

**Action for Sustainability**  
Sweden builds for the future





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# Sweden builds for the future

The building and property sector in Sweden is responsible for a very high proportion of the environmental impact on society; it accounts for 40 per cent of total energy use, just over 40 per cent of the use of materials, and a considerable share of waste. Considerable amounts of greenhouse gases are generated, and account for about 20 per cent of Sweden's total emissions of carbon dioxide. Environmental improvements within this sector will therefore have a big impact, and they are important in the ongoing work towards achieving a sustainable society.

A lot of work is being done, and many schemes are in progress in Sweden today with the aim of achieving sustainable development in planning, construction and property management. In this brochure we show examples of important activities and projects.

The overall goal of the Swedish government is sustainable development, and it presents here some of the activities it is engaged in. Extensive investment programmes for ecologically sustainable development has been launched starting 1998. Another example is the unique cooperation between the government, one national authority, several companies and municipalities in the dialogue project Building, Living and Property Management for the Future. A lot of research and development is also in progress. A special investment in research on sustainable development is made over the period 2005-2008, mainly through Formas, the Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning. Formas is also engaged in the research programme Sustainable Buildings in cooperation with the Swedish Construction Sector Innovation Centre. A number of projects are in progress here, all associated with innovations.

There are several methods of making environmental assessments of buildings. How good is the building with regard to sustainable development – energy use, indoor climate, use of resources, etc? Three methods have been applied to assess a newly constructed, environmental residential building in Hammarby Sjöstad, Stockholm. The methods yield different results depending on the parameters used and the way these are weighted.

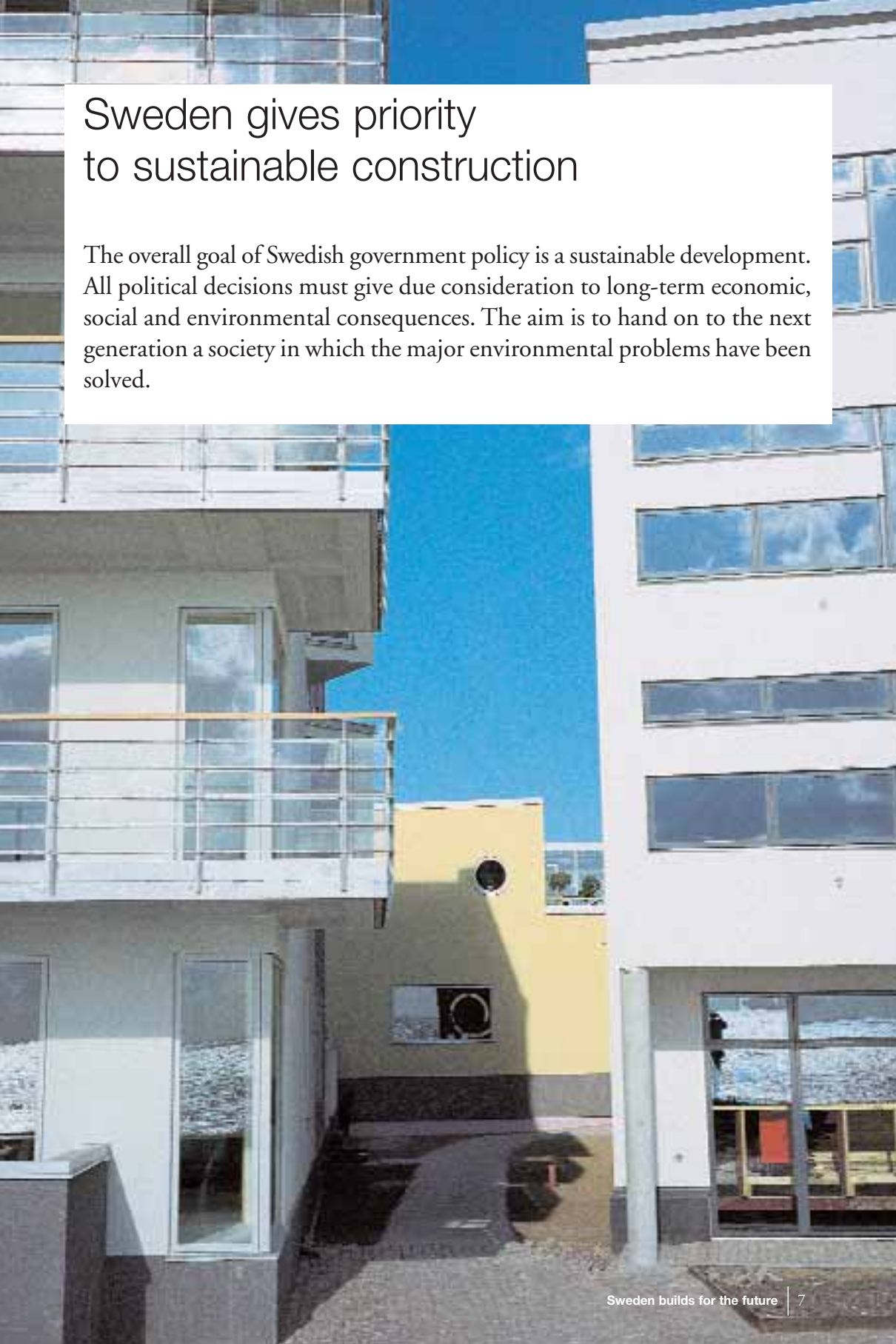
In several places in Sweden, new residential and other types of buildings are constructed with the ambition to make them sustainable buildings. In the Bo01 area of Malmö, an old industrial area is redeveloped into a new city district, the City of Tomorrow. A Quality Programme sets standards for the performance of buildings concerning materials, energy use and green issues. Results and experiences from the city development in the Bo01 area are presented here.

