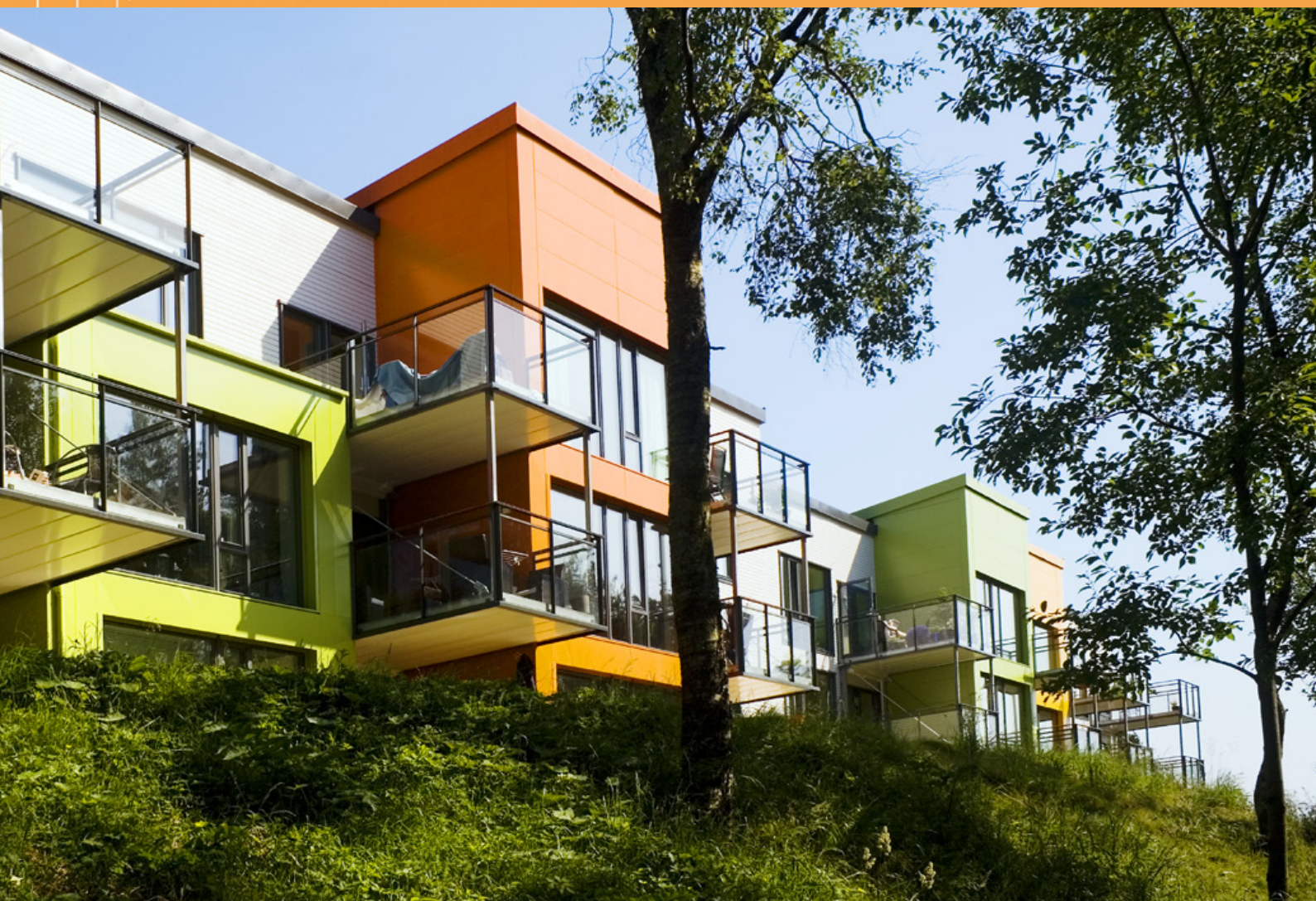
NORWEGIAN MINISTRY OF LOCAL GOVERNMENT
AND REGIONAL DEVELOPMENT

Action plan

Building for the future

Environmental action plan for the housing and building sector 2009–2012



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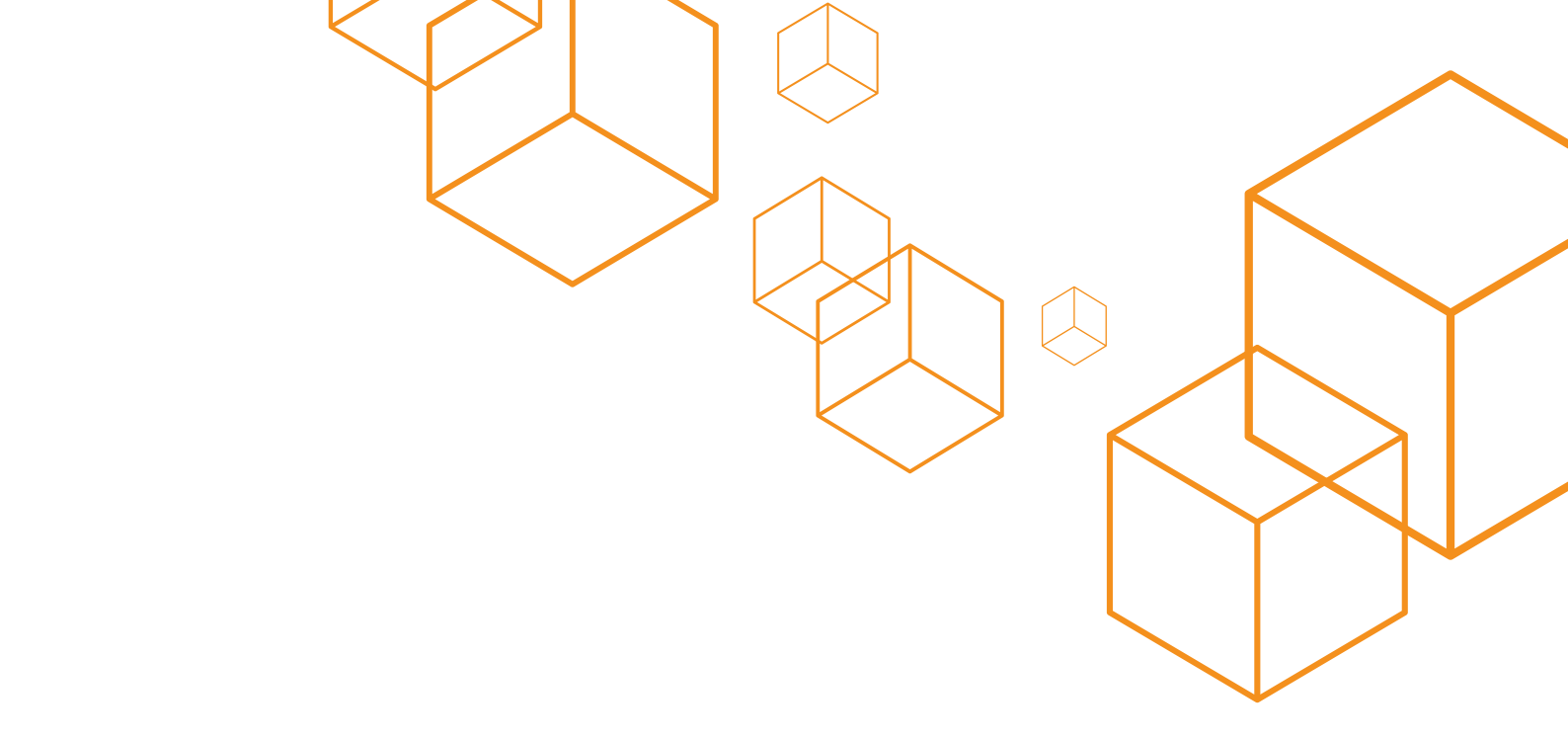


Photo: Bjørn Sigurdsøn, Scanpix

Foreword

The Government is pleased to present its new environmental action plan for the housing and building sector. This is the third environmental action plan and will apply for four years. The previous plan for 2005–2008 has acted as a management tool for the environmental drive in the sector. Most of the measures described in the plan have been implemented, but some have a horizon beyond the plan period. One thing is certain: reducing the negative environmental impact of the housing and building sector is a long-term task. Although we have seen positive developments in areas such as reuse and reduction of dumped construction waste, the amount of waste generated has increased. We still need to give priority to ensuring use of environment-friendly materials, for example by providing incentives for more products and materials to be declared green. Energy consumption in the sector is still high. Private households are using slightly less energy than before, whereas the trend seems to be the inverse in non-residential buildings. The efforts to ensure a necessary reduction in the use of electricity for heating are not sufficient. There is still a lot of work to be done before we can say we have done enough to improve environmental performance in the housing and building sector.

The red-green coalition government has tackled the environmental challenges head-on. Work to deal with the challenges of climate change has been stepped up in the period. In the housing and building sector, energy use requirements for buildings have been tightened in the technical building code. The amendments that have now been introduced in the regulations are an important step towards the low-emissions society that the parties to the Climate Agreement have agreed Norway shall aim for. However, further steps must be taken in the years to come, and the path we are going to follow has been mapped out. Amendments to regulations and new technical requirements alone do not suffice. Land-use planning on the municipal level defines the framework for building activities. How buildings are used and managed, how well they are built, and where they are situated are decisive factors for fulfilment of ambitious environmental and climate goals. This applies to all kinds of buildings. Most buildings in Norway were built according to old regulations, with much laxer technical requirements than now. One major challenge is thus reducing energy consumption and the environmental impact of older buildings. At the same time, these buildings have a huge potential for improving energy efficiency. Initiatives to improve energy efficiency in existing buildings will be an important topic in the future.

Positive interaction among many stakeholders is essential to achieve the goals. Public-sector players include the ministries and their associated enterprises, the county authorities and the local authorities. Private players in the building and construction industry – with its many professions and small businesses – are an important link in ensuring good interaction, in addition to property developers, property owners and the users of the buildings. This environmental action plan aims to pave the way for collaboration among these players. I have taken the initiative of compiling a list of all the plans from other ministries and their subordinate agencies that affect environmental and climate impact in the housing and building sector, which is included in this plan. Like the plan for 2005–2008, the new environmental action plan will be a starting point for joint, coordinated initiation of sub-plans, as well as forming the foundation for collaboration with the building industry and the local authorities regarding follow-up and monitoring. I look forward to a renewed, revitalised joint effort over the next four years to reduce energy consumption and emissions of greenhouse gases and promote use of greener energy sources so as to ensure a more sustainable housing and building sector.

