



NORWEGIAN MINISTRY OF LOCAL GOVERNMENT  
AND REGIONAL DEVELOPMENT

Action Plan

# Environmental Action Plan

for the housing and construction sector, 2005-2008





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# FOREWORD

Photo: CF-Wesenberg



The Norwegian Ministry of Local Government and Regional Development presents here its new Environmental Action Plan for the housing and construction sector. In environmental terms, this sector is often described as the 40% sector. As was described in our Environmental Action Plan for 2001-2004, the construction sector is responsible for 40 % of all deposited waste, uses 40% of all energy in our society, and comprises around 40% of all material flows. This is still the situation today. It takes time to change choices and priorities in the housing and construction sector.

However, many positive trends can be noted. The construction sector's Ecobuild program (1998-2002), supported by our Ministry and other public bodies, has contributed to increased environmental efforts in the industry. Following on Ecobuild, the large actors in the construction, public works and property sectors have set up an environmental network in order to exchange expertise. An increasing number of enterprises are developing environmental strategies. Experimental and pilot buildings have been constructed and provide useful experiences. But there is a long way to go.

In 2005 the Ministry has initiated a new collaboration with the construction industry in order to follow up and strengthen environmental efforts by supporting the abovementioned network. The industry is a key player for achieving better environmental quality in housing and construction; consumers and building clients are the other main group of actors in this field. Dissemination of experiences and information is therefore very important.

Environmentally friendly choices should not result in large cost increases. It is a precondition however that such choices be made on the basis of both investment costs and life cycle costs. Some environmental measures are in principle free - such as improved planning and know-how. Others will have higher investment costs but have a short payback period, and thereby provide direct savings for consumers through lower maintenance and running costs. Such choices thus require a good level of awareness on the part of developers, designers, homebuyers and commercial parties.

The role of public authorities is primarily to create frameworks and conditions that support environmentally sound choices by producers, users and buyers. In addition the state itself is one of the largest commissioners of construction works, and can lead the way through environmentally sound choices. In this Action Plan we have collected the goals and actions of various key public bodies that are working to promote environmentally sound choices in their own activities. This Plan contains the message that Norway's housing and construction sector shall become more environmentally sustainable in the coming years. It is my hope that it will inspire all key players in the housing and construction market to increase their efforts in this direction.

A handwritten signature in black ink, appearing to read 'E. Solberg'.



# 1. INTRODUCTION AND GOALS

## 1.1 An inter-ministerial plan

The overall purpose of this Environmental Action Plan is to stimulate actors in the housing and construction sector to have a focus on environmental concerns. The more specific purpose is to provide an overview of the most important public goals and actions aimed at improving the environmental profile of the sector. The Plan illustrates the diversity of actions that are being taken, and also highlights the efforts being made by the state regarding public properties.

The present Environmental Action Plan is a follow up to the Ministry's first plan for the period 2001-2004. The first plan discussed environmental goals and means related to the Ministry's whole field of responsibility, not only housing and construction. It was structured in accordance with the eight main environmental target areas as formulated by the Ministry of the Environment. The scope of this new Plan is both narrower, in that it focuses exclusively on the housing and construction sector, and at the same time broader in that it also presents goals and actions in this field that are the responsibility of other Ministries.

Many public bodies share responsibility for the environmental quality of housing and construction. This Environmental Action Plan, which is valid for the period 2005-2008, has therefore been elaborated in cooperation with other Ministries. Chapter 2 provides a brief overview of the roles and responsibilities of the most important Ministries in regard to the environmental challenges faced by the sector. Chapter 3 gives a summary of concrete goals and actions in each of six priority target areas. These are described according to which Ministry is responsible.

Through legislation, fiscal policies, information and support to skills and knowledge development, the state sets key frameworks and conditions for environmentally sound planning, building and management. The state may offer financial support for specific environmental solutions in buildings, in order to achieve energy savings, amongst

other goals. In addition, both central and local authorities can take the lead by ensuring environmentally sound planning and management of their own building stock.

## 1.2. Important documents

There are several documents which provide an overall presentation of the environmental policies of the government. The most important documents are the Parliamentary Reports/ White papers: "The Government's Environmental Policy and the State of the Environment" that are prepared every two years. ((St.meld.no.8 (1999-2000) and St.meld.no.25 (2000-2003)). In those parliamentary reports on environment (in short called RM) the government presents national goals, and an overview of results achieved in the environmental target areas. These include biodiversity, outdoor recreation, cultural heritage, agricultural and oil-related pollution, hazardous chemicals, waste, and climate change. The State of the Nation is a key marker for environmental policy for the housing and construction sector. Other important documents include:

- St.prp no.1: The annual budget for the various ministries
- St.meld no.42 (2000-2001): Biological diversity – sector responsibility and coordination
- St.meld no.39 (2000-2001): Recreation – towards better quality of life
- St.meld no.23 (2001-2002): Better environment in towns and settlements
- NOU 2003:14: Final recommendation of the Commission on the Planning Act
- NOU 2004:28: Law on nature and landscape preservation and biodiversity (report of the Commission on Biodiversity)
- NOU 2004:22: Well maintained buildings give more to everyone (recommendations from the Commission on Management of Real Estate).



Many EU directives also apply to environmental aspects of housing and construction. These directives are applied in varying degrees in Norwegian legal practice. For example, where a directive stipulates minimum requirements, individual nations are free to pose higher standards; where national requirements are already in line with those of the EU there is no need for special new national directives. There are also framework directives, where specific requirements are laid down in executive directives. Chapter 4 gives a brief overview of directives, both current and planned, which are of relevance to environmental aspects of housing and construction.

### 1.3. A joint effort for the environment

Public authorities alone cannot ensure a more environmentally sustainable construction sector. All important actors must contribute: municipalities as the local decision-makers, planning authorities and real estate owners, developers who can prioritise environmental solutions, the construction industry's many actors through best practice, and individuals acting as environmentally conscious consumers and users.

The basis for better and more environmentally sound building is good cooperation between the public and

private sectors. Municipalities, the construction industry and other influential actors must be consulted when legislation affecting environmental conditions for buildings are to be modified. Good planning, state-of-the-art knowledge and effective processes are preconditions for achieving the best possible environmental qualities at the lowest possible cost. An integrated and holistic approach is necessary for environmental decision-making, and profitability, optimal environmental effect and life cycle considerations must be seen together.

In 2005 the Building Costs Program has been set up. This is a five year program in collaboration between the Ministry and the construction industry's organisations (BAE-council). The aim of this program is to reduce costs and enhance quality in housing and other buildings through better processes. The programme focus areas are increased client competence, development of buildings that are efficient to manage, reduced construction errors and increased productivity. Measures within the program will make it possible to reduce construction costs whilst at the same time ensuring sound environmental choices. For example, reduction of errors, better coordination and management of construction sites can result in lower costs and better quality, in addition to reduced amounts of waste.

### 1.5 million NOK per year to a five year program for coordinated environmental measures in the construction, public works and real estate sector

The Ministry of Local Government and Regional Development, together with its main subsidiary bodies the State Housing Bank (HB) and the National Office of Building Technology and Administration (BE), will provide 1.5mill NOK per year in support to a five year program for coordinated environmental measures in the construction, public works and real estate sector. The initiative for this has come from

the Building Industries Federation (BNL), whose goal is to develop and disseminate information on environmental efficiency and to stimulate environmental awareness in the industry. The program is to function as a network and strengthen public-private cooperation. An internet site is to be set up where experience, examples and information will be easily accessible for all participants.

### 1.4. Priority action areas

One of the overall goals of housing and construction policy is to ensure healthy and environmentally sustainable building. This is elaborated in St.prp no.1 (2004-2005) of the Ministry of Local Government and Regional Development. The Housing Proposition identifies six priority areas, as is also reflected in the Ministry's budget.

These areas are:

1. To enhance spatial efficiency and attention to biodiversity
2. To reduce energy consumption in the building stock

3. To document and reduce the use of hazardous substances in construction
4. To reduce construction waste and increase recycling / re-use of materials
5. To focus on high quality and good building style in the built environment
6. To ensure environmentally sound building management and maintenance

Accessibility for all shall be ensured by the principle of Universal Design. Buildings designed according to



this principle have qualities which, seen in the users' life cycle perspective, reduce the need for costly subsequent modifications and adaptation. This is an important environmental quality. In December 2004 the

government presented a plan for universal design for various sectors of society. Further information on these goals and measures can be found at [www.universell-utforming.miljo.no](http://www.universell-utforming.miljo.no)

### **The State Housing Bank, Husbanken, is offering a new basic mortgage to stimulate environmental solutions and universal design**

As of 2005, the State Housing Bank's loans for new construction and for upgrading have been integrated into one basic mortgage. A considerable part of the Bank's total annual loan framework of around 13.5 billion NOK will be given in the form of basic mortgages. This mortgage shall contribute to promoting key housing qualities such as environmental quality and universal design in both new and existing buildings, as well as providing housing for disadvantaged groups and housing in outlying districts. The mortgage may be used to finance new housing, upgrading, conversion of other buildings to housing, and purchase of new or unused rental housing. It shall contribute towards housing policy goals that would not otherwise be achievable. The mortgage is conditional on projects having high overall quality and in particular fulfilling environmental and univer-

sal design criteria. Special design guides are to be developed by the State Housing Bank. The following shall be stressed in particular:

- Universal design: housing and housing areas with universal design, including provision for life cycle standard, provision of lifts and other accessibility qualities
- Environment: energy requirements lower than current regulations, improved indoor climate, measures to reduce radon emissions, recycling/re-used materials
- Good building and environmental design

The larger dwellings will have to meet higher standards. Exceptions to these rules may be made, in particular with regard to the needs for cheap housing for special groups and particular needs in some districts.

### **The State Housing Bank supports capacity building**

The State Housing Bank provides grants for capacity building, with a budget of NOK 56.7 million in 2005 as presented in the Ministry's budget, chapter 581 section 78. These grants shall be used, amongst other purposes, to stimulate environmental measures in housing and construction. The Bank collaborates with municipalities and others in the construction sector to achieve its aims. Priority will be given to projects that have a high degree of relevance for others and which can, over time, contribute to achieving national environmental goals. Particularly ambitious experimental and pilot projects may be given grants in addition to mortgages, up to 90% of costs. Amongst other themes, the Bank has provided support to:

- development of low energy housing
- massive wood construction applied in "passive" houses
- development of environmental technology for housing and buildings
- develop systems for energy-branding
- environmentally friendly maintenance and management
- life cycle costing and durability
- user-friendly internet databases for selection of ecological materials and building components
- a database of best practice sustainable buildings
- recycling / re-use of building materials and products
- international cooperation

For a more detailed discussion of the environmental challenges faced by the housing and building sector, see also St.meld. no.28 (1997-1998), "Habitat follow-up", the Ministry of Local Government and Regional Devel-

opment's Environmental Action Plan for 2001-2004, and St.meld. no.23(2003-2004) On Housing Policy (Boligmeldingen).