That the Swedish building and property sector is making determined efforts to bring about development that is more sustainable is shown not only through its participation in the dialogue project Building, Living and Property Management for the Future. Several leading companies and organisations are members of the Ecocycle Council which has adopted an environmental programme in which a number of measures are voluntarily undertaken in areas such as economical use of energy and materials, a good indoor environment, etc.



# Sweden gives priority to sustainable construction

The overall goal of Swedish government policy is a sustainable development. All political decisions must give due consideration to long-term economic, social and environmental consequences. The aim is to hand on to the next generation a society in which the major environmental problems have been solved.



### **The “green welfare state”**

A vision has been formulated concerning the “green welfare state”. The aim of this is to carry through the change and modernisation of Sweden, using new technology, construction and an active energy and environmental policy, in such a way that it promotes sustainable development, new jobs, growth and welfare.

The goal of Swedish housing policy is that everybody should live in good housing, at reasonable cost, in a stimulating and safe environment, within a long-term sustainable framework. In planning, construction, refurbishment and building management, an ecologically and socially sustainable development must be the fundamental principle. Modern and energy-intelligent solutions must contribute to more effective use of energy. Housing policy must also create the conditions for social integration.

Sweden’s energy policy must serve to promote efficient and sustainable energy use and a cost-effective and secure energy supply, with a low impact on health, the environment and the climate. In international terms, Sweden uses a high proportion of renewable energy. In the long run the objectives are for society to obtain all its energy from renewable sources.

### **Investment programmes**

The Swedish government has put substantial resources into local investment programmes for ecologically sustainable development (LIP). A total of BSEK 6.2 (approx. \$806 million) was allocated over the period 1998 - 2002. Municipalities engaged on joint programmes with local companies and organisations could apply for grants for investments that increase ecological sustainability.

In 2002 the Swedish parliament resolved that Sweden must reduce its emissions of greenhouse gases by four per cent over the period 2008-2012. This was done despite the fact that the Kyoto Protocol and the EU’s internal division actually permit Sweden to increase emissions by four per cent. So far, emissions have been reduced by two per cent since 1990. As one way of putting this objective into practice, the Climate Investment Programmes (KLIMP) were introduced during 2002. A total of MSEK 900 (approx. \$117 million) was allocated for funding KLIMP over the period 2002-2004.

### **A life cycle perspective**

The way we plan, erect, refurbish and maintain our buildings affects our environment and our lives for a long time. Enormous investments are needed for housing purposes, and these have

to satisfy the needs and demands of both today and tomorrow. Buildings have to be considered from the cradle to the grave – in a life cycle perspective. In order to achieve an efficient use of resources in the long run it is very important also to consider the life-cycle costs of the building.

The existing building stock forms the basis for necessary changes and upgrading. Like many other countries, Sweden has very many buildings that are in need of refurbishment and renovation. The goal of the investments – both in new construction and refurbishment – is to create energy efficient buildings which, at the same time, have a good indoor climate. With the assistance of good management, the buildings must also remain energy efficient and have a good indoor climate over their entire service-life.

Some steps have recently been taken towards a more sustainable construction. There are examples of buildings – new and refurbished ones – that take on board sustainable aspects. A joint initiative between Sweden and the UK has been launched. The purpose is to highlight and share best practice in sustainable construction throughout the construction chain and to provide leadership in this across the EU.

### **Examples of governmental measures and activities in Sweden:**

- The Swedish Parliament has adopted long-term environmental quality objectives in order to clarify the ecological dimension of sustainable development. A good built environment is one of the objectives. Interim targets have been adopted concerning e.g. noise, waste, energy use in buildings and a good indoor air; the last named point at present focuses on radon and ventilation.
- Local investment programmes (LIP, BSEK 6.2 1998-2002, approx. \$806 million).
- Climate investment programmes (KLIMP, MSEK 900 2002-2004, approx. \$117 million).
- Funds for land decontamination, environmental research and intensified work on energy efficiency.
- The dialogue Building, Living and Property Management for the Future – an agreement between the government, four municipalities and a number of companies within the building and property sector (described elsewhere in this brochure).