Magnhild Meltveit Kleppa

Young people's mental health care centre, Førde Photo: Jiri Havran Architect: Nordplan AS

1 An interministerial plan

Many government sectors play a part in determining how environmental performance in the housing and building sector develops. The Government is pleased to present its new environmental action plan, which combines a number of plans issued by various ministries and agencies concerning environmental efforts in the housing and building sector. The plan is valid for the period 2009–2012.

Central government authorities define important constraints for environment-friendly planning, construction and operation through legislation, loans and subsidies, taxation policy, information and training. Support for experimental building projects, pilot projects and research, development and knowledge generation are key input factors to improve environmental performance in the sector. The state is also a major property developer and owner. In this way, the central government can lead the way with good examples that can affect how other property developers and owners follow up.

The central government authorities have a duty to collaborate to ensure that the overall policy towards the construction and property industry is coordinated and effective. The purpose of the environmental action plan is to help ensure this happens. The main central government authorities are presented in appendix 1. This appendix also lists other relevant organisations and their websites.

1.1 Collaboration for a greener society

All the players in the housing and building sector must work towards the same goals for this plan to be implemented to the scope intended by the authorities. In this context, it is important that the public sector players lead the way by following up the plan of action for environmental and social responsibility in public procurement.

The central government must lead the way and set requirements and norms through legislation, financial incentives and support for information and competence building. As a property developer, the central government must adopt an innovative pioneering role.

The municipal authorities play a key role. The municipalities own approx. 25 per cent of all non-residential buildings in Norway, and are responsible for one-third of energy consumption in Norwegian business premises. They are responsible for local planning and have tasks linked to inspection and monitoring of building work. The municipal authorities are local norm-setters.

The county authorities own and operate many buildings and have a strong influence on municipal planning in their capacity as the regional planning authority

The construction and property industry has a decisive influence on good execution and ensuring good environmental choices in specific cases.

The owners and users of buildings must set environmental standards and act as environmentally aware users and consumers by demanding good sustainable solutions.

A prerequisite for buildings with good environmental qualities is good planning where all the considerations – including environmental issues – are taken into account from the very outset. All the players involved in the building process must possess the relevant knowledge, and the interplay between them must be efficient and productive. Once a building is finished, environmentally sound operation and management are essential to realise the eco-friendly qualities the building was designed to promote. A good result requires good collaboration across professions and among the people involved in the building process, the owners and the users.

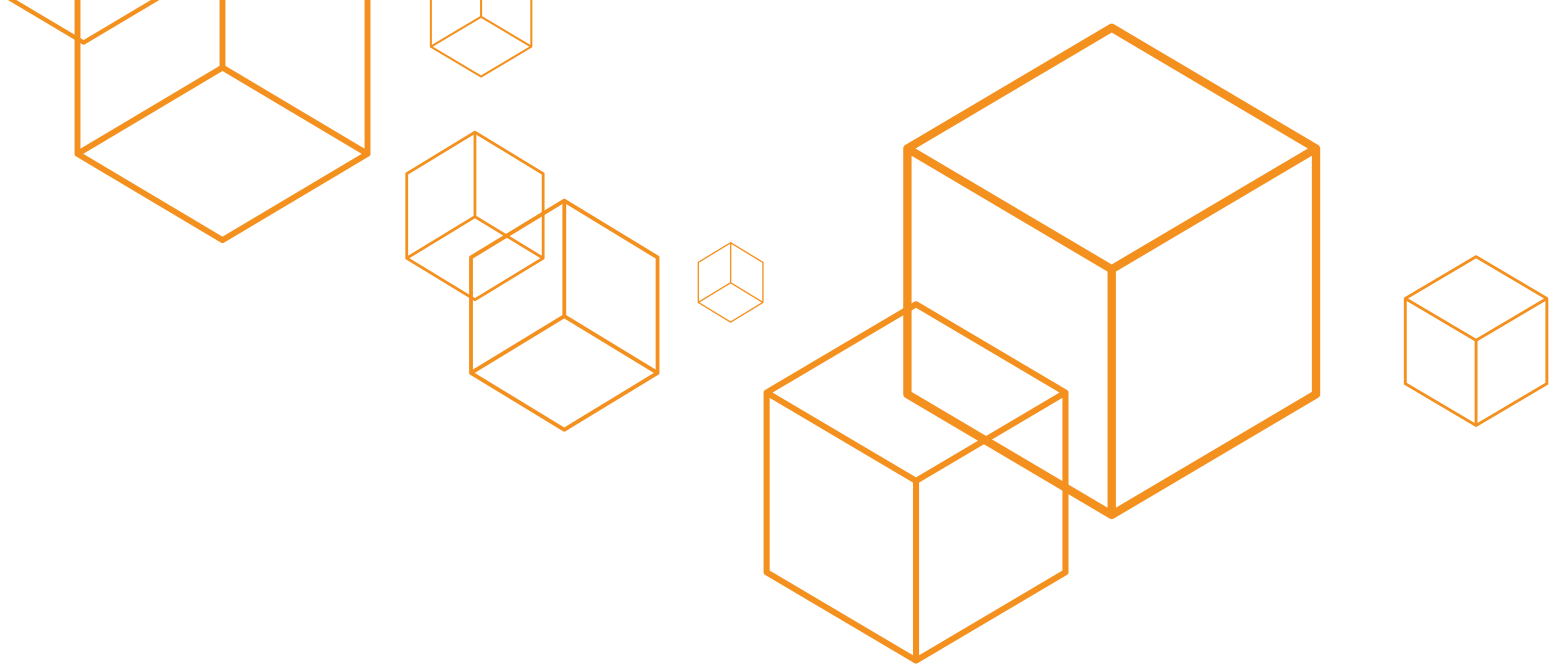
BOX 1. CLOSER COLLABORATION BETWEEN THE AUTHORITIES AND THE BUILDING INDUSTRY FOR BETTER QUALITY BUILDINGS

Environmental requirements in legislation and regulations must be realistic and implementable. This is the reason for the extensive collaboration between the authorities and trade and industry to ensure that the requirements and the proposed implementation rate are feasible. The building industry encompasses some 40–45,000 enterprises, the majority of which are small companies. Communication and sharing knowledge are key to achieving an efficient, good building process. It takes time to implement changes in the industry. The building industry's unions have been positive about working with the state to improve practices in the industry. We now have many examples of collaboration between industry and the authorities where important efforts have been and are still being made to improve the focus on environmental issues in the sector. Below are three examples of this kind of collaboration.

The Building Costs Programme (2005–2009) is owned by the Ministry of Local Government and Regional Development and the Building, Construction and Real Estate Council. The purpose of this programme is to improve the quality of buildings and increase profitability in the industry. Productivity, attitudes and unwillingness to invest in new developments and innovation are challenges among architects, engineers and contractors. At the same time, many consumers are not very good at setting requirements for the people who design and build. The lack of adapted knowledge, training and poor communication can create problems when coordinating tasks in a building process. The Building Costs Programme emphasises communicating results and that the companies in the industry implement the findings.

Byggemiljø – the Environmental Secretariat for the Norwegian Building Industry (2005–2009) consists of key players in the building industry and important authorities and works broadly with many different stakeholders linked to the industry. The Environmental Secretariat for the Norwegian Building Industry has developed information packs that provide a basis for greater focus on and knowledge about the environmental challenges facing the sector. The purpose of the collaboration programme is to achieve a broad interface with important players in the building industry in order to gather experiences, turn the spotlight on problems and challenges, assess the need for new instruments, adapt existing instruments, etc. The collaboration provides a basis for assessing the framework conditions so that they can be influenced in a direction that improves environmental performance in the housing and building sector.

The Low-Energy Programme is a collaboration between the state and the building industry to promote energy savings and energy conversion in buildings. The Federation of Norwegian Building Industries (BNL), the Norwegian Association of Architects' Businesses, the Norwegian State Housing Bank, Enova, the National Office of Building Technology and Administration, the Norwegian Water Resources and Energy Directorate (NVE) and Statsbygg are participating in the programme. The programme works primarily on improving competencies and exemplary projects. For the building industry to be capable of designing and building energy-efficient, good, safe buildings for the future, the level of expertise needs to be raised throughout the entire building industry, from the designers to the actual builders. Exemplary projects are a necessary part of this. The objective of the programme is to help ensure that the Norwegian building industry is a pioneer in Europe in terms of building energy-efficient and eco-friendly buildings, and that a large number of passive houses are built in Norway in the period 2014–2017.



1.2 The framework of the plan

The breadth and interconnectedness of the environmental challenges in the housing and building sector are described in more detail in Report no. 28 (1997–98) to the Storting, in the Ministry of Local Government and Regional Development's first environmental action 2001–2004 and Report no. 23 (2003–2004) to the Storting on housing policy. The approach to dealing with the environmental challenges in the housing and building sector described in these documents still applies and forms the basis for this action plan.

Since the previous action plan was presented in 2004, the Government has submitted a number of documents about environmental challenges and how they are to be addressed. The most recent document to lay down constraints for this plan and future environmental efforts in the housing and building sector is the Climate Agreement (see box 7). The main documents are summarised in box 2. Norway's participation in the EEA means that Norwegian regulations must be harmonised with European regulations. There is an overview of the main directives that affect environmental efforts in the housing and building sector in appendix 2.

1.3 Focus areas in the environmental action plan

This plan concentrates on the following five focus areas:

- Reduce greenhouse gas emissions.
- Reduce the need for energy in buildings.
- Chart and minimise use of hazardous substances in buildings.
- Ensure good indoor climate in buildings.
- Prevent waste generation and increase reuse and recycling of building materials.

These categories have been chosen to highlight the topics deemed the most important in terms of an environmental drive in the housing and building sector over the next four years. However, this does not mean that effort need not be made in areas outside these categories or that do not follow directly from them.

1.4 Increasing the environmental focus in existing buildings

Public attention is often focused on new buildings in connection with efforts to improve environmental performance in the housing and building sector. Technical requirements for buildings apply to new buildings and major redevelopments. However, the buildings that have already been built have the greatest potential to improve the environmental status of buildings in Norway as a whole. Approx. 80 per cent of the current buildings will still be standing in 2050. Stimulating environment-friendly management, operation, maintenance and development will therefore be a very important focus area in the years to come. However, the full potential can only be released to the necessary extent if the owners and users of buildings become more environmentally aware. Knowledge about and acceptance of the Government's environmental goals and how Norway's environmental footprint can be reduced efficiently is essential.