## 2. GOVERNMENT AUTHORITIES: ROLES AND RESPONSIBILITIES

Many Ministries have tasks, means and measures that influence environmental aspects of housing and building. They thus have responsibility for legislation and reporting to parliament, and for follow-up of prioritised tasks in respect to international organisations. The most important Ministries in this regard are:

- the Ministry of Local Government and Regional Development
- the Ministry of the Environment
- the Ministry of Petroleum and Energy

These Ministries have under their authority, Directorates and divisions whose task it is to execute more specific measures, such as formulating detailed regulations, monitoring and supervision of sectors, financing of research and analytical studies and construction projects – for example the State Housing Bank (Husbanken). In addition, the Ministry of Defence and the Ministry of Modernisation are responsible for the construction and management of the state's own building stock and properties through their subsidiary directorates, the Directorate of Public Construction (Statsbygg) and the Directorate of Defence Buildings (Forsvarsbygg). Governmental measures such as legislation and financing must in addition be accompanied by information to local authorities, industry and consumers. Information and awareness raising measures are of increasing importance in order to focus attention on the environment. In view of this, a range of forums for cooperation and exchange of experience have been established, both between central and local authorities, and between public and private sector interests in the construction, public works and real estate sectors.

### 2.1 The Ministry of Defence (FD)

Within the Ministry of Defence the activities of the Directorate of Defence Buildings (Forsvarsbygg) a management unit under the Ministry, are of particular

importance for the Environmental Action Plan, since Forsvarsbygg is the largest commissioner of new buildings and property manager in Norway. It controls approximately 6.0 million square metres of buildings. The Ministry's own Action Plan, Forsvarsbygg's Environmental Program, is based on the Parliament's Environmental State of the Nation (RM 1999-2000 and RM 2002-2003).

### Directorate of Defence Buildings Forsvarsbygg – <http://www.forsvarsbygg.no>

Through its Action Plan, Forsvarsbygg has established its environmental policy for the period 2003-2006. This states that Forsvarsbygg shall ensure environmentally responsible use of properties, buildings and other installations and shall manage them in an environmentally sustainable way. Environmental concerns shall be integrated into all Forsvarsbygg's activities where environment, health and safety are involved. Forsvarsbygg shall contribute to ensuring the Ministry's environmental responsibilities within the sector, and shall follow relevant national and international obligations and environmental goals. Its activities shall be executed in such a way as to prevent damage to people and the environment. Forsvarsbygg shall have the environmental expertise necessary to deal with the environmental challenges both within Forsvarsbygg and the Ministry as a whole.

### 2.2 The Ministry of Local Government and Regional Development (KRD)

This Ministry has amongst other matters, the responsibility for housing and construction policy. Its dependent directorates are the State Housing Bank (HB) and the National Office of Building Technology and Administration (BE). All the main features of housing and construction policies affect the environmental quality of buildings. These are:

- Building Regulations and associated technical directives

- HB's basic mortgages for building and upgrading of housing
- HB's grants to capacity and expertise development
- Support to research and development executed through the Ministry
- Support to analytical and technical reports executed for BE
- Information and dissemination activities initiated by the Ministry, HB and BE

### **The State Housing Bank (HB)**

– <http://www.husbanken.no>

Husbanken is an important institution for the purpose of translating national environmental policy goals into concrete awareness, commitment and practice. HB shall contribute to sustainable housing and built environment, using its regional structure, through cooperation, information and economic stimulation aimed both towards local authorities, the industry and end users. In addition to providing housing financing, HB plays an important role as a centre of resources and expertise on planning of housing, housing areas and living quality. Loan applicants can receive advice and information on economical environmental solutions, accessibility and other measures that can help to raise the quality of their projects without necessarily increasing the costs. HB often becomes involved during the early stages of the planning process for new housing areas. It is in the early phases that the most important decisions affecting quality are often made, and HB's information and advice can thus have a considerable positive influence on the final quality achieved.

Husbanken shall be a driving force and an agent of innovation towards achieving national environmental goals. Reduced energy consumption in the building stock is one of the main priority areas. HB's goal is that energy use shall be reduced by 50% in half of all new housing by the year 2010. It is also an ambition to develop specific environmental requirements in several of the target areas. HB's role is:

- to put a greater focus on the environmental role and potential of municipalities
- to support actors, processes and projects that have a good potential to stimulate demand and production of environmentally sustainable housing and housing areas
- to contribute to initiation and evaluation of best practice projects which have particular dissemination value
- to cooperate with ambitious actors in the field who introduce concrete environmental practices into their operations
- to contribute to development, dissemination and implementation of environmental skills, tools, coopera-

tive processes, policies and action plans, and evaluation / benchmarking systems in line with national policies.

### **The National Office of Building Technology and Administration (BE) – <http://www.be.no>**

BE has administrative responsibility for the many specifications in the Planning and Building Act which have important implications for environmental quality in construction. BE is also an important resource and information centre regarding building permits and related formal procedures and its aim is to be in close contact with all actors in the building process. BE plays a central role in developing and formulating technical directives and guidelines, in following up EU directives, and in international standardisation which is also of great significance for the environmental aspects of construction. BE shall contribute to the development of a more environmentally sustainable and resource efficient housing and construction sector.

In compliance with the Planning and Building Act's technical directives, all phases of building – from procurement to use to ultimate decommissioning – shall be carried out with a responsible use of resources and environment, and without reducing life quality and diversity. Materials and products for use in buildings shall be produced with a responsible use of energy and avoiding unnecessary pollution. BE shall contribute to buildings being designed and constructed in such a way as to necessitate minimal energy use and pollution over their lifetime, including in the demolition phase.

### **2.3. The Ministry of the Environment (MD)**

The Ministry of the Environment has the overall responsibility for the following measures that affect the environmental quality of the housing and construction sector:

- The Planning section of the Planning and Building Act, and associated directives
- Pollution legislation, including directives on pollution, emissions, recycling and wastes
- Legislation on Cultural Heritage, with associated directives
- The Environmental Information Act
- Legislation and directives regarding products control
- Funding of research and background studies
- Information and development of competence.

MD are responsible for the following directorates and foundations:

- The Directorate for Nature Management
- The Directorate for Cultural Heritage
- The Norwegian Pollution Control Authority
- The Norwegian Mapping Authority



- The Norwegian Polar Institute
- The Products Register
- The GRIP Foundation for Sustainable Consumption and Production.

#### **The Directorate for Nature Management (DN)**

– <http://www.dirnat.no>

As a directorate under MD one of DN's main responsibilities is to safeguard nature's diversity for future generations. Further to ensure that environmental considerations, including ecology, landscape qualities and outdoor recreational interests, are integrated into all stages of spatial planning, interventions into nature, construction and management. Key tasks are to promote the use of the Planning and Building Act as a means to protect the environment, the application of the Nature Conservation Act to preserve a representative selection of Norwegian nature, and to work with endangered habitats and species.

#### **The Directorate for Cultural Heritage (RA)**

– <http://www.riksantikvaren.no>

RA is the Ministry's advisory and executive body for the management of cultural heritage, both architectural and archaeological monuments and sites, as well as cultural environments. It provides expert guidance to the Ministry's work with cultural preservation. RA is responsible for the application of the state's cultural heritage policies and therefore also has overall responsibility for the regional administrations' work with cultural heritage. RA works to ensure that cultural heritage values are maintained as well as possible, and shall contribute to both understanding of the physical heritage, and to its being used as a precondition and a resource for future uses of landscapes, sites, buildings and other works.

#### **The Norwegian Pollution Control Authority (SFT)**

– [www.sft.no](http://www.sft.no)

As a directorate under MD, SFT shall contribute to a sustainable society where pollution, products and wastes do not cause health hazards, impair wellbeing or damage nature's capacity for regeneration. SFT shall reduce the risks of damage to human health and environment from chemical substances and products. The most hazardous matters shall be phased out and emissions shall be considerably reduced. In particular, SFT shall intensify its efforts towards chemicals in products and in dangerous waste. Other important areas are pollution of the sea-bed and the soil, and from petroleum related activities. SFT shall contribute towards a better coordination of the use of chemicals in Norway. SFT shall contribute towards the reduction of man made climatic changes. The prime

sources are petroleum-related activities, transport, land-based industry, waste disposal and energy-production and consumption. SFT shall give priority to the job of establishing and supervising a system of quotas, and to the management of pollution legislation whenever appropriate. SFT shall contribute to the reduction of health and welfare problem caused by airborne pollution and noise, particularly noise caused by transport.

#### **The GRIP Foundation for Sustainable Consumption and Production – <http://www.grip.no>**

GRIP is a foundation under the Ministry of the Environment and receives its basic funding from the ministry. The objective of GRIP is to contribute to environmental efficiency, i.e increased returns with lower environmental impacts. GRIP shall be a resource centre for private and public enterprises that wish to operate in an environmentally efficient way and thereby strengthen their competitive advantage in the future marketplace. GRIP takes a holistic view of environmental issues and operates across sectors and disciplines in order to be a catalyst in development processes.

### **2.4. The Ministry of Modernisation (MOD)**

The Ministry has the overall responsibility for state initiated building activities and for the management of state properties. Within MOD the main actor with relevance for environmental quality in housing and building is the Directorate of Public Construction (Statsbygg). Statsbygg is Norway's largest actor in the civil property market, with approximately 2.2 million square metres of buildings. Statsbygg executes planning, construction consulting, property management and control of building projects on behalf of ministries, directorates, universities and colleges. Statsbygg shall implement approved political goals as regards environment and cultural heritage as well as architecture and planning interests.

#### **The Directorate of Public Construction, Statsbygg – <http://www.statsbygg.no>**

Being the state's builder, property manager and developer, Statsbygg is a "co-owner" in the nation's environmental efforts seen as a whole. Within the building sector, the major challenges concerns energy use based particularly on oil and electricity, the use and correct handling of hazardous substances, and increased recycling / re-use Within its research and development division, Statsbygg has initiated many projects that can contribute to more sustainable development in the construction and property sector. Statsbygg's environmental goals are as follows:



- Statsbygg shall strive to improve its internal resource efficiency through systematic environmental management of planning and construction activities, operation and maintenance of its properties
- Statsbygg shall be a centre of expertise and a leading force for environmental solutions in the construction, public works and property sectors
- Statsbygg shall, through its advisory consulting services, encourage its clients and users to make environmentally sound choices in planning, building and property questions.

