And yet each individual must have access to decent housing and sanitation ... a context in which priorities differ. The overriding concern in developing countries is to suitably house the population. In developed countries, the emphasis is on ecological constructions that favour efficient, organic and local materials, employ environmentally friendly techniques, and take factors such as energy consumption, impact on the landscape and the cultural context into account. Two approaches that could meet in the years to come.

IMPACTS

Polluting materials

Concrete, a basic building material used for two-thirds of housing, is especially polluting. Once mined, the combination of limestone and clay must be fired at over 1,500°C then ground. Both these operations necessitate large amounts of energy: it takes 100 kg of coal to produce one tonne of clinker (concrete before grinding). While most of the time these operations use fossil fuels, they are increasingly being replaced

by substitute fuels such as scrap tyres, recycled motor oils and animal flour.

www.tpsgc.gc.ca/rps/aes/content/ercr_handbook_appenda3-e.html



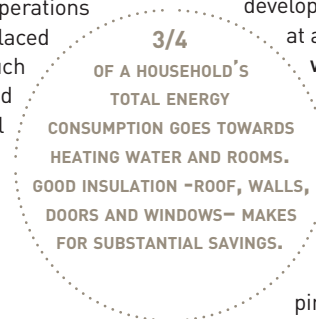
→It takes between 100 and 300 tonnes of gravel and sand to build a house.

Short-term constructions

Some forty years ago, many countries in the North were obliged to implement vast building projects in order to house their populations.

Inexpensive materials along with minimalist construction plans and procedures were favoured as a way of meeting escalating demand. Poorly laid-out, with inadequate thermal and sound insulation and built to last some thirty years, these constructions must now be replaced. The same phenomenon is reaching developing countries, where populations are expanding at a spectacular rate.

www.epa.gov/epaoswer/hazwaste/sqg/c&d-rpt.pdf



3/4
OF A HOUSEHOLD'S
TOTAL ENERGY
CONSUMPTION GOES TOWARDS
HEATING WATER AND ROOMS.
GOOD INSULATION -ROOF, WALLS,
DOORS AND WINDOWS- MAKES
FOR SUBSTANTIAL SAVINGS.

Polluted indoor air

The average individual spends more than 80% of their time indoors. Lead, asbestos, volatile organic compounds (VOCs) in paint, pipes and insulating materials are responsible for numerous illnesses. Lead poisoning, cancers and respiratory allergies are among the most common.

www.who.int/indoorair

www.teriin.org/indoor/indoor.htm

www.epa.gov/iaq

www.nsc.org/ehc/indoor/iaq.htm

http://pubs.wri.org/pubs_content_text.cfm?ContentID=1182

THE
CONSTRUCTION SECTOR
IS CONSIDERED TO BE
THE BIGGEST INDUSTRIAL
EMPLOYER IN THE
WORLD.

→ **1.7 t**

of iron ore and
450 to 650 kg of
coke are needed
to produce 1 t of
cast steel



→ **25 TO
60%**

of energy and
50% of water
could be saved
by respecting
environmental
quality standards
for constructions



HOUSING PEOPLE

Between now and 2025 the population is expected to grow by a third. The consequence will be an additional 2 billion people in need of shelter, workplaces and infrastructure. Building and maintaining these constructions will generate consumption of materials, but also water and energy. Furthermore, home ownership is tending towards ever more spacious individual houses, alongside a rise in the number of over-equipped second homes.



↓ Impermeable surfaces surrounding houses -frames, car parks, patios and roads- prevent rainwater from penetrating the ground. The result is increased incidences of flooding and runoff alongside depleted groundwater reserves.

WASTED ENERGY

A badly-designed house, or one built to inadequate specifications, can come at a high price for its occupants and for the environment. A house that is badly oriented, built from unsuitable materials, or with badly-chosen openings or equipment will be uncomfortable, perhaps even a health hazard, and costly in terms of energy consumption. Just like poor insulation, inexistent solar protection or inadequate ventilation result in heat loss in winter and high temperatures in summer. www.eere.energy.gov/consumerinfo/save_energy.html <http://edis.ifas.ufl.edu/EH206>

ON THE RIGHT TRACK

→ Habitat II: adequate shelter for all

Currently, more than 600 million people in developing countries live in unsanitary conditions and in a rundown urban environment. At least a third of city-dwellers are inadequately housed. In order to remedy this situation, the United Nations has staged two conferences on human settlements to alert the international community to these problems. The second of these conferences, Habitat II, ended with governments pledging that the right to adequate shelter would be fully respected. With this objective in mind, they recommended the creation of all necessary public or private partnerships, and a reinforced role for women in the development of human settlements.

www.un.org/Conferences/habitat



→ The most common domestic insulators, such as glass wool, mineral wool and foam, are industrially manufactured. And yet agriculture is a source of plant and animal-origin materials –hemp, coir, linen, felt, wool– that are just as efficient and less damaging. www.designinggreen.com

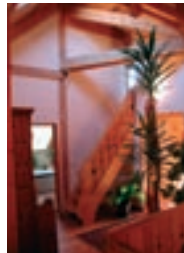
→ Using local resources

Populations in developing countries turn to all kinds of available materials, such as wood, stone, earth, bamboo, lime and cast-offs, to build their homes. Until the last century, this was still a widespread practice in developed countries too. In this way, local techniques and materials have helped shape vernacular constructions within the framework of time and place, and as dictated by needs and know-how. This intuitive approach furthers the notion of world heritage. It can also provide a basis for sustainable construction as it incorporates numerous criteria that respect both man and the environment.