Existing buildings constitute a major social resource. This entails a special challenge in reducing and adapting energy consumption in existing buildings and at the same time safeguarding heritage, aesthetic and environmental requirements. The interests of conservation, aesthetics and environment are often hard to reconcile. In order to assess the environmental consequences of renovation versus demolition and building a new building, comparable environmental, climate and energy accounts need to be prepared with a life-cycle perspective.

It is also necessary to take steps to make existing external constructions and buildings resistant to changes in the climate.

BOX 2. DOCUMENTS THAT AFFECT ENVIRONMENTAL PERFORMANCE IN THE HOUSING AND BUILDING SECTOR

- Report no. 36 (2008–2009) to the Storting Good public procurements
- The Climate Agreement (see box 7)
- Report no. 34 (2006–2007) to the Storting Norwegian climate policy
- Report no. 26 (2006–2007) to the Storting The Government's environmental policy and the state of the environment
- Report no. 14 (2006–2007) to the Storting Together for a toxin-free environment – ensuring a safer future
- Proposition no. 82 (2005–2006) Measures to limit use of electricity in households
- The Government's action plan for conversion to renewable energy
- The Government's strategy for its action on radon
- The Government's strategy for sustainable development
- Plan of action for environmental and social responsibility in public procurement
- Strategy to increase development of bio-energy
- Action plan to combat noise 2007–2011
- T-1466 Urban development and the Groruddalen environmental zone Measures and policy instruments for a better environment
- Norway universally designed 2025. The Government's action plan for universal design and better accessibility 2009–2013
- Official Norwegian Report NOU:2006:18 A climate friendly Norway
- Reduction of greenhouse gases in Norway: An analysis of measures for 2020
- Proposition no. 87 (2001–2002) to the Odelsting On the Act amending the Act of 13 March 1981 no. 6 relating to protection against pollution and relating to waste (the Pollution Control Act)
- Proposition no. 32 (2007–2008) to the Odelsting On the Act relating to planning and processing of building applications (the Planning and Building Act) (the planning part)
- Proposition no. 45 (2007–2008) to the Odelsting On the Act relating to planning and processing of building applications (the Planning and Building Act) (the building part)
- Proposition no. 52 (2008–2009) to the Odelsting On the Act on the management of natural diversity (the Nature Management Act)
- The Low Energy Commission's report "Improving energy efficiency"

1.5 Environmental investments in buildings are profitable

In 2007 the Norwegian Pollution Control Authority (SFT) published Reduction of greenhouse gases in Norway: An analysis of measures for 2020 describing the potential for technical measures that can reduce Norway's emissions of greenhouse gases towards 2020, assessed in terms of cost and feasibility. The Norwegian Pollution Control Authority's analysis indicates that there is a large potential for cost-efficient measures with high or medium feasibility in the housing and building sector. Official Norwegian Report NOU 2006: 18 A climate friendly Norway also draws the same conclusion. The main measures concern energy-efficient heating, switching from fossil fuels to renewable energy, and targeted information and seminars in the area.

Nordplan AS Photo: Jiri Havran

More and more players in the construction and property industry are focusing on environmental performance. In many cases, investing in environmental measures is also cost effective. Many companies have built up a considerable bank of knowledge about environmental matters and can help produce and operate buildings that will lead the way as good examples. However, there is still a large potential for improvements in the industry as a whole.

In many cases, qualitative improvements in housing and buildings may entail higher investment costs. This is used as an argument against making environmental improvements in the sector, and is one of several reasons why implementation of ambitious environmental goals has been slower than hoped for. However, the conception that environmental measures generally entail added costs for building projects is often based on a lack of knowledge and poor planning.

From an environmental point of view, one of the main challenges is that we often build larger buildings than necessary. Better layout can yield functional solutions that are just as good, with a smaller area. Increasing land-use efficiency is both good for the environment and saves costs. In addition, investments in environmental improvements and building qualities can yield lower operating costs, longer lifetime, and higher value for buildings if measures are planned and implemented appropriately. Investments can yield savings from day one, even if the initial outlay is higher. There are numerous examples of this; see box 3 for an example of energy conservation.

The Norwegian State Housing Bank provides basic loans for building and renovating homes, with environmental requirements designed to stimulate good environment-friendly buildings.

The stakeholders in the housing and building sector have been slow to recognise the opportunities that improving environmental performance can yield. It has been accepted for some time that many environmental measures can be profitable. For many enterprises, better holistic planning and more publicity about environmental measures are important elements in their market strategy and can put them in a good position for increased market shares in the future. The Ecobuilding programme, which was a collaboration programme between the industry and the authorities in 1998–2002, had this as one of its main messages more than ten years ago.

Increasing internationalisation of the building industry and a common energy market with identical energy prices will mean that an environmental focus in the housing and building sector is essential, not only from an environmental point of view, but also from a business perspective. Players that invest in good environment-friendly buildings may be able to achieve market advantages in competition with players with lower ambitions. There have been clear improvements over the last few years, but the industry as a whole still has a long way to go before it can reap cost-efficient environmental gains.

Misuse of building components, incorrect installation and bad planning will always result in extra costs. Getting things wrong is expensive. It is also possible to use an environmentally correct building in such a way that environmental gains are not achieved. Theoretical, technical calculations do not always pan out in practice when buildings are inhabited, because the users are not environmentally aware and user habits vary. For example, studies have found that energy consumption in identical residential buildings with the same sized households can vary so widely that one building uses twice as much energy as the other. Conscious users are therefore important to ensure that measures that were calculated to be profitable do in fact yield savings.

BOX 3. RENA LEIR MILITARY BASE SAVES MORE THAN NOK 3 MILLION EACH YEAR ON ENERGY

Rena leir military base is one of the Norwegian Armed Forces' newest bases, with the oldest buildings dating back only ten years. Nevertheless, the base has managed to achieve considerable reductions in its energy consumption. In 2004, the Norwegian Defence Estates Agency initiated a project to reduce energy consumption at Rena leir. The target of achieving savings of 4.7 GWh by October 2007 was reached a year ahead of schedule and at only 77 per cent of the budgeted costs. The project reduced energy consumption by approx. 15 per cent. The savings correspond to approx. 5 million kWh per year, or almost NOK 4 million, which can be spent on other things (NOK 0.8 per kWh).

1.6 Relevant instruments

Legal instruments

The most important legal instruments for promoting a more environment-friendly housing and building sector are the Planning and Building Act, the Pollution Control Act, the Nature Management Act and the Energy Act.

The building regulations define requirements for minimum standards of technical quality that society believes new buildings should have. The Technical Regulations to the Planning and Building Act (TEK) have been adjusted several times to reflect changes in society. The most recent amendment was in 2007 and included a tightening of the energy use requirements by 25 per cent.

In 2008, the Storting passed a new Planning and Building Act, cf. Proposition no. 32 (2007–2008) to the Odelsting for the planning part and in 2009 Proposition no. 45 (2007–2008) to the Odelsting, for the building part. The planning part, which came into force on 1 July 2009, provides the municipal authorities with a better tool for planning and facilitating environmentally sound developments. As a consequence of the new Planning and Building Act, the energy use requirements in the Technical Requirements are currently being reviewed and tightened. The plan is to implement these changes when the building part of the new Act comes into force in 2010. In this environmental action plan we assume that the energy use requirements in the Technical Requirements will be revised and amended at least every five years, cf. the Climate Agreement. The goal is to build ultra-low energy "passive" houses in the future.

In connection with future tightening of the environmental requirements in the Technical Requirements, the Government will work in close contact with the building industry regarding assessing requirements and deciding the amount of conversion time necessary. The high environmental ambitions that have been adopted in the Climate Agreement and elsewhere necessitate flexibility.

The Act on the management of natural diversity (the Nature Management Act), which came into force on 1 July 2009, entails that the building and housing sector and the public authorities must take every possible step to protect the natural diversity in connection with localisation, land use and construction.

Financial instruments

Experience indicates that environmental measures the outlay for which is not covered by saved operating costs within the first three to five years are not usually implemented. When social considerations so dictate, the central government must assess whether to set requirements concerning implementa-

tion or whether it is more appropriate to introduce financial incentives. Incentives are used to make environmental investments and measures more profitable and also to assist the industry in bringing about the changes more quickly.

Environmental taxes have been introduced to reduce harmful emissions to water and air and to reduce the amount of waste. Enova has been charged with contributing to permanent changes in the market through its grants. Grants for exemplary projects and building environment-friendly buildings with higher standards than the minimum requirements in the Technical Regulations can help bring about changes. Grants for publishing information and sharing expertise can also play an important part. Support via the Norwegian State Housing Bank for building passive houses and homes that need less energy for heating may also have a similar effect on the market. The Norwegian State Housing Bank has entered into letters of intent with large enterprises in the industry concerning different types of environmental measures. These letters of intent can qualify companies for loans and grants from Enova and the Norwegian State Housing Bank for projects that go further than the minimum standards in terms of environmental aspects. In this way, and through its own construction work, the central government can help set standards for building that will subsequently make it easier to introduce higher minimum requirements in the building code.

Building plot policy

Access to plots of land is a prerequisite for newbuild projects, and municipal zoning affects access to and the price of plots in an area. The Government wants stronger municipal involvement in the supply of building plots to encourage holistic land-use planning in the municipalities, and is going to support development of guidelines or a collection of examples for local authorities on how they can be more actively involved in the supply of building plots.

Development agreements

The local authority and the land owner or developer can enter into an agreement concerning development of an area. The development agreement will cover a specific land-use plan pursuant to the Planning and Building Act. The agreement may specify that the land owner or property developer must ensure or pay for in full or in part measures that are necessary for implementation of planned decisions. Environmental elements specified in a plan can generally be included in a development agreement if they satisfy the criteria that they are necessary for implementation of the land-use plan and are reasonable in light of the nature and size of the development project.