## 2.5. The Ministry of Petroleum and Energy (OED)

OED is responsible for petroleum and energy policies. The Norwegian Water resources and Energy Directorate (NVE) and Enova, a public enterprise, are under the ministry. Within OED, some of the activities of both NVE and Enova are extremely important for the environmental state of housing and buildings. OED is responsible for the following measures that influence this:

- The Energy Act and its directives
- Support to research and development in the field of energy
- Support to measures to switch towards more environmentally sound energy production and use.

### The Norwegian Water resources and Energy Directorate (NVE) – <http://www.nve.no>

NVE is responsible for the management of the nation's water and energy resources. NVE shall ensure integrated and sustainable management of water resources, work to achieve effective power distribution within an economically efficient energy system, and contribute to energy efficiency. An important strategy for NVE is to ensure a robust energy system, in part by reducing growth in energy demand, both by substituting other energy carriers and through increased flexibility in consumption. NVE shall promote flexible energy systems through normative measures and local energy studies. NVE shall also further develop expertise in management of wind power and gas. NVE is involved in international cooperation and is the national centre of competence for hydrology. NVE has also been given the responsibility of following up several of the areas in the EU directive on energy efficiency in buildings.

### Enova. <http://www.enova.no>

It is a governmental goal to promote conversion to more sustainable energy production and consumption, energy savings, reduced dependence on electricity, and development of new renewable energies. Enova SF was set up in June 2001 for this purpose. Enova is financed from the Energy Fund, whose income is generated by

an extra tax of 1 øre per kilowatt hour on the general electricity consumption tariff. A framework agreement has been drawn up between the Ministry and Enova regarding management of the Energy Fund. Within this framework, Enova selects solutions and manages the fund in such a way as to achieve the political goals in a cost-effective manner.

Enova shall by 2010 improve the Norwegian energy situation by the amount of 12 TWh, through reducing the growth in energy demand significantly more than would otherwise be the case, as well as by increasing the production of renewable energy. Of this at least 3 TWh is to come from wind power and 4 TWh from production of heat (cf. St.prp. no.1, 2005-2006). The total energy savings target for Enovas programs in the housing and building sector in 2004 was 325 GWh; for 2005 it is 440 GWh. The goals shall be achieved by binding contracts with owners in both public and private sector, who are invited to implement projects with concrete goals for energy savings and/or conversion. Support from the Energy Fund shall be seed money) and shall comprise a limited proportion of the project budget. Support is to be given to establishing energy management in the organisation as well as to concrete investments.

Enova has a specific program aimed at energy use in housing and commercial buildings, which covers both new construction and renovation. The basic conditions for energy use and flexibility in buildings are decided in the very early stages of the planning process through choices regarding architecture, structure and technical specifications. Measures are particularly important in new development since these buildings will have a long lifetime. The goal of the program is to reduce the energy consumption of new housing, offices, schools, health services buildings and commercial buildings compared to present standards and requirements. Other goals of Enova are to increase energy flexibility in the building stock, and to increase the availability of energy efficient products and services.

Enova works actively with education and information to raise the level of skills in municipalities and the building sector. A comprehensive program of courses has been conducted in 2004, titled "Energy focus in municipalities". Enova is working together with the National Association of Norwegian Architects (NAL) and the Association of Housing Producers (Boligprodusentenes forening); through this cooperation well attended courses have been arranged in many Norwegian towns.

Enova has set up a nationwide answering service where end users may obtain advice and suggestions, order brochures and other publications. Households as well as professionals can contact this service by telephone, email and internet.

### 3. PRIORITY AREAS – GOALS AND MEASURES

Six priority areas for more sustainable housing and building policies are described below. The tables for each area indicate which of the public bodies have proposed the various goals and measures.

It is to be noted that goals are formulated in varying ways by different ministries and their dependent bodies. For example Enova, Husbanken and the National Office of Building Technology and Administration (BE) have

different formulations regarding energy. This is because these three bodies have different responsibilities and approaches to the energy issue. BE's job is to make specific requirements in the building codes, Enova shall encourage reduced energy use through grants, whilst Husbanken offers housing finance and can attach conditions to this.

#### Low cost housing in massive timber for young people – Svartlamoen, Trondheim

**Architect:** Brendeland & Kristoffersen architects AS  
**Client:** Svartlamoen housing association  
**Builder:** Stjern AS

*This project won first prize in an open architecture competition in 2002 and will be completed in March 2005. The project comprises two new buildings with a shared courtyard, and contains 22 apartments with shared facilities, 6 one-bedroom flats and one commercial space. It is the first large building in Norway to be constructed with both load-bearing walls and floors in massive wood elements. All surfaces are of solid and durable materials. The project has a low energy use and extra insulation. Windows are large towards the South and small towards the North. A focus has been on achieving low costs. The massive wood construction for both buildings was mounted in ten days.*

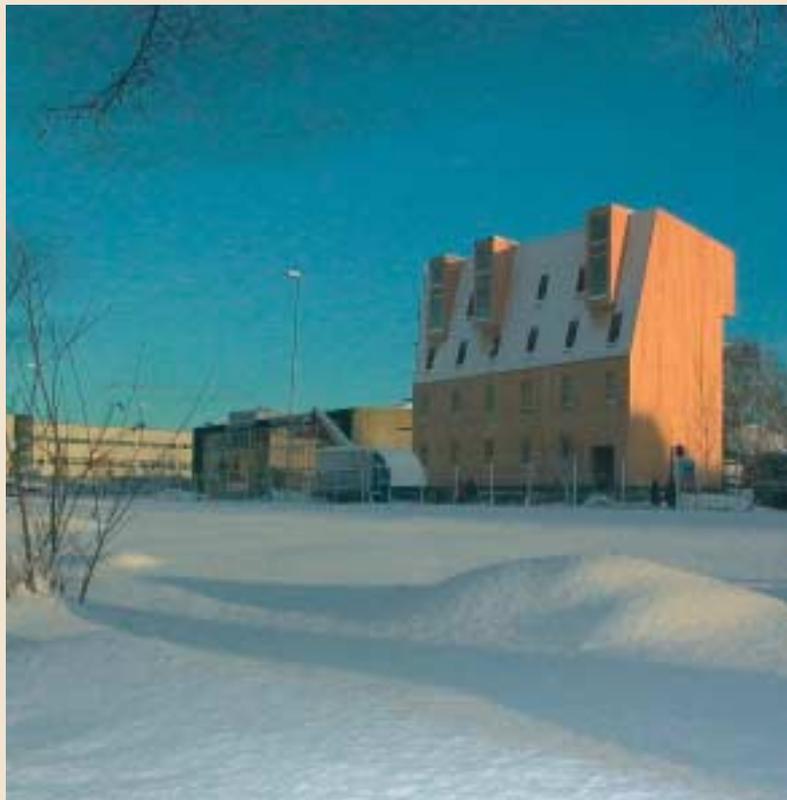


Photo: Brendeland and Kristoffersen AS

## Priority area 1: To enhance spatial efficiency and attention to biodiversity

More efficient use of space is an important means to reduce environmental impact in buildings and public works. Space-efficient buildings contribute to reducing energy needs and use of resources generally. Effective use of space includes densification of existing building zones, more effective use of existing space, and developing new building sites in a more effective and compact way. This makes it possible to avoid the development at pristine sites. Environmentally conscious localisation and planning are perhaps the largest contribution from the housing and building sector towards preserving important nature areas and qualities in and around existing settlements, and towards reducing the loss of biodiversity. Concentrating development along public transport corridors will also reduce the use of private cars and other polluting, energy intensive forms of transport.

Only 1.1 % of Norway's surface area is built up; however, built areas are often areas that would have had high biological value in their undisturbed state. Building land thus often conflicts with environmental goals for the maintenance of the variety of biotopes and landscapes which is essential to maintain the conditions for biodiversity.

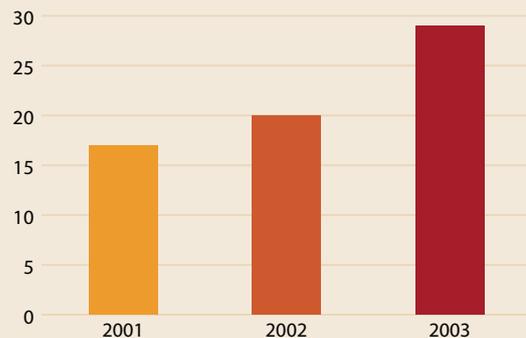
In order to improve the environmental quality of towns and settlements, St.m no.23 (2001-2002) states that the following must be ensured:

- densification and transformation must be of a high quality and neighbourhoods must be developed in a holistic perspective. In particular, traffic and pressures on green areas must be dealt with in an integrated way that ensures the maintenance of existing qualities at the same time as the need for renewal. There is a need for a concerted effort towards better care of the urban environment, public spaces, green areas and cultural landscapes.

Over the past few decades, natural environments in our urban settlements have been increasingly fragmented. Residual green areas are smaller, and many green corridors have been cut. This has negative effects on biodiversity, but also for playing, recreation, pedestrian and bicycle corridors. One cause is that these areas are not sufficiently protected, so that they are eroded by new building development and changes of zoning. A 1996 survey of four towns showed that of all the green areas existing in the 1950's, only 20-30% still exists today.

Building on green areas is still occurring on a haphazard basis. This accelerates fragmentation of the green structure and reduces accessibility to green areas. In addition, many green areas are poorly maintained.

**Figure 1:** Percentage of municipalities with a valid plan for biodiversity (Source: SSB 2004)



The most important tool for achieving a better environment and reducing the pressure on biodiversity in urban areas is the Planning and Building Act. How municipalities apply their planning and land development in practice is decisive for the maintenance of environmental qualities in the future. Most municipalities are by now in the process of, or have completed, the first round of registration of important local biodiversity zones. This information is published in Arealis, an internet system for spatial and planning data for municipalities and counties.

There are many signs that awareness regarding biodiversity is on the increase in the municipalities. As figure 1 shows, the number of municipalities having a biodiversity plan has grown sharply over the last three years from 17% in 2001 to 29% in 2003. Although there is no single trend, many of the plans appear to be made by the most populous municipalities.

National legislation promoting biodiversity is at present under revision. A particular aim is to strengthen the protection of qualities in nature. The Commission on the Planning Act delivered its report in 2003 (NOU 2003:14), and the Commission on the Building Act will deliver its report in summer 2005. New directives are being developed regarding Impact Analyses. In NOU 2004:28 the Biodiversity Commission proposed a completely new legislation on the preservation of nature, landscape and biodiversity. This covers both sustainable use, and protection of nature. It will replace the Nature Protection Act but will have a considerably broader focus. This law is intended to further the national goal of stopping the loss of biodiversity by 2010, and to maintain the biodiversity in the long term.