- Training programmes within e.g. the Building-Living dialogue. The government has asked the clients and managers acting for property owned by the government to cooperate in order to increase their competence.
- There is work going on to produce declarations for buildings concerning radon, ventilation and energy use. The intention is that this information must be available when a building is put into service, sold or rented – to provide information for the consumer, a potential tenant or the buyer of the building.
- The buildings owned by the government should be in the front line as good examples of sustainable buildings.
- On the initiative of the government, the building and property sector has formed a council to secure quality in the whole construction chain.

In order to coordinate work on sustainable development in the government offices, a Coordination Unit for Sustainable Development has been established. Its task is to coordinate, function as a thinktank and lead the work of further developing the national strategy. The Office is also responsible for developing Sweden's action in sustainability issues, both in the EU and the UN Commission on Sustainable Development (CSD). The Coordination Unit for Sustainable Development is located in the Ministry of Sustainable Development.

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# Building, Living and Property Management for the Future – a dialogue project

Dialogue is just one of many ways of implementing change and enhancing the trend towards sustainable development in society. Dialogues and voluntary agreements can function as driving forces. As working methods, they are stimulating for those involved and can bring about co-operation and collaboration between different sectors of industry and between industry and different levels of government. Voluntary environmental agreements can complement instruments such as legislation and government financed incentives.



The Swedish Building-Living dialogue is based on voluntary commitments in the field of sustainable development. It is a unique co-operation between 37 partners from different levels of government and from the industry. 31 companies, 4 municipalities, one national authority and the government are all taking part. The object is to initiate development towards a sustainable building and property sector in Sweden. Agreement has been reached to work towards achieving a number of specific goals and commitments have been made to take concrete actions necessary for sustainable development in the building and property sector. Those who have signed the agreement have also undertaken to develop and follow-up project goals and to assist in following-up the dialogue project as a whole. The agreement was signed in 2003. Three strategic topics are especially highlighted:

- A healthy indoor environment
- The efficient use of energy
- The efficient use of resources

#### **Seven strategic areas**

The commitments that the participants have signed are divided into the following seven areas:

- Plan for sustainable community planning!
- Adopt a holistic view to the entire life cycle of a building!
- Establish quality and efficiency in the construction and property management processes!
- Consider energy and the environment in property management!
- Classify buildings!
- Invest in research, development and training for a sustainable building and property sector!
- Follow-up and evaluate!

A secretariat has been set up within the National Board of Housing, Building and Planning, to coordinate and report on work within the Building-Living dialogue and to disseminate information. The secretariat has also been commissioned by the government to implement a national competence development programme for the entire building and property sector.

#### **Training for the building and property sector**

The national competence development programme is one of the government's commitments to the Building-Living dialogue. The secretariat at the National Board of Housing, Building and Planning is responsible for initiating and organising the training which will consist of short but regular sessions - at least a half a day per year and target group. Training will take place in two

stages, the secretariat will first instruct “trainers” appointed by the Building-Living companies and by other companies within the sector. The aim is for these “trainers” to then hold internal seminars, first and foremost within their own organisations. The concept has been tested at some of the companies involved in the Building-Living dialogue, and will be offered to the remaining contributing companies and to companies within the sector who have not yet signed the agreement starting this autumn. The first sessions will be for all workers involved in the building process and for maintenance workers. Other target groups, such as planners, architects and construction consultants etc., will be offered training successively.

Training materials for colleges providing courses in different construction trades is also being produced.

### **Environmental classification of buildings**

Another activity that is associated with one of the goals of the Building-Living dialogue is the energy rating and environmental classification of buildings. A number of companies have agreed to help ensure that a considerable proportion of the building stock in Sweden is classified as early as year 2009. Three research projects have started aiming at developing an environmental classification system for buildings, which takes into account both national and international findings and the need within the sector for simplicity and clarity. Several other countries have drawn up their own environmental classification systems and the same kind of system is needed in Sweden.

These research projects are financed by Formas, the Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning and BIC, the Swedish Construction Sector Innovation Centre. A number of Building-Living companies also contribute through co-financing and participation.

### **Local Building-Living dialogues**

Among other interesting activities that have been started within the project are the local Building-Living dialogues. In the city of Malmö, local representatives of the building and property sector in southern Sweden have met with Building-Living participants in order to create a contact network for companies wanting to work towards greater sustainability within the sector. The aim is for companies interested in environmental and sustainability issues to be given the opportunity to co-operate and develop business ideas together.