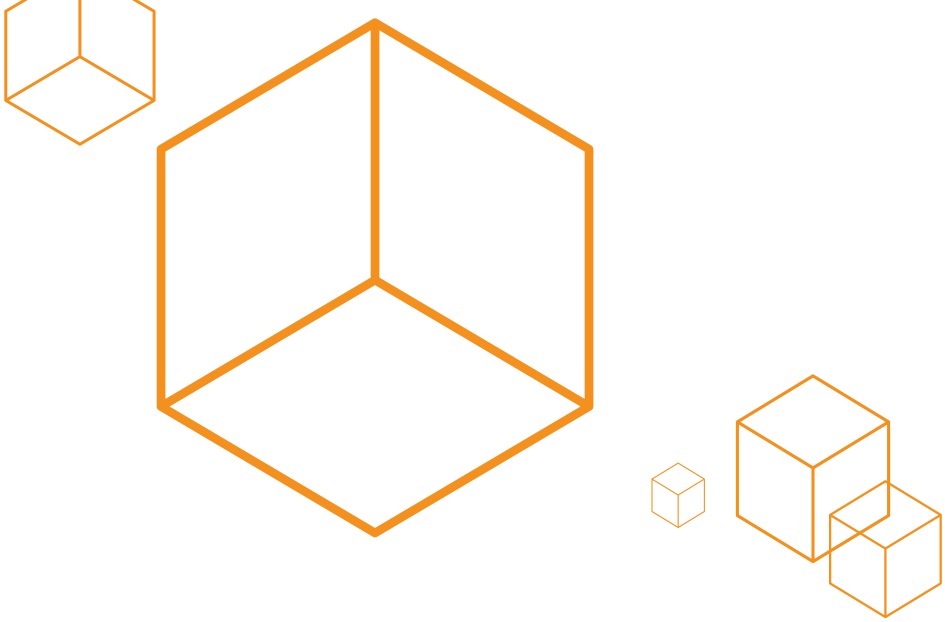
Information and training schemes

There are many opportunities for making profitable environmental investments in new and existing buildings. For example, there is much untapped potential in improving operation of the buildings and installing environmental devices that will also cut costs for households. This entails that information, training and spreading the word about good examples will continue to be important instruments in the coming plan period too.

Several ministries and government agencies as well as the industry itself produce information, provide training and work to ensure expertise is shared. More coordinated, systematic work is needed in this area. The Ministry of Local Government and Regional Development will therefore collaborate with relevant parties to find possible solutions for how knowledge and expertise can be shared among the players more efficiently.

Eco-labels

The foundation Ecolabelling Norway administers the Swan and the Flower labels, which are the two official eco-labels on the Norwegian market at present. The swan is a pan-Nordic eco-labelling scheme. The purpose of these



schemes is to help consumers be able to choose the most eco-friendly products on the market. In order for a product to receive an eco-label, the manufacturer or importer must submit documentation proving that the products meet a number of requirements concerning raw materials, pollution from the production process, energy consumption, harmful substances and packaging. There are also requirements concerning the product's quality and function. The environmental criteria for the eco-labels the Swan and the Flower are developed openly and in collaboration with experts and manufacturers. There are currently several thousand products that have the eco-labels within ever more areas of products and services, including building products and criteria for small homes.

Environmental certification

An environmental management system is an internal management system that helps enterprises limit their environmental footprint in the most efficient way. Introduction of environmental management entails charting the enterprise's environmental impact, defining goals and planning measures, implementing the measures and monitoring performance. The environmental management system must be anchored in the management and must be updated regularly. The international standard ISO 14001 and the European eco-management audit scheme EMAS are examples of third-party certified environmental management systems. Norway has a national scheme for small and medium-sized businesses Miljøfyrtårn – the Eco-Lighthouse programme. Certification pursuant to ISO 14001 or registration through EMAS indicates that the enterprise works systematically to continuously reduce its environmental impact. There is more information about this at Standards Norway.

Environmental product declaration

An environmental product declaration (EPD) is a short document that summarises and documents the environmental profile of a component, finished product or service. The purpose is to provide reliable grounds for people to be able to decide which product has the best environmental profile. In Norway, the Confederation of Norwegian Enterprise NHO and the Federation of Norwegian Building Industries (BNL) have established a foundation to develop use of environmental product declarations. Environmental product declarations have been prepared for various different types of products, such as furniture, building materials, energy, etc.

Collaboration with the construction and property industry

Various forms of collaboration between the central government and the construction and property industry are needed to increase mutual understanding and to communicate the authorities' goals for its action on environmental issues in the housing and building sector efficiently throughout the sector. Collaboration on R&D and development of technology, communication of new building techniques, spreading information about good examples, training and knowledge-building measures, and not least, eco-friendly operation and maintenance are relevant areas for collaboration. Byggemiljø – the Environmental Secretariat for the Norwegian Building Industry and the low-energy programme are examples of collaborative projects between the authorities and the industry. Collaboration with the industry will be a key instrument in the next plan period too. The Ministry of Local Government and Regional Development is looking for effective ways of continuing its collaboration with the industry.

1.7 Better statistics as a basis for measuring environmental status and performance in the housing and building sector

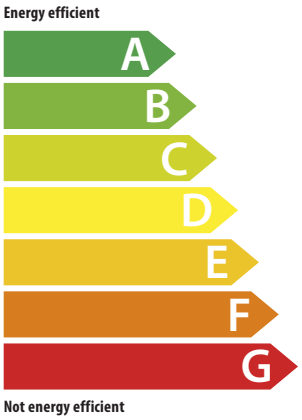
At present we do not have sufficient data about the factors that affect the environmental performance of buildings. We

BOX 4. ENERGY CONSUMPTION LABELLING OF BUILDINGS

The energy labelling scheme makes the owner of a building responsible for ensuring that the building has an energy certificate and an energy-consumption label when selling or leasing a property. Non-residential buildings and public buildings larger than 1000 m^2 and buildings that are being sold or let must be labelled. Designers are responsible for issuing the energy consumption label for new buildings. Non-residential buildings shall be certified regularly, and the energy consumption label shall be clearly displayed at the entrance.

The objective of the scheme is to provide basic information about the energy performance of the building in question. This promotes more knowledge and awareness of energy consumption in buildings and can help ensure implementation of energy efficiency measures. The energy consumption label can also ensure more correct valuation of homes and buildings when they are being sold or let. In addition, the total of all the energy labelled buildings can provide useful statistics on energy performance in buildings. The energy labelling scheme is part of the follow-up of the building energy directive (directive 2002/91 EC). The Ministry of Petroleum and Energy is responsible for the scheme, which is executed by the Norwegian Water Resources and Energy Directorate (NVE).

ENERGY CONSUMPTION LABEL



need better statistics about emissions of greenhouse gases and energy consumption, how widely officially declared eco-friendly products and materials are used, and the number of low-energy or passive houses that are built each year.

With time, more methods and models have been developed that allow energy consumption in individual buildings to be calculated relatively easily, both during the planning phase and when they are in use. The energy labelling scheme for buildings that is currently being introduced (see box 4), should provide better energy statistics for homes and other types of buildings than we currently have. Introduction of the Cadastre (figure 1) may also provide better insight into buildings' environmental performance. On the basis of these schemes, it will be possible to develop databases that provide a more accurate idea of the environmental status than is possible with the statistics that are currently available.

Overviews and statistics that are based on the theoretical effects of various environmental measures are not satisfactory for evaluating which measures to implement. Under the environmental action plan up until 2012, a clear goal is therefore to ensure better statistics on environmental developments in the sector.

The Cadastre is a public property register containing important information about properties and the buildings on them, including size and environmental aspects such as pollution, heating system, energy consumption, etc. See the illustration in figure 1.

BOX 5. RENOVATION TO THE PASSIVE HOUSE STANDARD

In the period 1960–1990, some 600,000 small homes were built in Norway – detached houses, terraced housing and multi-household dwellings. When they were built, standard practice was ten centimetres of insulation. The current building code specifies 25 centimetres of insulation in outside walls and 35 centimetres in roofs. This means that homes built in the 1960s, 1970s and 1980s are not sufficiently insulated by today's standards and have a considerable potential for energy savings. The gains of reinsulating these buildings are huge, and the owners will normally have covered their renovation costs after a couple of years. Renovating old buildings to the "passive house standard" can radically reduce heating needs. A well-insulated house yields lower electricity bills and greater comfort, at the same time as it also increase the value of the property and is good for the environment.

Myhrerenga housing cooperative in Skedsmokorset was built at the end of the 1960s. The inhabitants have decided to undertake a major renovation to bring it up to the low-energy standard with passive house elements. Energy consumption can be reduced by around 70 per cent from approx. 300 kWh per year to 80 kWh per year. Monthly bills (including energy costs) are expected to be slightly lower than they would have been if they had opted for a conventional facade renovation. This renovation is a pilot project, organised as a collaboration between SINTEF Building and Infrastructure, the Norwegian State Housing Bank and the housing association USBL.

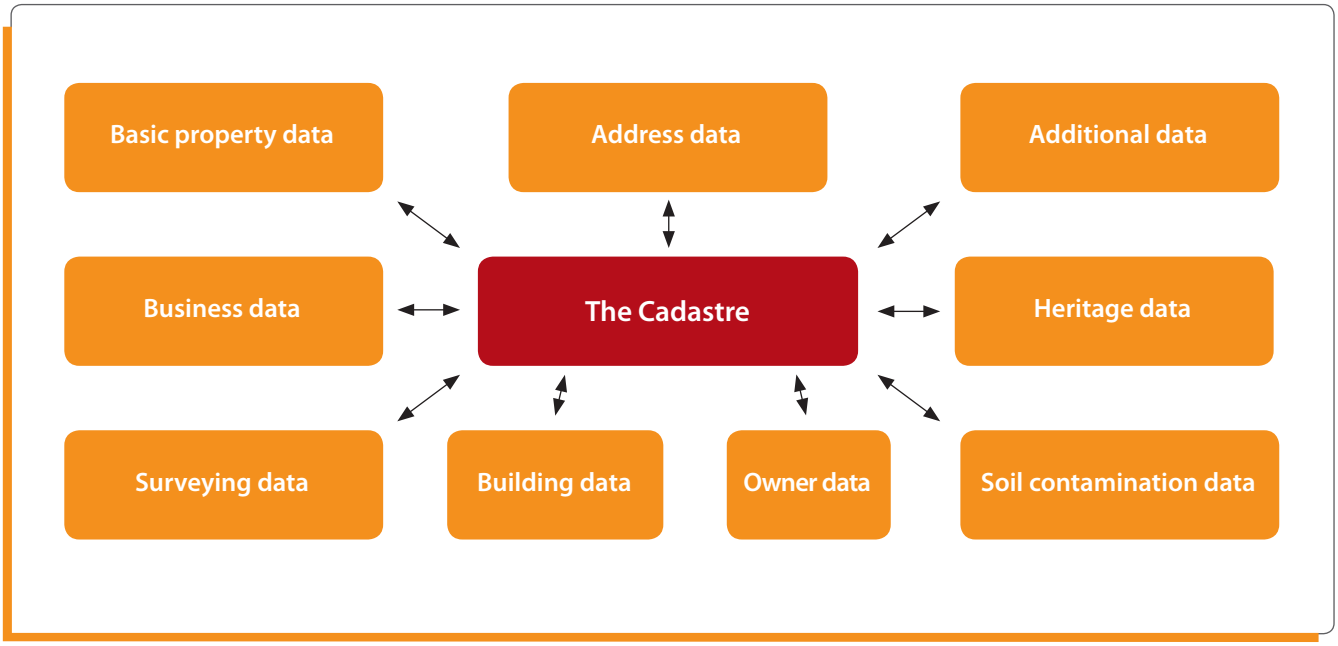
1.8 Other action plans and strategies that affect environmental performance in the housing and building sector

The increased focus on environmental issues has also resulted in various public authorities preparing action plans and strategies for implementation of the environmental goals or that have greater focus on environmental issues as a direct or indirect consequence. The Government's plan of action for environmental and social responsibility in public procurement is one example of this. This environmental action plan reiterates the measures in other published plans. Work is also currently underway on other plans and strategies that will have an impact on environmental performance in the housing and building sector that will not be published until after this action plan has come into force. This is one of the reasons why the environmental action plan for the housing and building sector 2009–2012 is not a static plan, and the Ministry of Local Government and Regional Development will keep abreast of new elements and measures that it may be relevant to introduce in the four-year period.