Priority area 2: To reduce energy consumption in the building stock		
Responsible	Working goals	Measures
FD – Forsvarsbygg 1.1	Biodiversity shall be registered in all properties managed by Forsvarsbygg, and a plan for monitoring shall be made and approved by the end of 2005	Implement procedures for registration and monitoring
FD – Forsvarsbygg and FD's military organisation 1.2	FD shall prevent disturbance of endangered species within the land it controls	Execute compensatory measures at priority FD sites that are important for biodiversity
FD – Forsvarsbygg and FD's military organisation 1.3	More resource efficient land use	Horizontal coordination between FDs primary and support activities shall reduce land requirements
KRD – BE 1.4	Reduce environmental and health impacts of construction activities	Develop a simplified method for environmental assessment of construction, to be formulated as a thematic guide in 2006
KRD – Husbanken 1.5	Increase the understanding of biodiversity in the building industry and municipalities	<ol style="list-style-type: none"> <li>1. Support development of densification principles and methods</li> <li>2. Disseminate experience and best practice by conferences, network information, brochures and other means</li> </ol>
KRD – MD 1.6	Develop dialogue with the largest towns on environmental issues in particular	Use the "Cities Forum" (Storbyforum) for dialogue on environmental issues.
MD 1.7	Strengthen the municipal plan as instrument for environmentally focused decision making	Conduct more regional guidance conferences (started in 2004)
MD – FD – KRD – MOD – UD 1.8	Avoid the use of tropical timber that is not sustainably produced, in order to protect global biodiversity	<ol style="list-style-type: none"> <li>1. Stimulate information measures, including the campaign led by the Rainforest Foundation (Regnskogfondet)</li> <li>2. Develop guidelines for use of tropical timber for public and private construction</li> </ol>
MD – KRD – MOD – Husbanken – Statsbygg – others 1.9	Support the work for better environment in towns and settlements	<ol style="list-style-type: none"> <li>1. Set up, continue and evaluate pilot projects for urban transformation, city management, environmental zones and sustainable transport</li> <li>2. Disseminate information from the pilot projects (<a href="http://www.odin.dep.no/md/planlegging/by/p30005022/bn.html">http://www.odin.dep.no/md/planlegging/by/p30005022/bn.html</a>)</li> </ol>
MD – KRD – KKD 1.10	Collaborate to achieve attractive towns in regions where environmental qualities are particularly important	<ol style="list-style-type: none"> <li>1. Conclude the towns program (Tettstedsprogrammet) in 2005 with follow-up and participation from 4 counties and 16 municipalities</li> <li>2. Disseminate experience from the program, a.o by development of an internet site</li> </ol>
MD 1.11	Encourage towns and settlements to make prioritised environmental efforts	Annual award of the Urban Environment prize (Bymiljøprisen)



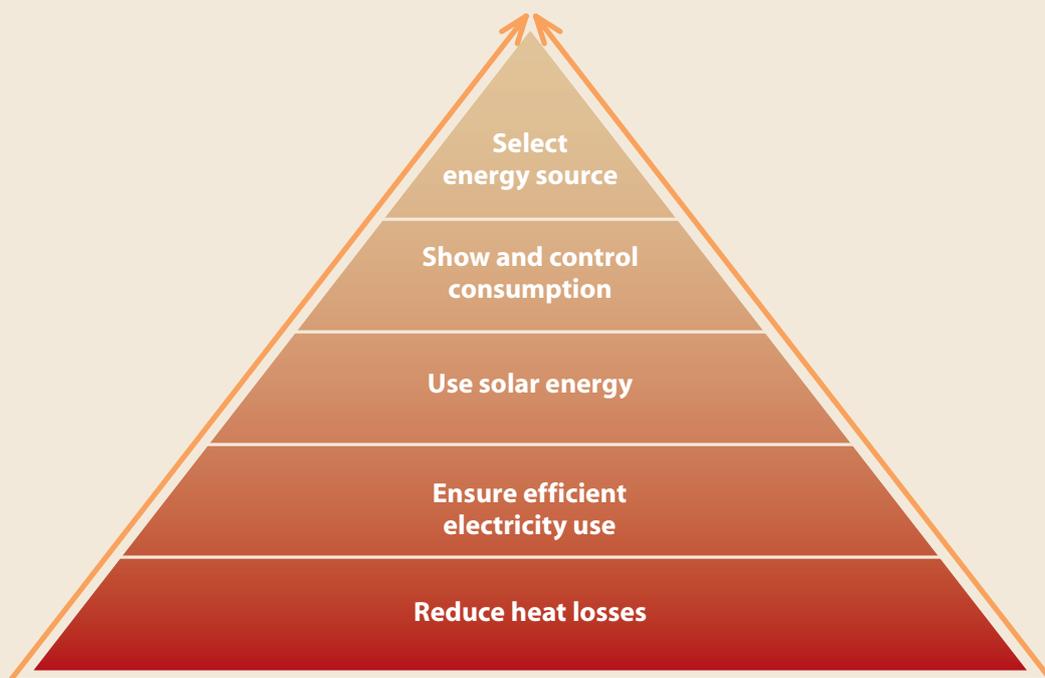
## Priority area 2: To reduce energy consumption in the building stock

Energy consumption causes various environmental impacts. These include climate gas emissions, acidification of groundwater and soils, degradation of nature, etc. In the future energy, in particular electricity, will become a more scarce and valuable commodity. It is therefore a political goal to reorganise the pattern of energy consumption in society (see Ministry of Oil and Energy, St.prp.no.1 (2004-2005)). These changes must be made in a way that is acceptable from a welfare point of

view. National goals have been formulated for changes in energy production and consumption amounting to 12 TWh by 2010. These are:

- to limit growth in energy demand considerably more than would otherwise be the case
- to use 4 TWh more water-borne heating based on new renewable energy, heat pumps and waste heat by 2010
- to construct 3 TWh of wind power by 2010

**Figure 2:** The “Kyoto pyramid” – passive energy design.



The most sustainable and environmentally friendly energy is energy which is not used. Passive energy design of buildings reduces the energy requirements to a minimum, following a hierarchy of priorities. The first priority is to reduce heat losses; the last priority is to select the environmentally best energy source and heating system, having reduced the need to typically 15-25 kWh per square metre per year. Figure 2 shows the Kyoto pyramid developed by Husbanken together with SINTEF and the Norwegian Building Research Institute.

Table 1 gives data for energy use in houses and commercial buildings. It shows that the total energy consumption in these buildings has risen from 76 to 82 TWh in the period 1998-2002. The biggest rise has been in commercial buildings, and this increase is mainly for other than heating purposes, whereas the increase in the case of housing is mainly for heating.

The average energy consumption per household in 2001 was just under 22,700 kWh. Electricity is the main energy source in households, with the average con-



sumption being 18,000 kWh. This is 79% of the total for the domestic sector.

Energy consumption varies greatly between different housing types and household categories. The average detached house uses about 27,450 kWh, of which 21,350 kWh (78%) is electricity. In apartment buildings consumption is less than half of this, about 12,000 kWh (of which 91% electricity). One main reason is that both the floor area and the number of persons are greater in detached houses than in apartments.

A study by the Western Norway Research Institute shows that in housing built after 1980, energy consumption per person is about the same for detached houses, terraced houses and apartment blocks. This is partly because of the differences in sizes of households, and also because the energy standard of houses has improved more than that of blocks.

Energy use for different types of buildings, measured in kWh per square metre per year, is shown in Figure 3.

**Table 1:** Energy consumption in Norwegian buildings in 1998 and 2002, TWh

	Total energy consumption		Total to space heating		Of which electric space heating	
	1998	2002	1998	2002	1998	2002
Housing	44	47	27	29.5	19	20.5
Commercial	32	35	18	18	13	12.5
Total	76	82	45	47.5	32	33

(source: NVEs byggsoperatør 2/99, SSB statistics, fact sheets OED and reports)

**Figure 3:** Average temperature corrected energy consumption in 2002 for the main building groups, kWh/m<sup>2</sup>

(source: Byggstudien 2003, Enova / SB: Energiforbruk per husholdning, 2001)





Priority area 2: To reduce energy use in the building		
Responsible	Working goals	Measures
FD – Forsvarsbygg 2.1	Reduce air pollution by conscious choice of energy sources	<ol style="list-style-type: none"> <li>1. From 2003, where possible alternative energy sources shall be used in new buildings and renovation.</li> <li>2. Forsvarsbygg shall apply energy conservation in its activities and actively use alternative and forward-looking energy solutions.</li> </ol>
KRD – BE 2.2	Reduce energy consumption below present requirements in new buildings and major renovation Contribute to a shift in heating from electricity to new renewable energies	<ol style="list-style-type: none"> <li>1. Support work on new methods of calculating energy needs</li> <li>2. Adopt international standards in 2005 for calculating the energy performance of buildings</li> <li>3. Introduce new requirements in the building regulations by January 2006</li> </ol>
KRD – BE 2.3	Reduce energy consumption in new leisure homes that have full housing standard	Evaluate whether energy requirements shall be introduced for such homes
KRD – Husbanken 2.4	Half of all new homes financed by Husbank shall by 2010 have reduced energy consumption by 50 per cent	<ol style="list-style-type: none"> <li>1. Conduct training and project initiation programs</li> <li>2. Develop, build and evaluate pilot projects</li> <li>3. Develop guidelines for consultants, planners and builders</li> <li>4. Initiate cooperation between actors in the housing and construction sector</li> <li>5. Develop and apply energy labelling of homes (cf. EU Directive)</li> <li>6. Introduce new criteria for Husbank mortgages</li> </ol>
KRD – Husbanken 2.5	Reduce energy consumption in existing housing	Initiate a project for analysis and combination of measures together with Enova, NBI and SINTEF
MD 2.6	Increased use of district heating plants and water borne heating	Consider changing the planning requirements in municipal plans and area plans, especially as regards infrastructures
MD 2.7	Increased focus on climate and energy parameters in municipal planning	Consider increased use of planning regulations to promote energy conscious plan solutions (cf. Commission on the Planning Act). Disseminate good practice.
MOD – Statsbygg 2.8.	In the period 2005-2009 Statsbygg shall reduce energy requirements and consumption in its buildings	<ol style="list-style-type: none"> <li>1. Implement measures ensuring that Statsbygg's buildings are designed with an average energy use of 180 kWh/m<sup>2</sup> on a temperature corrected basis. Specific and tailor-made energy goals shall be set for each building.</li> <li>2. Implement measures to reduce the temperature corrected energy use in Statsbygg's buildings by 7% in relation to the established benchmark of 210 kWh/m<sup>2</sup>.</li> <li>3. Complete skills programs in the following areas: energy consumption in technical facilities, energy conscious building location and design, calculation of energy use and energy budgeting, alternative heating systems, energy management, EU directive on energy in buildings.</li> </ol>
OED – Enova 2.9	Reduce energy requirements in existing buildings as well as public and private commercial buildings. Conversion from direct electric heating to other, environmentally sound energy carriers shall be quantified and be in addition to the demand side reductions.	Allocation of funding in 2005 from the Energy Fund through the investment program Energy Use – Existing Buildings