## Participant in the Building–Living dialogue

As participants in the Building-Living dialogue, companies and municipalities can claim that they have the ambition to work towards sustainable development and the competence and ability necessary to fulfil that ambition. These are companies and municipalities at the forefront of sustainable development in the building and property sector. As an external sign of this, they are allowed to display the trade mark “Participant in the Building-Living dialogue”.



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### Dialogue participants

AB Electrolux

AB Svenska Bostäder

Akademiska Hus AB

AP Fastigheter AB

Asplunds Bygg AB

Bengt Dahlgren AB

City of Malmö

Folksam

FöreningsSparbanken

Gillesvik Förvaltnings AB

Hofors Municipality

HSB Riksförbund

JM AB

Kalmar Municipality

Karlstad Municipality

Landstingsfastigheter Dalarna AB

Länsförsäkringar AB

LB-Hus AB

Locum AB

NCC AB

Norra Älvstranden Utveckling AB

Paroc AB

Platzer Fastigheter AB

RAMBÖLL Scandiaconsult Sverige

AB

Riksbyggen

Roxull AB

Saint-Gobain Isover AB

SBC Sveriges Bostadsrättscentrum

Skanska in Sweden

SWECO AB

Swedish Environment Protection

Agency

Swedish Government

Tyréns AB

Vasahallen AB

Vasakronan AB

White Arkitekter AB

WSP Sweden AB



# Sustainable Buildings – a Swedish research programme

Sustainable Buildings is a research and innovation programme carried out in public/private partnership between the Swedish Research Council Formas and the Swedish Construction Sector Innovation Centre (BIC). The programme supports research and development of the built environment with the focus on environmental sustainability and growth. Planning, construction and facility management are involved.



Research is coupled with innovation processes. The goal is that the research community and the sector should, in joint projects, generate new knowledge and create new innovative products, processes and services which satisfy the requirements of the final users, support sustainable growth and create the stimulus for new thinking.

The objective of the programme is a holistic approach to construction and to innovative processes which comprises all the parts of the process - from research until market response to new services and products. The objectives also require an integrated approach of the players in the value chain. An involvement of all stakeholders, i.e. end users, customers, owners, clients, designers, contractors, suppliers, authorities and the research community is therefore aimed at.

#### **Programme priorities:**

- Sustainability
  - environmental impact, resources, life cycle management
  - energy efficiency, energy use in buildings
  - indoor climate and health
  - classification
- Process management
- Use of information and communication technology, ICT
- Role of the building developer/client

The programme includes products as well as processes. Innovativeness and new approaches are encouraged and all projects comprise research as well as implementation efforts.

#### **Projects**

High priority is given to projects dealing with a holistic/comprehensive view, innovations and new ways of construction, contribution to the macroeconomic growth and increased competitiveness in the construction sector.

The research programme comprises a number of projects. Several of these are conducted in cooperation between companies and research institutions, for instance through the commitments in the Building-Living dialogue.

Projects are in progress in the following areas:

- Efficient use of materials
- Energy efficiency
- Indoor climate
- Classifications
- Processes

- ICT
- Building developer

## **ERABUILD**

Sustainable Building is the Swedish participating programme in the ERABUILD project ([www.erabuild.net](http://www.erabuild.net)). ERABUILD is a strategic cooperation between national programmes and its aim is to have a major impact in creating the European Research Area (ERA) for research on sustainable development in the construction and operation of buildings.

## **Partners**

*Formas*, the Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning, is a governmental research-funding agency associated with several ministries, the Ministry of Sustainable Development, the Ministry of Agriculture, Food and Consumer Affairs, the Ministry of Industry, Employment and Communications and the Ministry of Education, Research and Culture. Formas encourages and supports scientifically significant research related to sustainable development.

*BIC*, the Swedish Construction Sector Innovation Centre, is a non-profit association with the objective to encourage innovation and development in the construction, civil engineering and property sector ([www.bic.nu](http://www.bic.nu)). The objective is to develop the construction sector in cooperation with the members by creating the conditions for innovation processes and implementing these. The processes comprise research, development and implementation in the market, and focus on utility for the end user, sustainable growth and profitability.

Formas and the players in the construction sector fund the Sustainable Buildings projects in equal parts. The research programme started in 2004.

For more information about on- ongoing projects within the research programme Sustainable Buildings see [www.formas.se/sustainable\\_buildings](http://www.formas.se/sustainable_buildings)

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# Sustainability – different assessment methods give different answers

Many tools have been created to evaluate the degree of sustainability of buildings on a holistic and detailed basis. However, "sustainable" buildings are often created by applying a number of "environmental" solutions without adopting an overall approach.