1.9 Updating and implementation

The Ministry of Local Government and Regional Development will regularly publish information on its website about the main aspects of implementation of the plan. We will also

FIGURE 1. CONTENTS OF THE CADASTRE



compile an overview of any new measures in the Ministry of Local Government and Regional Development's and other ministries' areas that may have an impact on implementation of the plan. The National Office of Building Technology and Administration (BE) and the Norwegian State Housing Bank will follow up this environmental action plan with their own environmental programmes.

1.10 Focus areas, goals, sub-goals and measures in the plan

The next five chapters discuss the focus areas and goals and measures for increased focus on environmental issues in the housing and building sector for the period 2009–2012, after feedback and input from other ministries and agencies. The main goals have been broken down into sub-goals, some of which extend beyond the plan period. This was not considered appropriate in cases where goals have already been defined with a longer time horizon, as is the case in the Climate Agreement, for example.

The sub-goals have been defined to cover a variety of different formulations from the different ministries and government agencies. The various sector authorities may have more detailed goals and measures than have been included in this action plan.

Hundsund community centre, Bærum Photo: Jiri Havran Architect: div. A arkitekter

2 Reduce greenhouse gas emissions

Norway's emissions of greenhouse gases increased from around 50 million tonnes of CO_2 equivalents in 1990 to 55 million in 2007. This increase is primarily due to growth in oil and gas activities and increased transport. Emissions from heating in households and businesses have not changed significantly in this period, and tend to fluctuate from year to year, because of relative variations in the price of oil and electricity and differences in temperature from year to year, among other things. According to Statistics Norway's website, emissions decreased by 1.2 million tonnes of CO_2 equivalents from 2007 to 53.8 million tonnes of CO_2 equivalents in 2008.

Emissions of greenhouse gases in the housing and building sector are mainly from energy used for heating. Since 1990, emissions from heating in buildings have been reduced by approx. one-third and in 2007 was approx. 2.2 million tonnes of CO_2 equivalents. This is largely the result of diminishing use of oil-fired heating. The housing sector was responsible for around 33 per cent of emissions from heating buildings in 2007. Various industries are responsible for approx. 21 per cent of the total emissions from heating buildings in 2005. Emissions from the service sector constituted just under 34 per cent of emissions from heating buildings in 2005.

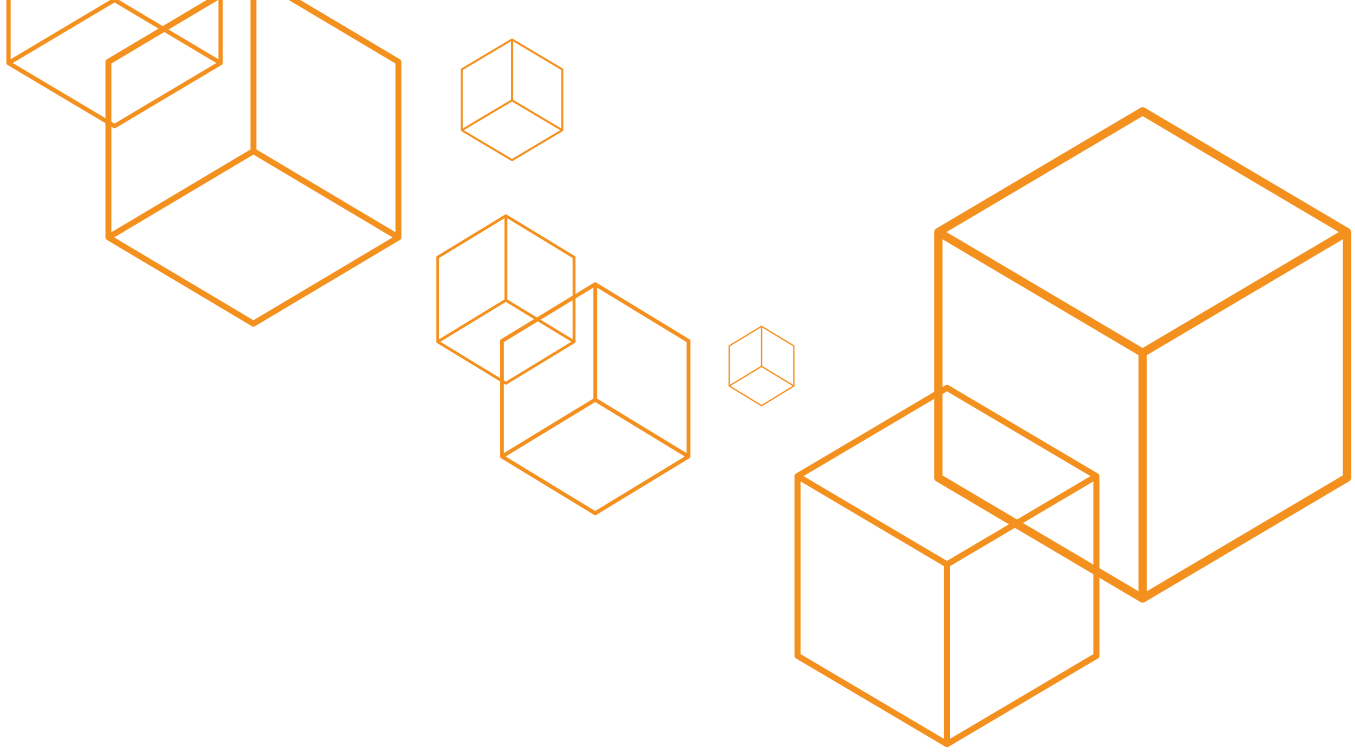
The Storting's Climate Policy Report and the Climate Agreement pave the way for escalation of efforts to reduce greenhouse gas emissions. The Climate Agreement assumes that by 2020 Norway shall have cut its global emissions of greenhouse gases by the equivalent of 30 per cent of Norway's emissions in 1990. A significant proportion of the emissions reduction is to be in Norway.

The Climate Agreement mentions measures in the building sector especially (see box 7). The ambitious national climate-change targets mean that the housing and building sector will also have to contribute towards achieving the targets. As part of the follow-up of the Climate Agreement, an action plan will be prepared for the transition from fossil to renewable sources of energy for heating.

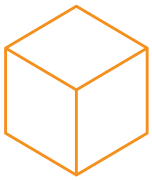
The Government has ascribed priority to strengthening cost-efficient instruments that trigger cost-efficient measures across sectors. The national emission trading system and taxes on emissions are cross-sectoral instruments that have been introduced to reduce greenhouse gas emissions. They will affect emissions from the housing and building sector too; for example, the 2008 rise in the basic charge on heating oil will help reduce emissions from the sector.

Reducing emissions of greenhouse gases from the end-users of energy in homes and other buildings is an express goal. This entails that use of fossil fuels for heating must be further reduced. Greenhouse gas emissions linked to production of energy used to heat buildings will thus have a decisive effect on future emissions figures from the housing and building sector.

The effects of climate change will mean that buildings are exposed to more extreme conditions. Stronger winds, increased precipitation and moisture will put an extra strain on materials and structures in both the short and the long term. It will be important to chart and take account of climate vulnerability in risk and vulnerability analyses on different planning levels and in building projects.



Focus area 1: Reduce greenhouse gas emissions		
Sub-goal	**Measures**	**Ministry responsible**
Conversion to and increased use of new renewable sources of energy in buildings.	Introduction of energy specifications in the Technical Regulations to the Planning and Building Act (TEK) in 2010 entailing more stringent requirements concerning use of renewable energy sources in large buildings.	KRD
	The Ministry of Petroleum and Energy will present an action plan for the transition from fossil fuels to renewable sources of energy for heating.	OED/KRD/MD
	Pilot projects using renewable energy shall be encouraged through collaboration with trade and industry and the local authorities.	MD/KRD/OED
	Through its programme for local energy centres and heat, Enova provides subsidies for players who want to convert to or establish new heat generation based on renewable sources of energy.	OED
	Klimakur ("Climate Cure") 2020 is a group comprising several government agencies, headed by the Norwegian Pollution Control Authority (SFT). The group was established against the background of the national climate-change targets laid down by the Storting in the Climate Agreement in January 2008. Klimakur 2020 shall assess and propose new measures or ways of adapting measures and instruments to reduce Norway's emissions of greenhouse gases in the period up until 2020.	MD
	Enova supports players who want to establish infrastructure for district heating and district cooling and appurtenant generation of renewable energy through support programmes for establishment and expansion of existing district heating plants.	OED
Encourage carbon-neutral developments in the municipalities.	A five-year collaboration agreement has been entered into between the Ministry of the Environment (MD) and the Norwegian Association of Local Authorities (KS) concerning Viable Municipalities – the municipal network for the environment and community development, in which up to 200 municipalities are participating.	MD
	Through the programme Green Energy Municipalities, local authorities shall be encouraged to reduce their emissions of greenhouse gases by investing in energy conservation measures and renewable energy.	KRD/MD/OED