Priority area 2: To reduce energy use in the building		
Responsible	Working goals	Measures
OED – Enova 2.10	Reduce energy requirements below present requirements for new housing, offices, schools, health and other professional buildings Increase energy flexibility in new buildings	Allocation of funding in 2005 from the Energy Fund through the investment program New Buildings and Houses
OED – Enova 2.11	Stimulate the introduction of new technologies for energy use and renewable energy	Evaluate a new support program in the course of 2005
OED – Enova 2.12	Nationwide training and information on energy conservation and conversion	Answering service (telephone, internet and email) for professionals and the public. Training and courses.
OED – NVE 2.13	The EU Directive on energy efficiency in buildings shall be implemented in Norwegian law	<ol style="list-style-type: none"> <li>1. Coordinate governmental work on introduction of the Directive</li> <li>2. Introduce requirements for energy certificates for houses and buildings</li> <li>3. Introduce energy inspection of heating and cooling plants</li> <li>4. Set up certification systems for experts who can execute energy certification and energy inspection of boilers and ventilation systems</li> </ol>
OED – KR D 2.14	Successful and comprehensive implementation of the EU Directive on energy efficiency in buildings	<ol style="list-style-type: none"> <li>1. Evaluate the consequences of the EU Directive</li> </ol>

### Priority area 3: To document and reduce the use of hazardous substances in construction

It is a goal of the government that emissions and use of hazardous chemicals shall not lead to negative effects on health or on the productivity of the environment or its capacity for regeneration. Concentrations of the most hazardous chemicals in the environment shall be reduced to near background levels, and to near zero in the case of anthropogenic compounds (see St.meld. RM 2003).

The use of hazardous substances is widespread in construction and public works. Increased use of chemicals is largely related to patterns of production and use, i.e. lifestyle and consumption habits. We are surrounded by chemicals both at the workplace and in our space time. Emissions of some of the most dangerous chemicals have been significantly reduced since the mid 1980's; however there has also been a general increase in the use of chemicals, and new products containing hazardous chemicals are continually appearing on the market. In

Norway, there are around 8,000-10,000 substances contained in around 50,000 products. The average consumer will not however come into contact with all of these.

In recent years diffuse sources of pollution have become increasingly significant. Diffuse sources include for example emissions from polluted land, waste deposits, sewage works and products containing harmful substances. Consumer products are a major source of diffuse emissions. Such emissions are many, small and scattered, and the effects are considerable when seen as a whole.

The indoor climate in buildings is influenced by many factors, including materials used, technical and other products, ventilation systems, humidity and mould, asbestos, formaldehyde, interior furnishings, etc. Poor indoor climate is the cause of health problems for many people and has large socio-economic costs, due to sick leave, medical expenses etc.



## Kvadraturen school, Kristiansand

**Architect:** CUBUS architects AS

**Client:** Vest Agder County

*The project, which was completed in January 2004, involved renewal of an existing school, and a large part of the old buildings was demolished and replaced. Indoor climate and energy conservation were two main themes addressed. Four environmental areas were defined: environmental project management, indoor environment, resource use and outdoor environment. Indoor climate measures include hybrid ventilation, environmentally friendly materials, daylight, and design for easy cleaning and maintenance. The hybrid ventilation system is calculated to give 7% lower running costs than a conventional system. Energy costs are reduced by about 40%. These calculations are based on energy prices in October 2001. A goal of the project has been that no materials shall be used which are on the "Red list" of the Norwegian Pollution Control Authority (SFT). Building materials should be easy to re-use, and should as far as possible include recycled materials; other qualities sought for materials were low resource use and embodied energy, low emissions and wastes, and good worker environment characteristics.*



Photo: Arkitektgruppen CUBUS AS

The authorities have developed lists of the most hazardous substances. For many of these substances there is a stated timetable for when emissions are to stop completely or be greatly reduced. These chemicals are on a priority list. The environmental authorities in particular are working to reduce emissions and use of these and have developed specific action plans for several of them.

Many other substances and groups of substances have been placed on a Red list (Obs-liste). These are substances that are seen to represent a serious problem at the national level. The list is a warning sign to industry that these substances should be phased out. The authorities will monitor how their use develops over time, and can consider further action depending on the risk

they represent if their use does not decline.

The Pollution Act and the Product Control Act regulate the handling of chemicals, with the goal of protecting the outdoor environment. The law states that all pollution is in principle forbidden, and that permits must be obtained for any polluting activity. Concessions given to industry are based on the Pollution Act. The Product Control Act shall prevent products from having negative health and environmental effects, and regulations regarding particular substances and compounds are based on this law. An obligation to substitute – that is, to replace hazardous substances with better alternatives – was introduced on 1st January 2000.



Priority area 3: Document and reduce the use of hazardous substances in construction		
Responsible	Working goals	Measures
FD – Forsvarsbygg and FD's military organisation 3.1	Defence activities shall not produce emissions of hazardous chemicals that reduce nature's capacity for productivity and regeneration. Concentrations of hazardous chemicals on FD controlled sites shall be reduced down to background levels.	Environmental considerations shall be prioritised in decisions regarding product choices for properties, buildings and installations, and shall also be given a high priority during disposal and demolition
KRD – BE 3.2	Encourage the use of environmental declarations that comply with official requirements for all building products	<ol style="list-style-type: none"> <li>1. Follow up the Building Products Directive's basic requirement no.3 regarding hygiene, health and environment</li> <li>2. Specify which environmental characteristics must be documented during construction processes in order to comply with the technical regulations of the Building Code.</li> <li>3. Strengthen the control of building products with particular focus on declarations.</li> <li>4. Provide information in articles, lectures etc.</li> </ol>
KRD – BE – Husbanken 3.3	Make it easier to choose environmentally sound products in the planning of building projects.	Support or contribute towards development of simple and user-friendly methods for documenting the environmental profile of building products.
KRD – BE 3.4	Phase out hazardous substances (cf. time lines mentioned in 3.11)	Cooperate with SFT and materials distributors towards substitution of bromide flame retardants used in insulation materials and EE products
KRD – BE 3.5	The construction and real estate sector shall have adequate knowledge regarding indoor climate	<ol style="list-style-type: none"> <li>1. Updating during the first half of 2006 of the educational material of the Buildings and Health (Hus og Helse) program</li> <li>2. Contribute to efforts to ensure that the sector uses products that have environmental declarations, through information etc.</li> </ol>
KRD – BE – Food Authorities, etc 3.6	Reduce health risks posed by construction materials in contact with drinking water	<ol style="list-style-type: none"> <li>1. Participate in the work of the EU Commission aimed at developing the European Acceptance Scheme (EAS), and inform and prepare the sector in Norway prior to its implementation.</li> <li>2. Develop requirements for water mains prior to the implementation of EAS</li> </ol>
KRD – Husbanken 3.7	Participate in ensuring that new building and renovation projects incorporate environmental considerations	Consider attaching environmental assessment tools to Husbanken's financing conditions.
KRD – Husbanken 3.8	Create more interest for environmentally healthy materials	Contribute to more exemplar projects that focus particularly on healthy materials
MD – SFT – KRD – others 3.9	Increase the use of traditional, proven and durable materials	Cooperate with ministries and their subsidiaries to increase information on materials, increase knowledge and research in the field and consider test projects with various products (product development)
MD – SFT 3.10	Ensure that serious pollution of soils, water and sediments is not caused by historical activities, incorrect waste handling etc.	Follow up the new regulations of 05.04.2004 requiring decontamination of polluted sites during construction and excavation works.



Priority area 3: Document and reduce the use of hazardous substances in construction		
Responsible	Working goals	Measures
MD – SFT 3.11	Emissions of specific toxins (see table 8.1 in St.m 25 (2002-2003) shall be halted or reduced considerably by 2000, 2005 and 2010 Emissions and use of chemicals which pose a serious environmental and health threat shall be continuously reduced aiming at a complete halt within a generation, i.e. by 2020 The risks of emissions and use of hazardous chemicals shall be reduced considerably.	<ol style="list-style-type: none"> <li>1. Follow up the Action Plans on PCBs and brominated flame retardants</li> <li>2. Follow up the prescribed obligation of importers and manufacturers to participate in the system for waste delivery of insulating windows containing PCBs.</li> <li>3. Follow up the requirement for condensers containing PCBs to be phased out by 01.01.2005 (the time limit may be extended by 3 years under special conditions)</li> <li>4. Follow up the ban on the brominated flame retardants octa-BDE and penta-BDE, and consider a similar ban on deca-BDE.</li> <li>5. Follow up on the chemicals on the OBS-list</li> <li>6. Improve knowledge on how to conduct environmentally conscious decontamination of buildings, including guidebooks and training.</li> </ol>
MOD – Statsbygg 3.12	In the period 2005-2009 Statsbygg shall limit environmental impacts through its selection of materials and products	<ol style="list-style-type: none"> <li>1. Implement measures to evaluate the need for demolition and prevent incorrect disposal of hazardous waste stemming from demolition, alteration and renovation of buildings</li> <li>2. Implement measures on the downstream side of Statsbygg's construction projects in order to achieve average wastes of 25 kg per gross square metre for new buildings, excluding demolition and excavation, and 60% separation at source of wastes, including demolition.</li> <li>3. Implement capacity building activities within the areas: environmental criteria in selecting building materials, design of buildings, selection of materials and dampness; traditional building materials; hazardous substance in building materials; obligatory substitution; file on substances.</li> </ol>

#### Priority area 4: To reduce construction waste and increase recycling / re-use of materials

Waste is considered by many to be one of the main environmental challenges we face today. Waste can cause serious pollution as well as undesirable degradation of the landscape. Reducing the quantities of waste produced, as well as increased recycling, is therefore important. Without increased recycling and re-use, there will be increased pressure on scarce resources. The policy of the government is that quantities of waste produced shall grow at a significantly lower rate than economic growth (see St.meld. no.25, (2002-2003)). The quantity of waste sent to waste deposits shall be no more than about 25% of all waste by the year 2010.

Particular efforts are to be made in the construction sector, ensuring that all wastes are properly handled and treated. Waste production over the lifetime of buildings shall be reduced by 10% by 2010. Waste per square metre of new buildings shall be halved by 2010 compared to the 2005-average.