A building specially designed to be sustainable, Holmen, in the new development area Hammarby Sjöstad in Stockholm, has been studied by three different environmental assessment methods. The ideas of the client and the City of Stockholm are compared with the assessment results.

### **The area**

The aspiration of the City when the work started in 1996 was to make Hammarby Sjöstad an international spearhead in sustainability. A sustainable solution for energy, refuse and water in the area – the Hammarby Model - was created. The residential buildings were to be twice as good as those normally constructed in 1998, i.e. use half the energy, impose half the environmental impact, etc.

### **Some of the client's goals for the building**

#### *User qualities:*

- quiet courtyards
- low magnetic fields indoors
- good sound insulation
- easy-to-clean and allergy free building details
- individual temperature control within a certain range
- building materials that do not contain harmful compounds

#### *Environmental qualities:*

- toilets, fittings and appliances of low water consumption
- electricity efficient lighting and white goods
- source separation of refuse in the flat and the building
- PEX tubes instead of copper
- hard wearing and demountable fittings
- monitoring of operation
- building envelope of very good insulation  
(windows  $U = 1.0$ , walls  $U = 0.15$ )
- effective heat recovery and fans of low power consumption
- installation of photovoltaic cells

### **Building data**

Building type	Residential
Owner	NCC/Tenant-Owner Association
Architect	White Architects
Finished	2003
Location	Hammarby Sjöstad, Stockholm, Sweden
Area of site	4,351 m <sup>2</sup>
Net area	11,011 m <sup>2</sup>
No of residents	232

## Environmental and indoor indicators

Energy (expected)	per m <sup>2</sup>	per user	unit
Bought heating energy	31	1.484	kWh/year
Bought electricity	41	1.938	kWh/year
Contribution to climate change	562	26.853	CO <sub>2</sub> -eq./year
Contribution to acidification	2,5	120	SO <sub>2</sub> -eq./year
Contribution to nutrient load	173	8.285	NO <sub>3</sub> -eq./year

## Indoor environment in general (actual)

Users satisfied with indoor temperature	84 per cent
Users satisfied with air quality	98 per cent
Users satisfied with sound level	96 per cent
Users satisfied with light	94 per cent

## Assessment tools

Three tools have been used.

The *GB Tool* has been developed since 1996 in international cooperation. The assessment comprises the categories A. Site selection, project planning and development, B. Energy and resource consumption, C. Environmental loadings, D. Indoor environmental quality, E. Functionality and controllability of building systems, F. Long-term performance, and G. Social and economic aspects. B, C and D are the principal areas for the environmental assessment. The characteristics of the building are assessed on a sliding scale from -1 to +5, where 0 represents acceptable and +5 the best practice. The results are weighted to obtain a value for each category.

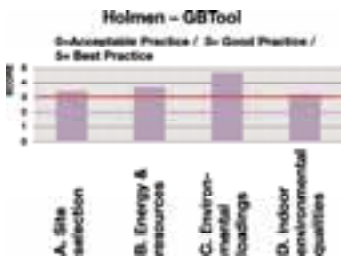
*CASBEE* is a state supported environmental assessment system in Japan. It comprises the categories Q1. Indoor environment, Q2. Quality of service, Q3. Outdoor environment on site and L1. Energy L2. Resources and materials, and L3. Off-site environment. The environmental impact is awarded between 1 and 5 scores – with 3 as common practise – and is then weighted to finally give a value for each category. Categories designated Q are called quality categories, and those designated L footprint categories. The quotient Q/L measures quality per environmental impact - which is associated with the concept of “Eco Efficiency”.

*EcoEffect* is a Swedish environmental assessment system developed by building researchers. Indoor and outdoor environment are assessed separately (internal environmental impact) and use of energy and materials separately (external environmental impact). The internal impact is determined by assessing individual issues

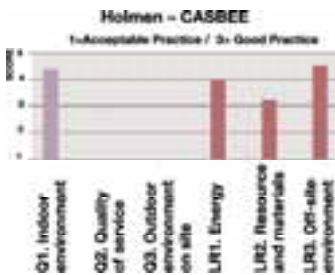
on a scale ranging from 0 to 3, where 0 is better than normal and 2 is normal performance, i.e. a reverse scale is used (impact scale). The external environmental load is calculated as a contribution to different impact categories according to the life cycle analysis method. Weighting based on potential damage is applied. The method shows how much better or worse a building is than a reference building (normal values).

### Assessment of building

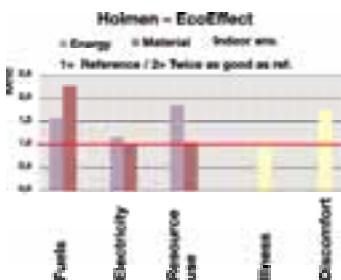
The assessment was applied only to certain components and therefore does not do the methods full justice.