Sub-goal	Measures	Ministry responsible
	The central government and the largest cities have agreed to collaborate on the programme Cities of the Future. The purpose of the programme is to encourage towns and cities to reduce their greenhouse gas emissions and develop sufficient robustness to tolerate the predicted climate change. The programme serves to establish collaboration with and among important players in trade and industry. See the description of the collaboration in section 1.1 and box 1, and read more about Cities of the Future in box 6.	MD/OED/SD/KRD
	From 2010, the Norwegian State Housing Bank will support Cities of the Future with up to NOK 5 million per year to encourage construction of more exemplary projects that promote the interests of climate change, the environment, universal design and good architecture.	KRD
	The Ministry of the Environment has ordered the municipalities of Oslo and Akershus to coordinate their land-use and transport planning in the capital and environs. Land-use and transport systems must be developed in such a way that they promote economically efficient use of the resources with environmentally sound solutions, safe local communities and living environments, traffic safety and ensure efficient transportation.	MD
	The advisory material on the new planning part of the Planning and Building Act will be prepared in 2009–2010, and will consist of a number of guides on a variety of topics. The new planning part came into force on 1 July 2009 and focuses on urban density and the quality of outdoor areas, giving priority to green infrastructure, biodiversity and storm water management. The new Planning and Building Act gives local authorities powers to prepare local climate and energy plans as municipal area plans. All planning is subject to mandatory risk and vulnerability analyses.	MD
	The Ministry of the Environment will continue its annual National Urban Environment Award. This award is given to a municipality that works closely with the authorities, trade and industry and the voluntary sector and takes an active stance in its work on urban development and improving the urban environment.	MD
	The Government will consider introducing state planning guidelines for climate and energy planning on the municipal and county levels. According to the Planning and Building Act, all local authorities must include climate issues in their planning.	MD
The state as an example.	The plan of action for environmental and social responsibility in public procurement must be followed up (cf. the environmental policy for public procurement 2007–2010). When planning building projects, state property developers must take environmental impact into consideration. The environmental properties of the various products used must be documented.	FAD/MD

Sub-goal	Measures	Ministry responsible
	Public property developers must ensure that tropical timber is not used as a construction material, in interiors, or in materials used in the building period, unless it can be definitely documented that the timber is from an area with approved, sustainable forestry. All public and private purchasers shall be encouraged to follow this practice voluntarily.	FAD/MD
	The Ministry of the Environment and Statsbygg are collaborating on a collection of examples to promote good urban and local development in connection with the Government's localisation, development and property management. The guide will be published in 2009.	MD/FAD
	Through the Energy Management Programme, the Norwegian Defence Estates Agency is aiming to raise user awareness and give the users of their buildings more responsibility with the goal of saving energy. The target is an annual reduction in emissions of approx. 5 per cent. As of 2009, the Norwegian Defence Estates Agency has made it a requirement that primary heating (the base load) in all new buildings shall be based on a fuel source other than fossil fuel.	FD
Support for research, analysis, information, publication and better statistics.	The Research Council of Norway is supporting eight time-limited centres for environment-friendly energy research (FME) with a budget of NOK 10–20 million per centre in the first year. The scheme is planned to last for eight years. The purpose of this support is to help resolve specific challenges linked to energy and environmental issues. Zero Emission Buildings (ZEB) is one of the centres. ZEB is going to focus on research, innovation and implementation of products and solutions that will result in buildings with ultra-low energy needs and zero emissions of greenhouse gases in connection with construction, operation and demolition. The centre is managed by the Norwegian University of Science and Technology (NTNU).	OED
	The National Office of Building Technology and Administration and the Norwegian State Housing Bank are going to work closely with the Low-Energy Programme and the Zero Emission Buildings research programme. The purpose of this collaboration is to gather experiences that can be used in the development of regulations, information and competence raising.	KRD
	Statistics Norway has the main responsibility for official statistics in Norway, including statistics on greenhouse gas emissions. The central government shall contribute to improving the statistics on energy consumption in homes and buildings related to emissions of greenhouse gases from homes and buildings.	MD/KRD/OED
	A series of meetings is being prepared to trigger pilot projects in the Cities of the Future scheme in the period 2009–2010.	MD/KRD/OED
	The central government will collaborate with the construction and property industry on reducing emissions of greenhouse gases from buildings, through, for example, the Low-Energy Programme and other collaboration programmes with the industry.	OED/KRD
	In consultation with other ministries, the Ministry of Local Government and Regional Development will assess how experiences gained from programmes such as the Environmental Secretariat for the Norwegian Building Industry and the Building Costs Programme can be applied in a continued collaboration with the construction and property industry in terms of environmental issues, energy and quality in the building industry.	KRD

Nordplan AS Photo: Knut Egil Wang

BOX 6. CITIES OF THE FUTURE

Through their action programmes, the 13 cities participating in Cities of the future want to reduce their emissions of greenhouse gases by 35 per cent by 2030 and by 24 per cent by 2020. Half of the world's population live in cities. Almost 80 per cent of the population of Norway live in urban areas. 80 per cent of all greenhouse gas emissions in the world come from towns and cities, and urban areas by far the largest consumer of energy. Cities of the Future is a collaboration between the central government and the 13 largest urban areas in Norway to reduce emissions of greenhouse gases and make the cities a better place to live. The 13 participating cities are Oslo, Bærum, Drammen, Sarpsborg, Fredrikstad, Porsgrunn, Skien, Kristiansand, Sandnes, Stavanger, Bergen, Trondheim and Tromsø. Cities of the Future is headed by the Ministry of the Environment and is organised into four priority areas:

1. Land use and transport (managed by the Ministry of Transport and Communication)
In urban areas, road transport is responsible for half of all emissions. The cities' planned measures demonstrate a willingness to use new instruments to achieve more environment-friendly transport. Collaboration with trade and industry concerning good locations and efficient transport solutions will further limit greenhouse gas emissions.

2. Stationary energy consumption in buildings (managed by the Ministry of Petroleum and Energy, assisted by the Ministry of Local Government and Regional Development)
40 per cent of the energy consumption is in buildings. Cities of the Future is planning a number of measures to improve energy efficiency and flexibility. Trade and industry will be an important collaboration partner in realising pilot projects with low-energy and passive house standards.

3. Consumption patterns and waste (managed by the Ministry of the Environment)
Increasing consumption leads to greater greenhouse gas emissions. Trade and industry can help reduce emissions through green procurements, smarter transport solutions and optimal packaging. The cities intend to reduce the amount of waste generated by changing consumption patterns, reuse, and recycling.

4. Adaptation to climate change (managed by the Ministry of the Environment)
Climate change will lead to major structural and societal changes: rising sea levels, more precipitation and wind, greater likelihood of flooding and changes in biodiversity. Cities of the Future is working to adapt to climate change. Trade and industry will be an important partner in the work to minimise the negative effects of climate change and clarify the economic consequences.

Photo: www.colourbox.com

BOX 8. THE CLIMATE AGREEMENT

On 25 June 2007, the Government published Report no. 34 (2006–2007) to the Storting on Norwegian climate policy. The climate policy report contains Norway's long-term goals for climate policy, climate action plans for the various different sectors, and targets for the main emissions sectors in Norway. Action plans have been published for petroleum and energy, transport, industry, primary industries and waste, for municipal efforts to combat climate change, and operation of the central government sector. The Storting's deliberation of the climate policy report resulted in the Climate Agreement between the governing political parties and the Conservative Party (Høyre), the Christian Democratic Party (Kristelig Folkeparti) and the Liberal Party (Venstre). The Climate Agreement is central to this action plan. Regarding the building sector, the Climate Agreement states:

1. **Priority to energy-efficient buildings through Enova**
   - This is based on part of the increase in the Energy Fund being earmarked for Enova's programme for Buildings, Housing and Construction to allow greater opportunities for development and implementation of efficient new building techniques and materials.

2. **Phase out oil-fired heating through Enova**
   - The parties are giving priority to measures to replace oil-fired heating with renewable energy.
   - The Government will assess banning replacement of old oil-fired boilers with new ones in existing buildings.

3. **Action plan for transition from fossil to renewable sources of energy for heating**
   - The parties have agreed that targeted, coordinated use of instruments shall be enforced to increase development of bio-energy by up to 14 TWh by 2020.
   - The parties have agreed that a support scheme shall be established for conversion from oil-fired heating to renewable heating under the auspices of Enova.
   - They also agree that work shall be continued to ensure that people do not replace oil-fired heating with electricity when replacing oil-fired boilers in existing buildings.
   - The parties are going to assess banning installation of oil-fired boilers in new buildings under the Planning and Building Act.

4. **Building standards**
   - The parties regard it as important that the energy specifications in the Technical Regulations to the Planning and Building Act are revised much more frequently than has been normal to date – and as a minimum every five years.
   - The parties agree that experiences with passive house standards shall be followed up, and introduction of a requirement that all new buildings must comply with the passive house standard by 2020 shall be assessed.

5. **The Low-Energy Programme**
   - The parties agree that the new Low-Energy Programme must be given greater priority. Sufficient funding must be set aside for training and competence building in the industry, carrying out exemplary projects, and research and development of more energy-efficient and eco-friendly building materials and solutions.

6. **Monitoring and inspection of building projects**
   - The parties regard the current system of self-inspection in building projects as unsatisfactory, and there is consensus that new, more stringent rules shall be introduced concerning monitoring and inspection in building projects in connection with the new Planning and Building Act.

Continues overleaf ▶

Photo: www.colourbox.com

- The parties believe that new energy requirements will be an important area for closer follow-up of building projects and greater inspection activity on the part of the local authorities.

7. Energy conservation

- The parties have agreed that good support schemes shall be established through the Norwegian State Housing Bank and Enova for energy conservation measures in companies and private homes.

8. Flexible energy systems for heating public buildings

- The parties agree on introduction of requirements concerning flexible energy systems in all new public buildings and in connection with major remodelling of public buildings larger than 500 m^2.
- The parties agree that oil-fired heating should be banned as the base load in public buildings and commercial buildings larger than 500 m^2 in connection with replacing old oil-fired boilers or major remodelling that encompasses the heating system.

9. Energy check

- The parties agree that work shall be continued on a scheme offering energy checks in homes in order to realise simple, effective ways of saving energy by 2009.

10. Climate standard for state procurements

- The parties agree that concrete requirements shall be set regarding energy consumption and energy supply in public building projects. Where practical, the requirements should be more stringent than the minimum requirements in the Technical Regulations.

BOX 8. NEW RESEARCH CENTRE ON ZERO EMISSION BUILDINGS (ZEB)

Centres for Environment-friendly Energy Research (FME) have been established against the backdrop of political signals, including the Climate Agreement. The Research Centre on Zero Emission Buildings (ZEB) is one of the first eight research centres established with funding from the Research Council of Norway and is a collaboration between SINTEF Building and Infrastructure and the Norwegian University of Science and Technology (NTNU) and will run from 2009 to 2016. The centre has been awarded NOK 15 million for its first year (and with its partners and NTNU, the budget for the first year amounts to NOK 40 million). The Faculty of Architecture and Fine Art at NTNU is responsible for the project, which will develop buildings with zero greenhouse gas emissions from a lifecycle perspective including production of components and materials to operation and demolition of the building. The centre will do research in a wide range of areas from research on materials to research on entire buildings and systems in buildings, and will develop new materials and components to replace ones currently in use that are not good enough. The goal is to present practical built examples after a few years, proving that zero emissions are possible within a reasonable financial framework and with the expected standards of comfort.