Waste from construction and public works comprises one of the main waste emissions in society. There are many categories of waste including considerable amounts of hazardous waste and EE (electric and electronics) waste that cause many environmental problems. Statistics Norway ([www.ssb.no](http://www.ssb.no)) estimates the total



wastes generated from construction and public works industries to approximately one million tons annually, excluding clean fractions and excavations. Since a large part of this is hazardous waste, it is a major challenge to ensure that it is processed in an environmentally sound way, and that best possible use is made of the resources which waste represents.

Through the Pollution Act, municipalities have been assigned authority to require waste and environmental demolition plans from the responsible party in all construction, demolition and renovation projects which are

subject to permits under the Planning and Building Act para.93 and which exceed 400 square metres gross area. The aim of this is to prevent illegal dumping of hazardous wastes as well as to ensure that other wastes are delivered to licensed waste handling centres. By autumn 2003 30 municipalities had adopted such regulations.

The main actors in the industry have set up a network to follow up the Norwegian Action Plan for Wastes that was presented in 2001 with support from the Ecobuild program.

## The Pilestredet Park – Stensberggaten housing condominium

**Architects:** GASA AS and Lund og Slaatto architects AS

**Client:** Pilestredet Park Boligutbygging AS (collaboration between Skanska bolig AS and OBOS nye hjem)

**Project leadership:** Statsbygg

*The Pilestredet Park development is one of the largest urban ecology projects in Scandinavia. Statsbygg and the City of Oslo have had ambitious goals. An environmental action plan (MOP) for the development was formulated, which obliges builders to develop the area according to urban ecology principles and to document achievement of the targets set.*

*Very positive experience has been gained from the program for environmentally friendly demolition of the old National Hospital buildings on the site. Statsbygg's environmental plan aimed for 90% recycling / re-use of the 98,200 tons of demolition materials. Final results achieved were 96,600 tons which is 98,4%. One of the reasons is that all the buildings were constructed of heavy materials that lend themselves well to recycling or re-use.*



Photo:GASA architects AS



**Priority area 4: To reduce construction waste and increase recycling / re-use of materials**

Responsible	Working goals	Measures
FD – Forsvarsbygg and FD's military organisation 4.1	Defence shall ensure that all waste is reduced to a minimum, in particular the proportion delivered to combustion or waste disposal	<ol style="list-style-type: none"> <li>1. Efforts shall be made to further reduce the quantity of wastes generated by normal operations, compared to budget ambitions</li> <li>2. From 2005, all construction shall be designed in such manner that the quantities of waste delivered to waste disposal from demolition operations are reduced to half of the 1998 level (31 kg/m<sup>2</sup>).</li> <li>3. Materials shall be selected on the basis of documented life cycle analysis and, where relevant, environmental labelling.</li> </ol>
FD – Forsvarsbygg 4.2	All hazardous waste shall receive proper treatment by the end of 2006	Establish procedures for handling hazardous wastes and delivery of sorted fractions
FD – Forsvarsbygg – FD's military operations 4.3	By the end of 2010 the amount of waste delivered to disposal shall not exceed 25% of total generated wastes	Sorting at source following NS 9431 to be introduced at all locations
KRD – BE 4.4	Construction related wastes for the total life cycle shall be reduced by 2010	<ol style="list-style-type: none"> <li>1. Develop standards for specifying the durability of products</li> <li>2. Promote choice of high quality, durable products, for example by contributing to the establishment of declaration systems for building products where lifetime/durability are specified, and by developing guidelines for the prevention of damage from humidity</li> <li>3. Contribute with information on how the lifetime of buildings can be extended, including development of guidelines, together with the Cultural Heritage authorities, as regards preservation and renovation of the existing building stock.</li> </ol>
KRD – BE 4.5	Increased use of waste substances in the manufacture of building products	1. Stimulate use of, amongst other materials, recycled concrete as raw material
KRD – BE 4.6	Quantities of waste per square metre of new building shall by 2010 be reduced compared to the level in 2005.	<ol style="list-style-type: none"> <li>1. Promote prefabricated solutions</li> <li>2. Evaluate introducing governmental requirements for waste plans in the building regulations</li> </ol>
KRD – BE 4.7	75% of all construction waste shall be recycled (re-used, recycled to new material or combusted) by 2010 (cf. MD's national goals for waste)	<ol style="list-style-type: none"> <li>1. Consider introducing governmental requirements for waste plans into the building regulations</li> <li>2. Evaluate how building regulations can be formulated so as to promote recycling.</li> </ol>
KRD – BE 4.8	Ensure separation and responsible handling of hazardous wastes	Consider introducing obligatory labelling for new building materials with information as to harmful substances they contain in order to facilitate their identification during subsequent decontamination and demolition
KRD – Husbanken 4.9	Contribute towards increased recycling / re-use of construction wastes	Support seminars and dissemination of guidelines



Priority area 4: To reduce construction waste and increase recycling / re-use of materials		
Responsible	Working goals	Measures
MD – Cultural Heritage authority and others 4.10	Preserve cultural heritage by constructive use and development of existing buildings and by re-use of demolition materials	Focus on information and awareness building
MD – SFT 4.11	Future production shall generate less waste. Increase the efforts to reduce construction related wastes and ensure appropriate treatment	<ol style="list-style-type: none"> <li>1. Consider new strategies regarding bio-degradable waste</li> <li>2. Consider a ban on disposal of bio-degradable wastes in order to stimulate recycling</li> <li>3. Consider increasing the efforts made to ensure that more municipalities endorse the voluntary agreement on building wastes</li> <li>4. Consider whether the voluntary municipal directive requiring waste and demolition plans in all building permit applications should be made obligatory for all municipalities</li> </ol>
MD – SFT 4.12	By 2010 the proportion of wastes delivered to waste disposal shall be about 25%	<p>Follow up measures stimulating increased recycling and reduced waste depositing, including:</p> <ul style="list-style-type: none"> <li>· the tax on deposited waste</li> <li>· stricter requirements for waste deposits</li> <li>· evaluate how the treatment of degradable waste can be shifted from deposit to other forms of treatment</li> </ul>
MD – SFT 4.13	Hazardous waste shall be responsibly handled and shall either be sent to recycling or be assured sufficient national treatment capacity	Follow up the new strategy for collection of hazardous waste, which includes wastes generated in the construction and public works sector.
MOD – Statsbygg 4.14	Statsbygg shall in the period 2005-2009 reduce the environmental impact of its waste production and treatment.	<ol style="list-style-type: none"> <li>1. Implement measures to evaluate demolition requirements and prevent incorrect disposal of hazardous wastes from demolition and renovation works</li> <li>2. Implement measures on the downstream side of Statsbygg's construction projects in order to achieve <ul style="list-style-type: none"> <li>· average wastes of 25 kg per gross square metre for new buildings, excluding demolition and excavation,</li> <li>· 60% separation at source of wastes, including demolition.</li> </ul> </li> <li>3. Implement skills enhancement programs on re-use of materials, recycling of heavy fractions) waste accounting, evaluation of demolition needs and environmentally friendly demolition.</li> </ol>



## Priority area 5: To focus on high quality and good building and environmental design

Quality in the built environment comprises a range of aspects:

- Health, environment and safety, indoor climate and wellbeing
- Functional considerations
- Accessibility; universal design
- Good building and environmental design

The original reasons for regulating construction qualities were related to health and welfare. Health, safety and environment are still the most important grounds for regulating important aspects and details in the built environment. Building regulations and related legislation set fundamental requirements to ensure good quality in the planning, design and execution of buildings. Application and planning procedures in the municipalities pose important conditions as to how these qualities are to be achieved in practice. The building permit procedures also aims to prevent construction errors and ensure good functional qualities as well as ease of maintenance of buildings. The building sector seen as a whole involves many actors, both public and private; there is consequently a need for periodic updating of legislation,

clear instructions, and efficient information flows if one is to achieve the considerable potential for an improved environment which the sector represents.

In the case of both new construction and renovation, functional considerations are normally decided by the client. Laws and regulations contain a number of requirements regarding functionality, but these are not detailed requirements. At times more specific requirements have been made, for example minimum standards for housing financed by Husbanken. However, the state has in principle moved away from detailed rules and regulations towards broader based control through general frameworks. It is now a premise that the planning procedures of the municipalities shall ensure functional quality, whatever the source of finance.

However, when analysing the building stock as a whole there are areas where the actual development does not sufficiently comply with the functional requirements. One example is the case of elderly people who keep on living in oversized and unsuitable housing because the market is not providing enough suitable dwelling units with better accessibility.

### The Government Action Plan for universal design

In November 2004 the government presented a five year Action Plan to promote accessibility for persons with reduced functional capacity in various parts of society (Ministry of Labour and Social Affairs and Ministry of the Environment, see [www.universell-utforming.miljo.no](http://www.universell-utforming.miljo.no)). This Action Plan is based on the principle of sector responsibility. It contains almost 100 measures, and financial incentives will be allotted annually to the plan. Within the housing and construction sector, the strategy of universal design is defined as a key principle to ensure accessibility for all in a larger proportion of the building stock. This is to be achieved through

revision of the relevant economic and legal instruments and through increased information and expertise.

The role of the State Housing Bank and the National Office of Building Technology and Administration as resource centres for municipalities and the construction sector is to be strengthened. These bodies will amongst other things develop various information and skills enhancement programs for central actors in the various stages of the building process. These measures will increase skills, awareness and understanding of universal design as a quality principle in construction.



## Georgernes verft, Bergen

**Architect:** Rambøll AS

**Client:** Bergen og omegn boligbyggelag (BOB)

**Main contractors:** Veidekke ASA, Hans Helgesen and sons AS, Arne Wikholm AS

*Georgernes verft is a waterfront housing development on a former marine industrial site in the centre of Bergen. There are 10 blocks of flats from 4 to 6 storeys, with a continuous parking garage beneath the buildings, and a total of 151 apartments of average size 90 square metres. The project has focused on environmental solutions which are thought to be attractive to buyers i.e. which are economical and increase living quality.*



Photo: Pål Hoff

Husbanken has been given the task of being a national centre for good building and environmental design. Good building and environmental design create a built environment where considerations of physical and social living quality, use of resources and energy, universal design and aesthetics combine within a local whole. The work with good building and environmental design shall cover all types of buildings that are important in daily life. Aesthetics and local identity are important dimensions of this, as is adaptation to local natural conditions, cultural heritage and cultural environment. A key goal for Husbanken's work with quality and good build-

ing and environmental design is to ensure functional house plans and housing areas, with sufficient variety of housing types providing effective use of resources both in the short and long term. The physical frameworks shall provide a good basis for local identity, community, privacy, wellbeing and health.

The challenge for both private and public sectors is to stimulate increased supply as well as demand for these criteria of excellence and environmental quality. Information and awareness raising will be important means towards achieving this.



