

Sustainable Building and Construction Norwegian approach and experience Applicability to Egypt

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Objectives and characteristics of sustainable buildings

Why sustainable building and construction industry?

- The building and construction sector is the largest sector of the economy in terms of resource consumption and waste production. The environmental impact of the building sector is considerable: In Europe this sector is responsible for 40% of the society's consumption of energy, 40% of the society's consumption of materials and excessive consumption of problem substances.
- There is also a link to sustainable development issues in general that need to be explored more. It is imperative that sustainable building and construction is adapted as a major theme in the national and global sustainable development debate.

Objectives:

- Better resource management; of energy, water and construction materials
- Eco-efficiency; "zero" or minimum harmful emissions to air and water, minimize and recycle solid waste
- Good indoor climate and low risk for health injuries during construction, operation/ use, maintenance and demolition

Characteristics

A sustainable building is characterised by:

- architect design adapted to local landscape and natural environment or urban context,
- infra structure makes public transport possible
- using environmentally sound building materials,
- oriented to take advantage from local climate,
- efficient use of energy, use of renewable energy sources if possible and minimum of fossil fuel energy
- efficient use of water, reuse of waste water and environmental treatment of sewage
- minimum waste production, source separation and recycling of solid waste in operation
- recycling of construction waste
- environmental competency requirements for the planners
- environmental guidelines for operation and maintenance

- trained operation staff
- environmentally aware residents, users or employees

There are many benefits on the industrial and investor level

- Reduced investments and buildings costs as well as increased profitability during operation because of better resource management and eco-efficiency
- New and innovative solutions motivate staff
- Safe and healthy buildings means good working and living conditions for construction workers as well as employees or residents
- Sustainable buildings = high environmental profile = good for long term business (The “Logo Effect”)

Environmental Management in Building and Construction sector

From “business as usual” to innovative thinking

Decision making approach:

The concept of sustainable building is based on the precautionary principle to ensure that environmental concern is integrated in all decisions during planning, construction, operating and maintenance of a building. Most important is to make sure that all decisions include relevant environmental criteria in addition to economic, technical and other considerations.

The building and construction sector is characterised by its way of making decisions. Changing already made decisions as the building project proceeds is difficult and expensive. The earlier environmental concern is integrated in the project the easier it is to carry out significant actions and benefit economically from an environmental and sustainable profile.

Management commitment is of uttermost importance!

Investors and companies need to decide their own policies and choose if compliance with laws and regulations is sufficient in the project. Management commitment is needed to give environmental issues the necessary attention and overcome obstacles during planning and building.

The most important part is to decide the eco-profile of the project and include all stakeholders in this process; the Governorate, municipalities, investors, real estate developing companies, building and operating companies etc. Public institutions and/or private investors need to decide on the general objectives and main focus points.

Environmental programme as a management tool

An environmental programme is a useful tool to address the environmental challenges in each project.

- National, regional and local regulations and guidelines to be applied in the project
- General environmental policy for the building project
- Environmental objectives on all relevant areas
- Identify specific environmental actions and activities
- Define responsible units for carrying out all environmental measures
- Monitoring system, environmental audits
- System for dealing with deviations

- Environmental report and communication

The environmental programme will represent the general framework for the whole building project and specify environmental requirements needed at each stage. Each environmental objective needs to be made operational in the design and planning phase, as well as the building period and operation of the building.

The EcoBuild programme in Norway

EcoBuild in Norway: a five-year programme initiated in 1998 by the Building/Construction and Real Estate Industry. The industry itself and four different Ministries funded the programme. The total budget of the programme was 20 mill Euro from 1998-2002.

The objective of the programme was to increase eco-efficiency in building, construction and real estate industry. Focus points of the programme were co-operation, solutions and self-interest. The idea was to introduce a necessary change and create results through practical projects involving different parts of the industry.

Co-operation

The programme was a co-operation between the government and the industry, involving all parties within the building and real estate industry. Chairman of the board was the CEO of one of Norway's leading Real Estate companies. The board included leaders from all parts of the industry: building owners, architects, consulting engineers, contractors, producers of construction materials and professional associations. A government group of four ministries followed the programme and set the conditions for government funding.

The programme was administrated by GRIP; the Norwegian foundation for sustainable production and consumption founded by the Ministry of Environment. Advisers were engaged from different positions within the sector to evaluate incoming projects and initiate new ones, and follow up on ongoing projects.

Solutions

The EcoBuild programme focused on solutions instead of problems, involving the sector in development of solutions for:

- Energy efficiency
- Material efficiency
- Waste
- Hazardous chemicals
- Indoor air quality

Project types in the programme included:

- **Pilot projects**
Not research projects but projects that used current knowledge in commercial building development to give practical experiences with eco-efficient planning and building. The programme covered up to 50% of extra costs.
- **Training and information**
A lot of knowledge exists, but the need for education and dissemination remains no less pressing
- **Development of tools**
Common tools are useful considering time constraint, need for standard

procedures and high quality. Developed tools are e.g.: a design manual, waste handling manual, building maintenance manual, building classification system etc.

Networking

Formal and informal networks are important, like: linking companies within different trades, e.g. consulting engineers, contractors, building owners; network concentrated on specific issues such as energy or waste.