Passive house, Grimstad Photo: The Norwegian State Housing Bank Architect: Arkitektfimaet Bengt G. Michalsen AS

3 Reduce the need for energy in buildings

All energy use entails some kind of environmental impact, such as emission of greenhouse gases, local pollution of the water and soil, intervention in the landscape, etc. In Norway, energy consumption in buildings is dominated by electricity. Electricity is largely a renewable resource in Norway. Nevertheless, inherent in the energy conversion concept is the call for electricity to be replaced by renewable energy where appropriate. Use of electricity for heating should be limited by enabling more water-borne heating (cf. Report no. 29 (1998–1999) to the Storting on Norwegian energy policy, where the term energy conversion was introduced). One of the reasons for this is the need for a more reliable energy supply. In principle, oil-fired heating should not be used in new buildings. The Government has set a target of increasing development of bio-energy by 14 TWh by 2020. Water-borne heat or similar flexible heating systems that can be used with a variety of different renewable energy sources ought to be the standard in the future.

Energy consumption in the housing and building sector is estimated to constitute around 40 per cent of total energy consumption nationally and globally. Energy consumption in Norwegian households and business premises has levelled off and is now beginning to sink. However, Enova's building statistics indicate that the category new commercial buildings is using increasing amounts of energy, primarily based on electricity and oil. The greatest increase is in energy consumption for ventilation and cooling. Statistics Norway publishes the official statistics on energy consumption in Norway. In June 2009, the Low Energy Commission submitted its report to the Minister of Petroleum and Energy. The commission proposes halving energy consumption in buildings by 2040. According to the commission, a reduction of this magnitude can be achieved by ensuring investment in energy efficiency in connection with major renovations, energy conservation measures in other existing buildings, and introduction of tighter requirements for new buildings.

TABLE 1. ENERGY CONSUMPTION IN NORWEGIAN BUILDINGS IN 2002 AND 2006 IN TWH
(SOURCE: ENOVA'S BUILDING STATISTICS)

	Total energy consumption		Of which total energy consumption for heating		Of which heating using electricity	
	2002	**2006**	**2002**	**2006**	**2002**	**2006**
Housing	47	44	29.5	27	20.5	19
Business	35	30	18	15	12.5	10
Total	82	74	47.5	43	33	29

Photo: ROJO Arkitekter AS

Since all energy generation has some kind of impact on the environment, it is important to reduce energy needs. According to models that SINTEF Building and Infrastructure is working on, measures to ensure a gradual decrease in the energy needs of new and existing buildings will be able to reduce the energy need in buildings by some 50–60 per cent by 2040.

The energy requirements defined in the Technical Regulations to the Planning and Building Act (TEK) in 2007 reduce the energy need in new buildings by 25 per cent compared with the former requirements. New European directives on energy use entail phasing out fossil fuels and greater use of renewable energy. In addition, the directives define strict constraints for tightening the requirements by minimising energy needs in buildings.

The proposed new directive to promote energy efficiency in buildings was submitted by the European Commission on 13 November 2008 (COM (2008) 780 final). This directive proposes amendments to the former building energy directive (Directive 2001/91/EC). The proposal is currently being deliberated by the European Parliament and the Council of Europe. During treatment of the bill in the Parliament, the proposal was forwarded that by 2019 all new buildings shall generate as much energy as they consume. The European Parliament also wants the member states to prepare national action plans by mid-2011 containing a strategy for increasing the number of buildings with ultra-low or zero CO_2 emissions and energy consumption. There has also been a call for requirements concerning renovation of buildings and compliance with minimum standards. It has been suggested that the new requirements shall apply when more than 25 per cent of the facade is going to be renovated. The new requirements shall also apply in renovation projects exceeding 20 per cent of the value of the building.

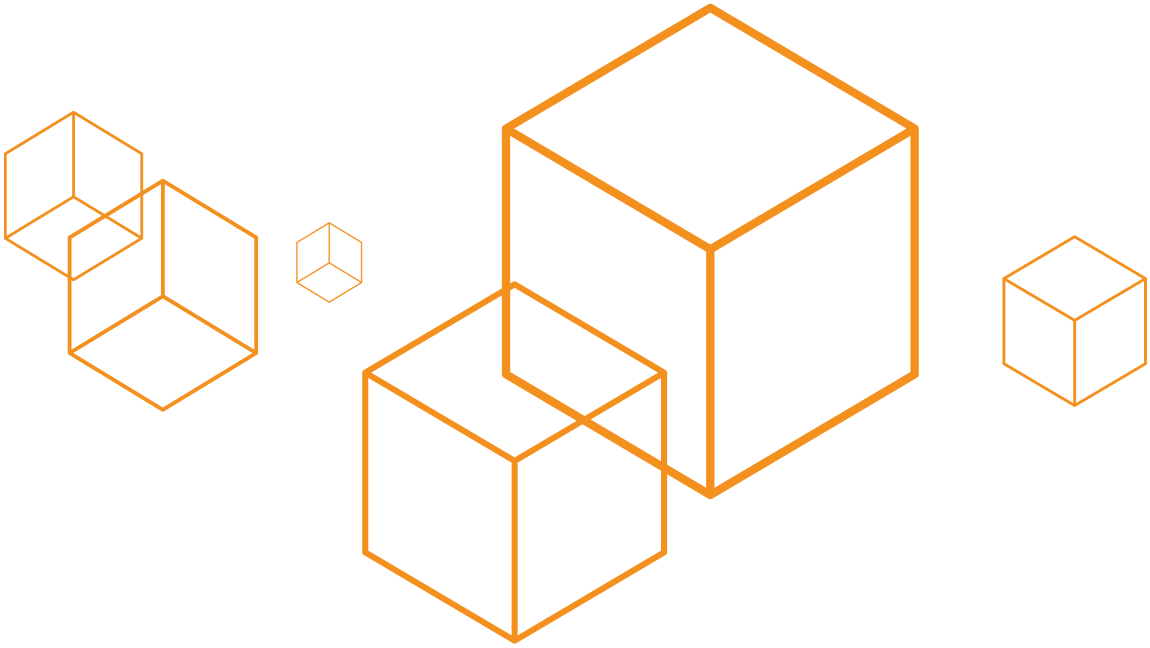
In this environmental action plan, it is assumed that it will be assessed whether the technical building code shall include requirements on the same level as the passive house standard for all newly constructed buildings by 2020. A major challenge in the future will be reducing energy consumption in existing buildings.

Focus area 2: Reduce the need for energy in buildings		
Sub-goal	**Measures**	**Ministry responsible**
Reduce energy needs and increase use of renewable energy in the building sector through new requirements and opportunities in legislation and regulations.	Advisory material on the planning part of the new Planning and Building Act will be prepared in 2009–2010 and will include information about the opportunities afforded by active use of the new planning provisions. The new Planning and Building Act gives local authorities powers to prepare local climate and energy plans as municipal area plans. The local authorities can demand that new buildings have infrastructure for the supply of water-borne heating in the land-use part of the municipal master plan and the zoning plan.	MD
	A group will be established with representatives from the authorities, the building industry and other affected parties that will be responsible for developing a schedule for increasing energy efficiency in new and existing buildings. The group shall propose regulatory and economic measures.	KRD
	The requirements concerning heat recycling in ventilation systems in commercial buildings in the Technical Regulations (TEK) are going to be tightened in 2010.	KRD
	The National Office of Building Technology and Administration will contribute to developing a Norwegian standard that defines the passive-house and low-energy standards in the Technical Regulations for homes in 2009 and for business premises in 2011.	KRD
	Assess making the passive house standard a requirement for all new buildings in 2020 by tightening the energy requirements in Technical Regulations at least every five years up until 2020.	KRD
	The new planning part of the Planning and Building Act gives the local authorities the opportunity to demand that new buildings have infrastructure for the supply of water-borne heating in development areas in 2009. This will allow connection to district heating.	MD
	Ensure that technical systems work efficiently with minimal impact on the environment through introduction of obligatory regular energy assessment of boilers over 20 kW and climate control systems over 12 kW in non-residential buildings and public buildings from 2010 (cf. Proposition no. 24 (2008–2009) to the Odelsting). See box 4 on the energy labelling scheme.	OED

Sub-goal	Measures	Ministry responsible
Reduce energy needs through support for energy-efficiency and/or use of renewable energy.	• Support programme through Enova for innovative energy solutions • Support programme through Enova for introduction of new technology • Enova's support programme for buildings, housing and construction	OED
	When awarding basic loans, the Norwegian State Housing Bank will give priority to projects with high ambitions in the areas environment, energy and universal design, with certain exceptions, for example, housing for disadvantaged people.	KRD
	The Norwegian State Housing Bank will support exemplary projects and regional passive house centres.	KRD
	The Norwegian State Housing Bank will provide financial support for the Urban and Housing exhibition in Oslo and Drammen to promote more exemplary projects within environmental building and universal design.	KRD
	The Norwegian State Housing Bank will support good R&D projects that contribute to development of new technology and energy-efficient housing solutions.	
	The Norwegian State Housing Bank will enter into collaboration agreements with companies in the construction and property industry concerning energy-efficient homes.	
Increased expertise in energy-correct building and more efficient communication of knowledge about energy use in buildings.	The Research Council of Norway is supporting eight time-limited centres for environment-friendly energy research (FME) with a budget of NOK 10–20 million per centre in the first year. The scheme is planned to last for eight years. The purpose of this support is to help resolve specific challenges linked to energy and environmental issues. Zero Emission Buildings (ZEB) is one of the centres. ZEB is going to focus on research, innovation and implementation of products and solutions that will result in buildings with ultra-low energy needs and zero emissions of greenhouse gases in connection with construction, operation and demolition. The centre is managed by the Norwegian University of Science and Technology (NTNU).	OED