**GB Tool:** Assessment of the area benefits from the reduced number of parking places and good public transport, but is reduced because of insufficient space for storing bicycles. Energy performance is slightly better. It is reduced by the weak values for maximum electric power, energy use for manufacture of materials and the use of recycled materials. Environmental loadings receives a good assessment, chiefly because of low discharges from district heating. In spite of the fact that indoor environment is, on the whole, considered good (see the table), the value is reduced by e.g. complaints about fan noise and low temperatures in the winter (questionnaire results).



**CASBEE:** The indoor environment (Q1) is assessed as good. Individual control and good air quality help this. Quality of service (Q2) and outdoor environment (Q3) are not assessed. Energy performance (L1) is also assessed as good owing to comparatively low energy use and good monitoring of operation. Under Resources and materials (L2) an assessment is made of e.g. use of rainwater and grey water and manufacture of building materials, which were not important for the client. Assessment is normal. The Off-site environment (L3) comprises e.g. noise, smells and wind impact. Since no wind studies have been made, the mark is somewhat lower than maximum.



**EcoEffect:** Energy performance is assessed much better than normal for fuels (district heating) but quite normal as regards electricity consumption. Use of fuel for manufacture of materials is lower than in the reference building, one of the reasons being less use of concrete. Allergy conditions are assessed as better than normal, noise a little worse than normal. Comfort conditions (heating, air quality, noise and light) are assessed as better than normal on the basis of a questionnaire.



## Comparison of results

The Hammarby Model gives rise to low environmental impact (energy, water and sewerage) for the area. This is to the benefit of the building, but has not been influenced by the client. None of the systems awards top marks for use of energy and materials. Use of electricity is quite high, and the use of renewable resources is quite low. The building is relatively space consuming (m<sup>2</sup> per planned number of residents). A better value would have given a better assessment in both EcoEffect and GB Tool. Nor is indoor environment given top marks by any of the methods.

The building does not therefore receive the top marks, which the client presumably hoped for. One explanation may be that very good performance in a limited number of areas on, which the client concentrated is overwhelmed by the general assessment, another that the methods do not reflect the perception of the client as to what a sustainable building is. Issues such as source sorting and materials without harmful compounds, for instance, do not yield a large return. Nor do photovoltaic cells give a yield since their contribution to the electricity supply is insignificant. Electricity efficient equipment is good, but this is counterbalanced by high electricity use in services systems, as in many other recent buildings. Water saving also provides little return since water use is no major problem in Sweden.

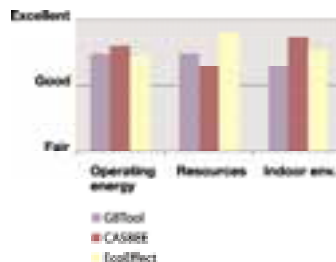
To receive top marks, most parameters must be given good assessments. Especially in the case of EcoEffect which does not measure "effort" but results, it is important, for instance, that the users are satisfied. However high the aspirations, they do not help unless the users value the qualities.

When the methods are compared, it is seen that the results are obviously dependent on the parameters that are measured, but the way the weighting system is designed is just as important. The greater the number of parameters, the less the significance of each individual one of these. In a qualitative weighting system that awards relative weights for marks, the same parameter is given different weights when it is decided not to assess certain of the issues in the same group. This does not occur in EcoEffect which employs absolute weights. What is used as the reference values are also important.

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Holmen – Approximate results when adapting the three methods to a common scale



# Next steps towards the City of Tomorrow

## Sustainable city development in Malmö

In the summer of 2001 the Bo01 European Housing Exposition was held in Malmö. It was the first stage in the development of the so called Western Harbour, an industrial area that was formerly used by the shipbuilding industry. This project envisaged incorporating the following considerations from the Swedish Strategy for Sustainable Development:

- that the pursuit of sustainable development must be integrated within all fields of policy fields
- that national initiatives are needed for the long-term safeguarding of, and investment in, resources forming the basis of sustainable development.

Approximately MSEK 250 (approx. \$ 32.5 million) were provided through state subsidies to encourage and part-finance investments considered to be sustainably preferable. By means of the so called “Local Investment Programme” 67 different projects received support varying from 30 per cent (private companies) and 50 per cent (public bodies) support. The projects were grouped into eight initiative areas:

- Urban planning
- Soil decontamination
- Energy
- The ecocycle
- Traffic
- Green structure and water
- Building and housing
- Information, knowledge dissemination and housing expo activities

### **Urban planning**

The underlying concept for the Bo01 area was defined by the Master Plan and a Quality Programme, the latter being the result of negotiations between the City of Malmö and other involved stakeholders, above all construction companies. The consensus document laid down general criteria, e.g. to create a lively city district with good conditions for a high quality of life. But it also laid down specific targets, e.g. an energy consumption of not more than 105 kWh/m<sup>2</sup> and per year.