Self-interest

One of the ideas behind the EcoBuild programme is to prepare the industry for coming framework conditions, to contribute to voluntary actions to avoid detailed regulations, and thereby encourage the industry to take responsibility and meet the expected changes on its own initiative.

Saving material, energy and transport resources usually also means saving money. To use developed technology and planning tools means saving resources and money.

Factor 4 – energy efficiency

Pilot projects have shown that it is possible to reduce the amount of “bought energy with up to 75%. In a commercial office building saving energy can be done by:

- flexible buildings and more efficient use floor space
- architectural design, orienting the building etc; adjusted to local climate to minimize need for heating and cooling
- energy management systems
- using local renewable energy sources e.g. heat pumps using sea water
- using oil and electricity for peak loads

Reduce and recycle solid Waste

As part of EcoBuild the Building Industry Association has developed a “National Action Plan for Construction Waste Management”. Better waste management in the building and construction sector has been a priority from the start. The National Plan provides solutions for reduction of waste and recycling of construction waste. General recommendations as well as practical actions such as different recycling schemes are part of the plan.

Some of the recommendations and measures are:

- Reuse of materials on site if possible
- Plan for material use – minimize wastage
- Use of recyclable materials
- Action plan for waste management for every building project. This action plan must describe waste types and amounts, waste separation scheme on site, waste recycling scheme including transport and delivery agreements
- Harmful substances must be avoided as much as possible and hazardous waste treated according to regulations

EcoBuild Programme results and follow up

EcoBuild has participated in app. 120 sustainability projects. The result is new knowledge and experience, and increased awareness and interest within the building and construction industry. Different tools will definitely make it easier to implement environmental actions in building projects.

Some of the reasons for success in pilot projects were management commitment, competency requirements for the planners, and training of users and those responsible for buildings operations. Company success came as a result of environmental standards and requirements ahead of regulations established by the authorities.

The Building and Construction Association has taken over the responsibility to follow up on these results called EcoBuild Implement. A main challenge is the dissemination of the developed tools and achieved results as well as further knowledge development and necessary framework conditions.

Dissemination of tools and results, target groups

In the evaluation of the programme some groups of professionals in the industry are pointed out as target groups that need to be addressed more, e.g:

- architects – especially the large group of small, private architect companies to implement new tools available
- planners – within areas such as area & land use planning, regional planning, transport planning . These issues have not been part of the EcoBuild programme so far.
- “sales” people in housing sector – need more competence on environmental and energy issues
- building owners, investors and their customers have the possibility of being the driving market force by their demands for eco-efficient solutions
- public officers in local communities and governmental institutions responsible for building guidelines and regulations need more knowledge on best practises and new solutions

Knowledge development

There is certainly still a need for more knowledge development on practical useful solutions. Some areas are e.g.:

- development of a sustainable building “ecolabel” that can be used in the real estate market,
- tools for life cycle analysis of building materials,
- product database with independent environmental assessment.

Experience with organisational learning in the planning and building process shows good results when different groups of professional are working together at an early stage of the building project. Guidelines to increase this kind of collaboration are developed. But architects, planners and consulting engineers are not always used to working closely in teams thus a change of attitude is necessary.

Necessary framework conditions

- Public procurement practices will be of vital importance to implement sustainable building development. Procurement policies need to stimulate the market to implement environmentally sound solutions and increasing use of eco-efficient technology.
- Regulations need to be developed to ensure sufficient minimum standards and equal market conditions. Voluntary actions are not enough.
- Governmental economic instruments must be used to support introduction of new eco-efficient technology
- New way of making contracts that opens to increased collaboration between parties involved

Future challenges

Conclusions from Sustainable Building 2002 (SB02) in Oslo, Norway

This was the second conference in a series of SB conferences. The first one took place in Vancouver, Canada in 2000, the next will be in Tokyo, Japan 2005. A regional event for Africa will take place in Cape Town towards the end of 2004.

The main conclusions from the conference in Oslo 2002 were:

- **From agenda to action:** this is the moment to make things happen, to proceed from agendas to action.
- **New concepts:** To avoid severe problems in resource availability and water supply, new revolutionary concepts and radical change in management of our resource cycles are needed.
- **Climate change:** Building sector must participate in preventing climate change, as well as anticipate the effects of climate change and take these effects into consideration while planning new projects.
- **New design or rehabilitation:** Design and construction of new building has been emphasised so far. Existing building stock and rehabilitation of neighbourhoods needs to be addressed more and should be the main starting point for the sustainable building and housing strategies.
- **Renewable energy:** Use of renewable energy is growing in the housing sector, but it lags behind in office buildings.
- **SMEs:** There is a clear need for simpler methods and tools for small and medium sized companies, both for technical and business aspects.
- **Public procurement:** Continuous and active government involvement in establishing a sustainable built environment is essential and public procurement is a basic and important instrument.
- **Certification and labelling schemes:** Every country should implement such schemes for residential and commercial segments, to lead the market towards minimising environmental impacts
- **Sustainable Building Conference 2005:** Next conference SB 05 in Tokyo 2005 should give extra attention to themes such as: developing countries, climate change, re-use, recycling and waste, existing building stock,- and formulate linkages to sustainable development issues.