Priority area 5: To focus on high quality and good building style in the built environment		
Responsible	Working goals	Measures
FD – Forsvarsbygg 5.1	Forsvarsbygg aims to ensure good architecture and engineering in Norway by promoting and rewarding excellence in building style.	Annual Forsvarsbygg building award for good architecture and engineering
KRD – BE 5.2	Contribute towards better quality in buildings through appropriate requirements and good building processes	<ol style="list-style-type: none"> <li>1. Consider whether existing building permit procedures contribute sufficiently to good quality</li> <li>2. Support research and development in the field of building quality</li> <li>3. Information activities, for example thematic guidebooks on spatial utilisation and on existing buildings (collaboration with RA), articles, lectures etc.</li> </ol>
KRD – Husbanken – others 5.3	Change attitudes, promote awareness and enhance relevant skills regarding good building and environmental design	<ol style="list-style-type: none"> <li>1. Annual National award for Good Building and Environmental Design. (Byggeskikkprisen)</li> <li>2. Further development of the good building and environmental design training program (courses, internet modules, regional seminars etc) in collaboration with relevant parties</li> <li>3. Strengthen information on good building and environmental design through news, articles and internet information</li> <li>4. Collaborate with other institutions and enterprises to develop new knowledge and implement learning packages</li> <li>5. Promote increased use of design competitions</li> <li>6. Support pilot projects on good building and environmental design</li> <li>7. Support R&amp;D projects that contribute towards good quality and which evaluate measures that have been implemented</li> </ol>
KRD – MD 5.4	Develop positive dialogue on environmental quality with the largest towns (cf. Priority area 1)	Use the Storbyforum for dialogue on environment
MD 5.5	Stimulate environmental efforts in towns and settlements (cf. Priority area 1)	Annual Urban Environment prize
MD 5.6	Increase user participation with a focus on quality and building excellence	Develop open planning competitions, good building and environmental design as part of the area planning process, and disseminate this through regional meetings and seminars
MD 5.7	Good quality in housing areas including communal spaces	Encourage active use of the planning regulations to set clearer standards for quality
MD and others 5.8	New uses for existing buildings	Focus on education regarding good materials, traditional crafts and proven building methods
MD – KRD – MOD – SD – Husbanken – Statsbygg 5.9	Strengthen the work towards better environment in towns and settlements (cf. Priority area 1)	<ol style="list-style-type: none"> <li>1. Set up, execute and evaluate pilot projects for urban transformation, city management, environmental zones and sustainable transport</li> <li>2. Disseminate information from the pilot projects (<a href="http://www.odin.dep.no/md/planlegging/by/p30005022/bn.html">http://www.odin.dep.no/md/planlegging/by/p30005022/bn.html</a>)</li> </ol>



Priority area 5: To focus on high quality and good building style in the built environment		
Responsible	Working goals	Measures
MD – KR D – KKD 5.10	Promote attractive towns in the regions (cf. Priority area 1)	1. Conclude the towns program (Tettstedsprogrammet) in 2005 with follow-up from 4 counties and 16 municipalities 2. Disseminate experience from the program, including through the internet site <a href="http://www.tettsteder.no">http://www.tettsteder.no</a>
MOD – Statsbygg 5.11	Improved management of Statsbygg's cultural properties	Make management plans for properties which are subject to cultural heritage protection

### Priority area 6: To ensure environmentally sound building management and maintenance

In 2004, the total turnover of the construction and public works sector was 150 billion NOK, of which three quarters was construction activities. This turnover, which grew by about 8% in the course of the year, comprises a very large part of total national investments. A considerable part is renovation of existing buildings. Buildings also provide the physical frameworks that affect both

people and environment for decades. By ensuring environmental quality in construction we can thus reduce environmental impacts and improve the quality of life for coming generations. By deliberately prioritising quality and flexibility, building clients can also reduce lifetime operational costs.

### Telenor Kokstad

**Architect:** Pedersen / Ege AS and Bjerk and Bjørge architects  
**Client:** Telenor Eiendom

*Telenor's new building at Kokstad outside Bergen was planned according to the ambitions set up in Telenor's environmental handbook. It describes in detail the goals the company sets itself with regards to environmental control, indoor climate, air quality, materials and products procurement, waste management, outdoor environment and, perhaps most of all, energy management. It has been the intention that the Telenor centre at Kokstad should be a model for state of the art environmental and energy strategy.*



Photo: Øystein Klakegg



In October 2004 the Commission on Management of Real Estate submitted NOU 2004:22 entitled “Well maintained buildings give more to everyone. Property management in the municipal sector.” Background studies carried out in this context demonstrates that poor maintenance of buildings can be extremely costly. This is of course also true for buildings owned by others. Proposals for follow up of the Commission’s work were presented in the Budgetary Proposition for the municipal sector for 2005.

Property management is not defined as a public task, with the exception of the state’s own properties.

The main state actors Statsbygg and Forsvarsbygg have elaborated their own plans for sustainable construction and building operation. According to the Building Act, requirements may be posed as regards maintenance of buildings, but this clause is related to special conditions about health, environment, safety and accessibility. General requirements for maintenance and upgrading are the responsibility of building owners. For this reason, state instruments for stimulating better maintenance and upgrading are mainly limited to information, support to skills programs and dissemination of knowledge

Priority area 6: To ensure environmentally sound building management and maintenance		
Responsible	Working goals	Measures
FD – Forsvarsbygg 6.1	Prevent or strictly limit any environmental impacts arising from the production, procurement, operation and disposal of the Defence sector’s properties, buildings and installations	Forsvarsbygg shall manage its properties in an environmentally conscious way. Environmental considerations shall be an integrated part of all Forsvarsbygg’s activity
KRD 6.2	Stimulate well planned, cost effective and value-conserving operating, maintenance and development of the municipal and county building stock	<ol style="list-style-type: none"> <li>1. Consider changes to building regulations that are relevant for operation and maintenance, including: obligations on upgrading and maintenance, requirements for survey reports, upkeep and control, complaints procedures, requirements for maintenance plans and calculation of annual costs, requirements for secure documentation about buildings.</li> <li>2. Strengthen skills in the municipalities regarding building management and maintenance.</li> </ol>
KRD 6.3	Stimulate appropriate organisation of municipal property management	<ol style="list-style-type: none"> <li>1. Disseminate information on good organisation models for municipal property through the magazine Kommunalnytt, Kostra, etc</li> <li>2. Stimulate skills development in the municipalities in this field through courses, CPD etc.</li> <li>3. Consider whether an R&amp;D program on property management should be initiated.</li> </ol>
KRD 6.4	Increase awareness about well planned maintenance and renewal of municipal buildings.	Consider legislative changes to ensure that municipal goals and strategies for property management shall be included in their planning documents



Satsingsområde 6: Stimulere bygging, forvaltning, drift og vedlikehold		
Responsible	Working goals	Measures
KRD 6.5	Better enable municipalities to manage property on the basis of life cycle considerations.	<ol style="list-style-type: none"> <li>1. Consider changes in the municipalities' legislation to ensure that enterprises whose function it is to manage municipal and county properties, shall follow the general legislation on accounting (statements on economic life-span for permanent assets, the value of rental agreements, conditions of depreciation, accruals etc.)</li> <li>2. Consider applying Norwegian Standard (NS 3454 Life Cycle Costing for Buildings) in the mandatory accounting of the municipalities (the KOSTRA system)</li> </ol>
KRD 6.6	Raise awareness in municipalities on the real costs of municipal spaces and sites	Set up an expert group with representatives from both the state and the municipal sector to develop a system for internal rents.
KRD – BE – Husbanken 6.7	Increase skills regarding environmentally effective building and operation and stimulate environmental choices amongst actors in the housing and construction sector	<ol style="list-style-type: none"> <li>1. Support a five year program (2005-2009) for environmental measures in the construction, public works and property sector</li> <li>2. Promote cooperation, skills development and exchange of information between public and private actors in the housing and construction sector</li> </ol>
KRD – Husbanken – BE 6.8	Contribute towards increased focus on life cycle costs	<ol style="list-style-type: none"> <li>1. Support development and dissemination of knowledge and models for evaluating life cycle costs</li> <li>2. Support research-based education and resource centres that focus on change in the built environment and life cycle perspectives.</li> </ol>
KRD – KKD – RA – Husbanken 6.9	Strengthen the maintenance and upkeep of church buildings	Set up a system of compensation to municipalities for financial costs incurred in connection with improvements to churches. To be administered by Husbanken.
KRD – UFD 6.10	Promote good quality in schools buildings	A system has been set up for compensation to municipalities for financial costs incurred in connection with new construction and improvements to schools. It is administered by Husbanken
MD 6.11	Strengthen knowledge in the field of environmental policy	<ol style="list-style-type: none"> <li>1. Encourage awareness of and use of the internet site "Environmental State of Norway" (Miljøstatus i Norge)</li> <li>2. Follow up the Environmental Information Act that was passed in 2004.</li> </ol>
MD and MD subsidiaries 6.12	Reduce quantities of waste produced, by better use and maintenance of the building stock	Support research to develop methods for maintenance, renovation and re-use as alternatives to demolition and replacement.
MOD – Statsbygg 6.13	Systematic environmental management of planning and building processes, operation and maintenance of Statsbygg's buildings	In the course of 2006 Statsbygg shall implement an environmental management system in accordance with NS-EN ISO 14001:96.



## 4. EU DIRECTIVES

### OF RELEVANCE TO ENVIRONMENTAL ASPECTS OF HOUSING AND CONSTRUCTION

- **Directive on Building Products**, 89/106/EØF  
Pose basic requirements regarding health, hygiene and environment. Follow up of the directive should stimulate more environmental declarations for building products and increased use of such products.
- **Directive on Drinking Water**, 98/83/EF  
Ensure that materials used in water supply systems do not emit substances that do not fulfil requirements for health, hygiene and the environment.
- **Directive on Buildings**, 2002/91/EF  
The purpose is to improve energy use in buildings. The background is that there is a large potential for increased energy efficiency in the building sector which can contribute both to reduced climate gas emissions and increased security of supply.
- **Directive on Heat Producing Units for Space Heating and Hot Water Boilers**, 78/170/EØF  
Regulate the performance of heat producing equipment that is used for heating and production of hot water, as well as insulation of piping for heating and hot water. The goal is energy savings that will be achieved over time as new equipment is installed.
- **Directive on Hot Water Boilers**, 92/42/EØF and supplementary directive 93/68/EØF  
Contain efficiency requirements for new hot water boilers using liquid or gaseous fuels, in order to promote energy efficiency.
- **Directive on Noise**, 2002/47/EF  
Comprise requirements for noise both in and outside buildings, with the aim of preventing and reducing negative impacts from noise.
- **Directive on Evaluation of Environmental Impacts of Certain Plans and Programs**, 2001/42/EF  
Pose requirements for environmental impact assessment of general plans that create premises for construction, and area plans that may have significant consequences for environment, nature or society.
- **Directive on Impact Assessment**, 85/337/EØF, as modified in 97/11/EF  
Concerns environmental impact evaluation of certain public and private projects. It imposes requirements for evaluation of the environmental effects of public and private projects that have a probability of significant environmental impacts.
- **Directive on Environmental Information**, 313/1990/EØF  
Give all citizens the right to environmental information from both public and private enterprises regarding matters that have significant environmental consequences.
- **Directives on Waste**  
Pose technical and environmental requirements regarding treatment of waste as well as knowledge about hazardous properties of wastes. See the Directive on Waste Deposits 1999/31/EF and Directive on Combustion 94/67/EF, as well as Directive on Special Waste 91/689/EØF and Directive on Waste 75/442/EØF.
- **RES-Directive** 2001/77/EF  
Directive on promotion of renewable energy in the internal electricity market. Its goal is to increase consumption of renewable electricity following specific targets. A transition to renewable energy reduces climate gas emissions. The directive is based on the climate strategy of the EU.