There were no direct sanctions for non-compliance with the targets in the Quality Programme. Instead the construction companies were given incentives to follow the Quality Programme by allocating preferable plots of land and better development opportunities in the later stages of the development of the Western Harbour.

The concept of the Quality Programme has been developed and adapted over the last four years and is being used increasingly for the development of new areas.

### **Energy**

The energy concept developed for the Bo01 area is based on 100 per cent locally renewable energy generation. The system solution is based on wind power, complemented by heat pumps and a relatively small number of photovoltaic panels.

With regard to the consumption, a target of 105 kWh/m<sup>2</sup> per year was set. This target is exceeded in some of the houses. The frequently used argument concerning the behavioural patterns of individuals does not therefore account for the higher than expected electricity consumption, since the observed quantity of domestic electricity use is roughly the same as was estimated in the original calculations.

Heat consumption on the other hand is higher than originally assumed. Residents influence heat consumption to some extent. But the building shell, i.e. walls, floors, ceilings and windows, and the built-in thermal bridges, determines the baseline consumption. In general, the heat requirement was estimated too low in those buildings that exceed the target consumption, which can be partly ascribed to the calculation programme used, and partly to unrealistic assumptions.

All in all, however, the concept for energy generation has become renowned internationally and is inspiring energy concepts on a national as well as an international level.

### **The ecocycle**

A range of measures were devised to create an ecocyclic city district as far as possible. One of them is the collection of organic waste. Two different waste separation systems have been introduced:

- A system where the waste is transported from rubbish chutes to two collection points using a vacuum suction technique.
- A system where the organic waste is chopped up using a food waste disposer installed in the kitchen sink and then flushed away in separate pipes to collection tanks. Biogas is produced from the organic waste.

The latter method yields better separation results since the responsibility for a well functioning food waste disposer lies with the individual households.

### **Results and experiences from Bo01**

Factors that should be considered for successful implementation on smaller scale as well as on city level are:

- the ability to create involvement, local partnership and partnerships between people, organisations and businesses
- the ability to mobilise necessary resources for investments and development co-operation

- the ability to combine local ideas and preferences with knowledge and experiences from various professional players.

Sustainable development is fundamental to the current revision of Malmö's comprehensive plan. The aim is for Malmö to become an important part of the Öresund region, with a high level of skills and steady employment, ecologically adapted housing, a wealth of cultural amenities and good opportunities for quality schooling and active leisure in a living natural environment.

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**Read more in “Sustainable City of Tomorrow, Bo01 – Experiences of a Swedish Housing Exposition” published by Formas in 2005.**



# Environmental Programme 2010 of the Ecocycle Council

The Swedish building and real estate sector has made a unique commitment through the Environmental Programme 2010 which the Ecocycle Council adopted in October 2003.



The building and real estate sector has a great environmental impact and accounts for about 40 per cent of energy and material use and a substantial proportion of waste. The sector employs more than 440,000 people, and the annual turnover for construction and building management is in the order of BSEK 400 (approx. \$ 52 billion).

The Ecocycle Council was formed in 1994 in close cooperation with the Swedish Ecocycle Commission to promote the environmental work of the sector. The Council comprises four groups – clients and building owners, consulting architects and engineers, the construction industry, and the construction materials industry.

The objective of the work is that "the construction sector, through a voluntary commitment, must achieve a credible, effective, systematic and coordinated environmental work which results in continual environmental improvements". This commitment is based on cooperation with the authorities and on the policy that, while legislation forms the basis of environmental work, the sector must, through voluntary action, achieve more than what the legislation demands. Work must be based on the principles of market economics.

The tool which the Ecocycle Council uses to realise this goal is the Environmental Programme 2010.

### **Environmental programme**

Through the Environmental Programme 2010 the sector has adopted voluntary goals and undertaken

- to be economical in using energy
- to be economical in using materials
- to phase out harmful compounds
- to secure a good indoor environment.

### **Economical use of energy**

#### **Overall goals**

##### *Buildings:*

- Use of bought energy (per m<sup>2</sup>) in residential and non-residential premises must be reduced by 10 per cent between 2000 and 2010
- Use of fossil fuels for heating must be reduced by 20 per cent between 2000 and 2010

##### *Installations:*

- Use of fossil fuels for transport, construction plants and fixed assets must be reduced by 10 per cent between 2004 and 2010.