www.international.icomos.org/e_summary.htm



→ Thermal balance



Domestic energy management is related to the choice of equipment and insulation, but also how the different spaces are oriented and structured. Properly oriented doors and win-

dows, as advocated by bioclimatic architecture, ensure better management of heat and light. A covering of trees or climbing plants as outside insulation is an ideal complement.

www.ornl.gov/sci/roofs+walls/facts/index.html
www.livingroofs.org



Many countries have adopted environmental assessment methods to guide construction choices. The International Council for Research and Innovation in Building and Construction (CIB) has examined the practical application of several of these. Generally speaking, they scrutinize every stage in a building's life from construction –choice of materials, site organization, etc.– to managing energy, water, waste or activity, not forgetting thermal, acoustic and visual comfort. The Haute Qualité Environnementale (HQE) label, a French concept launched some ten years ago, is awarded to architectural projects that limit a construction's impact on the environment while providing a healthy, comfortable and well-insulated interior. The ISO standard applies to a variety of building materials for shell, interior finishes and systems, as does the Qualité Sécurité Environnement (QSE) label. In Canada, the Green Globes method offers an online building and management environmental audit.

www.cibworld.nl
www.greenglobes.com
www.assohqe.org

PUTTING IDEAS INTO PRACTICE

Individuals

→ CHOOSE THE DIRECTION A HOUSE FACES; INSULATE IT CORRECTLY; CONTROL VENTILATION AND ENERGY CONSUMPTION → RESPECT LOCAL ARCHITECTURAL STYLES → GROW PLANTS ON HOUSE WALLS AS AN ATTRACTIVE PROTECTION → OPT FOR SUSTAINABLE ARCHITECTURE OR A BIOCLIMATIC CONSTRUCTION: ALTHOUGH MORE EXPENSIVE TO BUILD, IT IS MORE ECONOMICAL TO LIVE IN → PREFER INDIVIDUAL METERS IN APARTMENT BUILDINGS (HEATING, WATER, ETC.) → FURBISH AND REPAIR A HOUSE USING ENVIRONMENTALLY FRIENDLY PRODUCTS (SEE "LEISURE") → CHOOSE FSC-CERTIFIED WOOD (SEE "LEISURE") → PREFER NATURAL MATERIALS TO MAN-MADE

Companies

→ RESPECT "GREEN BUILDING SITE" RULES → GLOBALLY EVALUATE THE LIFE-CYCLE COST OF DIFFERENT CONSTRUCTIONS AND BUILD TO ENVIRONMENTAL STANDARDS → RENOVATE EXISTING STRUCTURES; BE ATTENTIVE TO HYGIENE AND HEALTH HAZARDS (ASBESTOS REMOVAL, VENTILATION, ETC.) → INSTALL A SUITABLE WATER AND ELECTRICITY NETWORK AND EQUIPMENT; INFORM STAFF ON WAYS TO SAVE ENERGY AND WATER

ENVIRONMENTAL CONSTRUCTION STANDARDS

Local authorities

→ BUILD LASTING HOUSING AND INFRASTRUCTURE → RENOVATE AND REHABILITATE OLD BUILDINGS WHENEVER THE ENVIRONMENTAL AUDIT OF SUCH OPERATIONS IS ACCEPTABLE → INSTALL AN URBAN HEATING SYSTEM → PLAN LAND USE ACCORDING TO THE LANDSCAPE AND GEOLOGICAL IMPERATIVES → PREFER URBAN DENSIFICATION THAT WILL RATIONALIZE ACCESS TO LOCAL INFRASTRUCTURE AND SERVICES SUCH AS TRANSPORT AND SCHOOLS → PRESERVE GREEN SPACES: LEAVE ROOM FOR COMMUNITY GARDENS AND PEDESTRIAN ZONES → ENCOURAGE ACCESS TO LOCAL ENERGY AND WATER SOURCES → ENCOURAGE INDIVIDUALS TO RESPECT LOCAL ARCHITECTURAL STYLES, CYCLE AND ROLLERBLADE LANES, AND PEDESTRIAN AREAS BY INCORPORATING THEM INTO URBAN MOBILITY PLANS

FIND OUT MORE

Sustainable building information system: www.sbis.info
US Green Building Council: www.usgbc.org
Network for an economical and ecological habitat:
www.ecosur.org/eng/index.php
US EPA -Green homes:
www.epa.gov/greenbuilding/homes.htm
Energy and Environmental Issues in the Building Sector: www.iisbe.org
Environmental design and green building construction portal:
www.yourhomeplanet.com
Eco-construction: <http://greenhomebuilding.com>
United Nations Human Settlements Programme: www.unhabitat.org
International Initiative on a Sustainable Built Environment:
<http://greenbuilding.ca>
Energy & Green Building Resource Center: www.environmentalhouse.org
Sustainable architecture, building and culture: www.sustainableabc.com
Global Ecovillage Network: <http://gen.ecovillage.org>

AT UNEP

→ HABITAT

UNEP has developed a set of resources to help local authorities and decision-makers assess the characteristics of buildings and promote eco-construction. The objective is to develop sustainable construction as a means of reducing health hazards for occupants while adding to their comfort, and to minimize the additional costs associated with this more demanding form of construction. The impacts of design, materials and techniques have been studied. First and foremost a platform for sharing experiences, this network makes possible the local application of high-performance systems and technologies that better respect human health and the environment.

www.unep.or.jp/ietc/sbc/index.asp