- **Directive on Cogeneration of heat and power**, 2004/8/EF with amendments of 92/42/EØF  
Promotes cogeneration based on useful heat demand in the internal market. The aim is to improve energy efficiency and security of supply by promoting high efficiency combined heat and power (CHP) production. Implies a potential for increased energy efficiency, reduced emissions, reduced net losses and increased security of supply. Energy efficiency increases considerably with CHP wherever this replaces separate production of heat and power.
  - **Directive on Water**, 2000/60/EF  
Cover freshwater and coastal areas. Its aim is to protect, preserve and improve water quality. The goal is that all water sources shall by 2015 fulfil environmental targets relating to pollution and biodiversity.
  - **Directive on Waste Water**, 91/271/EØF with amendments 98/15/EF  
Give environmental requirements for the waste water sector, including regarding treatment of sewage water.
  - **Four Directives on Chemicals**, 67/548/EØF, 99/45/EF, 76/769/EØF, 92/32/EØF  
Give regulations as to how chemicals shall be registered, risk assessed, classified and declared, and on how the use of chemicals is restricted or forbidden.
  - **Directive on Quotas**, 96/61/EF  
Provide the basis for the introduction in the EU of a quota system for climate gases. The aim is to achieve emission reductions in a cost effective manner.
  - **Directive on VOC in Paints and Varnishes**, 2004/42/EF  
Supplements Directive 1999/13/EF limiting emissions of volatile organic compounds (VOC's) originating from the use of organic solvents, and aims to achieve lower levels of solvents in these products.
  - **Directive on Public Procurement**, 2004/18/EF  
Environmental protection requirements are built into directives on public procurement. Authorities can through their procurement contribute to environmental protection and sustainable development. This directive concerns harmonisation of procedures to be followed in public procurement, public service and public building and works contracts.
  - **Directive on Discarded Electrical and Electronic Products**, 2002/96/EF  
Impose on manufacturers and importers the responsibility for financing and collection of past EE waste.
  - **Directive on Household Appliances**, 92/75/EØF  
Cover the energy and resource use of household appliances by means of labelling and standardised product information. Appliances must be labelled with information on the product's consumption of energy and other key resources. The goal is for consumers to make more energy efficient choices and thus promote energy savings.
- ### EU-directives being processed
- **Proposed Directive on energy services**  
Relate to effective end-use of energy and energy services. Shall contribute to the reduction of climate emissions and to the increased security of energy provisions. The purpose is to improve the market for energy efficiency in the end-use of electricity by removing barriers for this, mainly through the reduction and market imperfections.
  - **Proposed Directive on Infrastructure for Geographical Information – INSPIRE**  
This directive will provide a legal framework for geographical information. The proposal focuses on requirements in the field of environmental policy, but by providing a general geographical infrastructure it can also be utilised in other fields.
  - **Proposed Directive on Chemicals – REACH**  
Amongst other features this requires industry to provide fundamental information regarding the health and environmental effects of chemicals – a requirement which does not exist today. The directive will replace over 40 existing directives and statutes.
  - **Proposed Directive on Persistent Organic Compounds**  
Regulate production, distribution, use, emissions and disposal of substances covered by the global Stockholm Convention on persistent organic compounds (POP) and the ECE POPs protocol under the convention on long distance cross-boundary air pollution. Amongst other things the directive bans recycling/re-use of POP waste, and requires quantitative reporting for PCBs.
  - **Proposed Directive on Ecodesign**  
Concern the framework for “ecodesign” requirements for energy consuming equipment. The background is that manufacture, distribution and disposal of energy consuming equipment has considerable environmental impacts.

## 5. USEFUL LINKS: AGENCIES AND THEIR INTERNET ADDRESSES

Agency:	Internet address:
<b>Public</b>	
Ministry of Defence · The Directorate of Defence Buildings (Forsvarsbygg)	<a href="http://www.fd.dep.no">www.fd.dep.no</a> · <a href="http://www.forsvarsbygg.no">www.forsvarsbygg.no</a>
Ministry of Local Government and Regional Development · State Housing Bank (Husbanken) · National Office of Building Technology and Administration	<a href="http://www.krd.dep.no">www.krd.dep.no</a> · <a href="http://www.husbanken.no">www.husbanken.no</a> · <a href="http://www.be.no">www.be.no</a>
Ministry of the Environment · The Directorate for Nature Management · The Products Register · The Directorate for Cultural Heritage · The Norwegian Pollution Control Authority · The Norwegian Mapping Authority · Environmental State of Norway	<a href="http://www.md.dep.no">www.md.dep.no</a> · <a href="http://www.dirnat.no">www.dirnat.no</a> · <a href="http://www.produktregisteret.no">www.produktregisteret.no</a> · <a href="http://www.riksantikvaren.no">www.riksantikvaren.no</a> · <a href="http://www.sft.no">www.sft.no</a> · <a href="http://www.statkart.no/IPS">www.statkart.no/IPS</a> · <a href="http://www.miljostatus.no">www.miljostatus.no</a>
Ministry of Modernisation · The Directorate of Public Construction (Statsbygg)	<a href="http://www.mod.dep.no">www.mod.dep.no</a> · <a href="http://www.statsbygg.no">www.statsbygg.no</a>
Ministry of Petroleum and Energy · Enova · NVE	<a href="http://www.oed.dep.no">www.oed.dep.no</a> · <a href="http://www.enova.no">www.enova.no</a> · <a href="http://www.nve.no">www.nve.no</a>
Statistics Norway	<a href="http://www.ssb.no">www.ssb.no</a>
The Europe Gateway	<a href="http://www.europaportalen.no">www.europaportalen.no</a>
<b>Research Institutions</b>	
The Research Network	<a href="http://www.forskning.no">http://www.forskning.no</a>
Research Council of Norway	<a href="http://www.forskningsradet.no">http://www.forskningsradet.no</a>
Building Research Institute	<a href="http://www.byggforsk.no">http://www.byggforsk.no</a>
Norwegian Institute for Urban and Regional Research	<a href="http://www.nibr.no">http://www.nibr.no</a>
SINTEF	<a href="http://www.sintef.no">http://www.sintef.no</a>
University of Oslo, Centre for Development and the Environment Cicero, Centre for Climate Research	<a href="http://www.sum.uio.no">http://www.sum.uio.no</a> <a href="http://www.cicero.uio.no">http://www.cicero.uio.no</a>
Norwegian University of Science and Technology, NTNU	<a href="http://www.ntnu.no">http://www.ntnu.no</a>



Agency:	Internet address:
<b>Research Institutions</b>	
University of Environment and Biotechnology	<a href="http://www.nlh.no">www.nlh.no</a>
Norwegian Institute for Cultural Heritage Research	<a href="http://www.niku.no">www.niku.no</a>
Nordland Research Institute	<a href="http://www.nordlandsforskning.no">www.nordlandsforskning.no</a>
Eastern Norway Research Institute	<a href="http://www.ostforsk.no">www.ostforsk.no</a>
Western Norway Research Institute	<a href="http://www.vestlandsforskning.no">www.vestlandsforskning.no</a>
<b>Construction, public works and property industry</b>	
Boligprodusentene	<a href="http://www.boligprodusentene.no">www.boligprodusentene.no</a>
Byggenæringens landsforening (BNL)	<a href="http://www.bnl.no">www.bnl.no</a>
Entreprenørforeningen- Bygg og Anlegg (EBA)	<a href="http://www.ebanett.no">www.ebanett.no</a>
Grønn byggallianse- nettverk for eiendomsnæringen	<a href="http://www.byggalliansen.no">www.byggalliansen.no</a>
Norges Bygg- og Eiendomsforening	<a href="http://www.nbef.no">www.nbef.no</a>
National Association of Norwegian Architects (NAL-NABU) ECOark database	<a href="http://www.arkitektur.no/nabu">www.arkitektur.no/nabu</a> <a href="http://www.arkitektur.no/ecoark">www.arkitektur.no/ecoark</a>
Tekniske Entreprenørers Landsforening (TELFO)	<a href="http://www.telfo.no">www.telfo.no</a>
Korrosjons-, Isolerings- og Service Entreprenørernes Forening – KIS	<a href="http://www.kis.bnl.no">www.kis.bnl.no</a>
Association of Consulting Engineers (RIF)	<a href="http://www.rif.no">www.rif.no</a>
Norges Byggstandardiseringsråd (NBR):	<a href="http://www.nbr.no">www.nbr.no</a>
Norsk Standardiseringsforbund (NSF):	<a href="http://www.standard.no">www.standard.no</a>
<b>Interest groups / NGOs</b>	
Bellona	<a href="http://www.bellona.no">www.bellona.no</a>
Grønn hverdag	<a href="http://www.gronnhverdag.no">www.gronnhverdag.no</a>
The Ideas Bank (Idébanken)	<a href="http://www.idebanken.no">www.idebanken.no</a>
Miljøfyrtårn	<a href="http://www.miljofyrtarn.no">www.miljofyrtarn.no</a>
Norwegian Society for the Conservation of Nature	<a href="http://www.naturvern.no">www.naturvern.no</a>
Norges miljøvernforbund - Miljøsanering	<a href="http://www.miljovernforbundet.no">www.miljovernforbundet.no</a> <a href="http://www.miljosanering.no">www.miljosanering.no</a>
<b>International organisations and networks</b>	
Green Building Policies Network	<a href="http://www.greenbuilding.ca">http://www.greenbuilding.ca</a>
Byggmiljøguide – Folksam, Sverige:	<a href="http://www.folksam.se">http://www.folksam.se</a>



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