### **Targets**

1. Relevant national energy statistics for buildings must be compiled by 2006. National energy statistics must be complemented with household electricity, building electricity and industrial electricity, and the area concept Usable Area, UA.
2. At least 20 demonstration projects regarding energy efficient operation must be produced by 2006.
3. At least 50 per cent of all blocks of flats and premises must be energy rated by 2007. Cost effective energy management measures must be taken by 2010.
4. The use of bought energy in residential buildings completed in 2010 or later must be lower than 100 kWh/m<sup>2</sup>/UA/year. Forms of agreement for energy performance must be available by 2006.

### **Economical use of materials**

#### **Overall goal**

The quantity of construction waste taken to landfill must be cut by half between 2004 and 2010.

#### **Targets**

1. In 2005, the sector must have made a survey of the quantity of construction waste taken to landfill in 2004.
2. Common guidelines for sustainable waste management in conjunction with construction, demolition and building management must be available by 2005. These guidelines must function as a standard to which reference can be made in agreements.
3. By 2006, the sector must have produced technical and environmental guidelines for the recovery of concrete, bricks and other inorganic materials for construction purposes.

### **Phasing out of harmful compounds**

#### **Overall goal – use to be reduced to a minimum by 2010**

The use of compounds regarded as undesirable from the environmental and health standpoints must have been reduced to a minimum by 2010.



## **Targets**

1. Criteria for the properties of compounds that are undesirable from the environmental and health standpoints must be available in 2004. These are to be based, inter alia, on the regulations of the Swedish Chemical Inspectorate.
2. A common system for applying these criteria to report and assess the undesirable compounds contained by construction products must be available in 2005.
3. By 2006, the sector must have completed an initial survey of the most extensively used construction products containing undesirable compounds.
4. By 2010, property owners must have examined their buildings and located the undesirable compounds which occur in such concentrations and forms that they cannot be accepted for environmental and health reasons.

## **Overall goal – Building product declarations for construction products**

Most of the construction products on sale in Sweden in 2006 must be provided with Building product declarations.

## **Targets**

1. The sector must create a website to make it easier to find environmental information concerning construction products.
2. The template for Building product declarations produced by the Ecocycle Council must be developed.

## **Securing a good indoor environment**

### **Overall goal**

New buildings must be designed and constructed in such a way that they do not give rise to health problems, and existing buildings that give rise to health problems must be identified and remediated no later than 2010.

## **Targets**

1. A template for the description of the properties of the indoor environment, and recommendations for its use, must be available in 2005.

2. In 2006, the properties of the indoor environment must be described in newly constructed buildings and in buildings that have undergone major modernisation. A description of the properties of the indoor environment, accompanied by a questionnaire, must be drawn up if the residents request this and if there are reasons to suspect that illhealth is related to the building.

3. A template for describing how damp conditions are prevented, and recommendations on how to use this, must be produced in 2005 and used in all the stages of a project.

Work on producing "tools" to facilitate the work which firms carry out in connection with the environmental programme is in progress.

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### **SUSTAINABLE CITY OF TOMORROW Bo01 – Experiences of a Swedish Housing Exposition**

The Bo01 housing expo area, in Malmö's Western Harbour, is one of the biggest and most ambitious projects in Europe for sustainable urban development. An old industrial site was to be transformed into a diversified inner city environment with the aid of good architecture and environmental initiatives. Support from the European Union, from the Swedish Government, through local investment grants, and from the City of Malmö made possible a number of applications and experiments, which would otherwise have been out of the question. Since the expo in 2001 this new city district has attracted international attention as an inspiring example of sustainable urban development.

This anthology summarises experiences and lessons learned from the Bo01 environmental projects, based on the researchers' evaluations. It also presents examples of functioning public – private partnerships that produce results, and provides glimpses of other parts of Bo01. The book is useful to local authority practitioners and decision-makers, consulting firms, construction and housing companies and the general reader interested in sustainable spatial planning, environmental technologies and innovative construction.

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Hopefully this book can serve as a foundation for overarching energy policy decisions and definitions of research strategy. It will be of interest to politicians and other decision-makers, to post-secondary students and to members of the general public with an interest in energy issues.

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### **Sweden builds for the future**

A lot of work is being done, and many schemes are in progress in Sweden today with the aim of achieving sustainable development. In this brochure, the Swedish government sets out its views on sustainable development in planning, construction and property management. Examples are given of ongoing projects and activities in this area. These are:

**Sweden gives priority to sustainable construction**, Ministry of Sustainable Development

**Building, Living and Property Management for the Future – a dialogue project**, National Board of Housing, Building and Planning

**Sustainable Buildings – a Swedish research programme**, Formas, Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning, and BIC, Swedish Construction Sector Innovation Centre

**Sustainability- different assessment methods give different answers**, University of Gävle

**Next steps towards the City of Tomorrow – Sustainable city development in Malmö**, City of Malmö

**Environmental Programme 2010 of the Ecocycle Council**, Ecocycle Council