Sub-goal	Measures	Ministry responsible
	In consultation with other ministries, the Ministry of Local Government and Regional Development will assess how the experiences gained from programmes such as the Environmental Secretariat for the Norwegian Building Industry and the Building Costs Programme can be applied in a continued collaboration with the construction and property industry in terms of environmental issues, energy and quality in the building industry.	KRD
	The Norwegian State Housing Bank will enter into collaboration agreements with educational institutions to help ensure that students at universities and regional colleges in all parts of Norway receive better training in passive house and low-energy projects.	KRD
	Statistics Norway has the main responsibility for official statistics in Norway, including statistics on greenhouse gas emissions. The central government shall contribute to improving the statistics on energy consumption, i.e. energy consumption in homes and buildings in particular, by comparing information from the Norwegian Water Resources and Energy Directorate's system with building data recorded in the Cadastre (see section 1.7 on statistics and the Cadastre and figure 1 on the Cadastre.)	MD/OED
	Enova's service Enova Answers is an advisory service for professionals and private individuals via telephone, e-mail and online. In addition, training and seminars will be organised aimed at private and public players linked to the housing and building sector.	OED
Stimulate demand for energy-efficient buildings, building solutions and products.	Raise consumer awareness about household appliances' energy consumption and resource use through the energy labelling scheme for household appliances. (Under the Energy Labelling Scheme, household appliances are given an energy consumption label that provides a simple illustration of the item's energy consumption using a graded scale.)	OED
	Enova Recommends is a scheme that aims to make it easier for people to choose products with good energy performance. The Enova Recommends scheme currently covers triple glazed low-energy windows. Enova is considering expanding the scheme to include more product types.	OED

Sub-goal	Measures	Ministry responsible
	The energy labelling scheme will be introduced from 2010 (see box 4). The owners of a building are responsible for ensuring that the building has an energy certificate with the energy-efficient label when selling or letting a property. Designers are responsible for issuing the energy consumption label for new buildings. Non-residential buildings shall be labelled regularly, and the energy consumption label shall be displayed at the entrance. The energy labelling scheme includes a list of ideas for measures to further improve energy efficiency in the building.	OED
	Free flow of environment-friendly and energy-efficient products shall be ensured in the EU and EEA through follow-up of the European eco-design directive (2005/32/EC). This framework directive shall be followed up with implementing regulations, under the Product Control Act, for selected groups of products.	OED
	The Ministry of Local Government and Regional Development wants to make sure that good examples of modern, eco-friendly, universally designed architecture in Norway are made easily available, for example by continuing to support the NAL |Ecobox project database.	KRD
	Candidates for the annual National Award for Good Building and Environmental Design (Statens byggeskikkpris) must meet certain basic environmental requirements. These pertain to use of materials and energy requirements, amongst others.	KRD
The state as an example.	Statsbygg must have good competencies in: • energy use in technical systems and energy consumption in different types of buildings and different locations • calculating energy consumption and energy costs • alternative heating systems • energy management.	FAD
	Measures shall be implemented to ensure that buildings planned and designed by Statsbygg have an average energy consumption of 180 kWh/m^2. Specific energy targets shall be set and adapted for each individual project.	FAD
	Measures shall be implemented to reduce degree-day-corrected energy consumption in Statsbygg's properties by 7 per cent compared with a set target of 210 kWh/m^2.	FAD
	When allocating grants for nursing and care buildings, the Norwegian State Housing Bank will attach importance to the projects ensuring energy-efficient solutions.	HOD



BOX 9. BIM AND BUILDINGSMART IN STATSBYGG

BIM technology allows new, more efficient ways of collaborating in the building industry. The buildingSMART initiatives are bringing about a standardised development of the information flow based on international standards.

BIM stands for both:

a. Building Information Model – the end product, and
b. Building Information Modelling – the process. The constructions that Statsbygg wants to model (primarily buildings and other constructions with areas, components, installations and equipment) are established as objects (e.g. a door) that can be ascribed characteristics (e.g. fire-resistance class EI-60).

BIM technology can be coordinated and communicated with a high degree of precision and, if used correctly, helps prevent construction errors and reduce the amount of waste generated. Through R&D, Statsbygg has developed new tools for climate analyses for the building sector. One of the results of this is the website www.klimagassregnskapet.no that allows you to analyse a building's carbon footprint. Using BIM models and GIS analyses affords the state and other users many new possibilities in climate policy linked to building, localisation of functions and use of properties. BIM technology makes it possible to analyse buildings' energy consumption early in the planning phase and thus design and build more energy-efficient buildings

A development strategy has been prepared for how Statsbygg should gradually start using BIM in new building projects up until 2010. The strategy was to use Statsbygg's own organisation as a development arena, combined with active use of Norwegian collaboration partners, for example through Public Research and Development (OFU) Contracts and other R&D instruments. This strategy has subsequently been anchored in the Government's innovation report (Report no. 7 (2008–2009) to the Storting). Statsbygg has also been working actively for standardisation and widespread use of BIM through the buildingSMART collaboration. Key to the strategy is active deployment of Statsbygg's market power as a demanding client. Statsbygg is subject to constraints laid down by the Ministry of Government Administration and Reform and has a duty to keep abreast of ICT developments and through its own activities help develop the Norwegian construction and property industry.

ABO Plan & Arkitektur AS Photo: Knut Egil Wang

The National Office of Building Technology and Administration (BE) has a duty to facilitate electronic communication in planning and building projects in the private and public sectors. The measures are based on two areas:

- The National Office of Building Technology and Administration develops and operates ByggSøk, which is a system for electronic communication for the building industry and the Government, for private zoning plans (ByggSøk-plan) and building applications (ByggSøk-bygning).
- The National Office of Building Technology and Administration has the overall responsibility for ensuring that open national and international standards are developed enabling electronic communication between computer systems in the building industry.

Electronic communication in the building industry is based on open international standards called buildingSMART. Using these standards, building information models (BIM) can be developed that can communicate with any software that supports the buildingSMART standards. Using BIM, the building industry can develop digital models of buildings before they are built. The models provide good support for making decisions using visualisation, simulation and enabling analyses to be performed. This paves the way for hitherto unknown possibilities in developing energy-efficient solutions etc. at a stage where this does not incur huge costs. The models can also be useful in the building phase and the operating phase. The latter can be very important, not least in terms of optimising energy use in a building.

BOX 10. KOBE

KoBE is a competence-building programme under the National Office of Building Technology and Administration for municipal and county property management. Competent property owners and managers are an important prerequisite for the local authorities to be able to realise the goal of owning and operating their buildings and property management efficiently. Good maintenance and good operation of buildings constitute good property management and contribute to efficiency and good municipal economy. This in turn helps reduce the environmental impact in terms of greenhouse gases and pollution, contributes to equivalence for users through universal design, and gives the municipality a good reputation.

BOX 11. USING WOOD AND BIO-ENERGY

Use of wood as an eco-friendly, renewable material that can substitute other more energy-intensive materials combines good environmental solutions with a pleasing aesthetic expression. The annual felling of timber in Norway constitutes roughly one-third of the annual growth. Thus, even within the limits set pursuant to environmental standards and the Forestry Act, there is a huge potential for greatly increasing the annual cut and thereby increasing the amount of eco-friendly timber available for construction and energy purposes. The Ministry of Agriculture and Food is responsible for Innovation Norway's Wood Innovation scheme. Greater use of wood can also help reduce the building industry's climate footprint and promote more sustainable development (ref. Statsbygg's climate account and www.klimagassregnskap.no).

Bio-energy is an environment-friendly source of energy. The Government has set the target of increasing development of bio-energy by 14 TWh by 2020. Bio-energy resources are diverse and include products from forestry and the waste sector. The most common uses are household heating, processing, heat and power generation in industry and district heating and small heating plants. There is also a potential for increased use of biogas from sewage and waste, and use of biodiesel and bioethanol for transport. The Ministry of Agriculture and Food is responsible for Innovation Norway's Bioenergy Programme.

Preikestolhytta mountain lodge, Jørpeland Photo: Jiri Havran Architect: Helen & Hard AS

4 Chart and minimise use of hazardous substances in building

Buildings are made up of many different components and materials. Innovation, development and new building techniques mean that new products are always appearing on the market. Too little attention has been paid to generating knowledge about the health and environmental effects of the substances that the products contain. Harmful environmental effects of not only new, but also well-established products on the building market are constantly being discovered. It is also the case that hazardous substances that are prohibited in buildings being built today can still be found in existing buildings. (see box 12 and figure 2). In many places, previous activities mean that the ground is polluted.

Figure 2

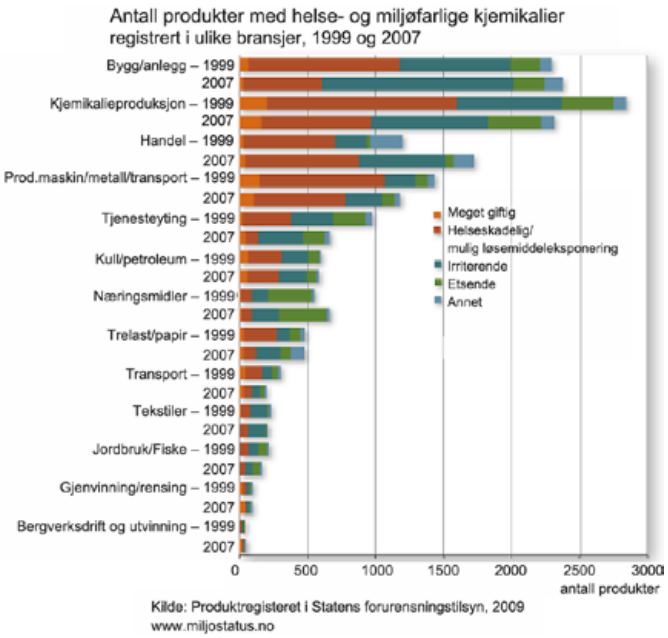


Figure 2 shows the number of products containing substances that pose a health or environmental hazard declared to the Product Register in 1999 and 2007 distributed according to hazard classification. It is clear that the building and construction sector is one of the largest users of products containing chemicals hazardous to health and the environment in 2007. The proportion containing toxic substances and directly harmful substances is decreasing, while the category "irritants" is increasing.

According to the Product Control Act, everyone who uses products that may contain substances that pose a health and/or environmental hazard (e.g. property owners and contractors) has a duty to assess whether the products can be replaced with less harmful alternatives (the substitution obligation). The Norwegian Pollution Control Authority has found that large parts of the construction and property industry do not comply with the substitution obligation or consider their use of hazardous substances. In light of this, they initiated a special control campaign in 2009. The ultimate objective of this campaign and other measures is adoption of a precautionary approach in the industry regarding use of components that have a harmful or unknown environmental impact. A precautionary approach means that only materials and products whose environmental impact is known and is low are used, as opposed to materials and products containing substances whose environmental impact is unknown.

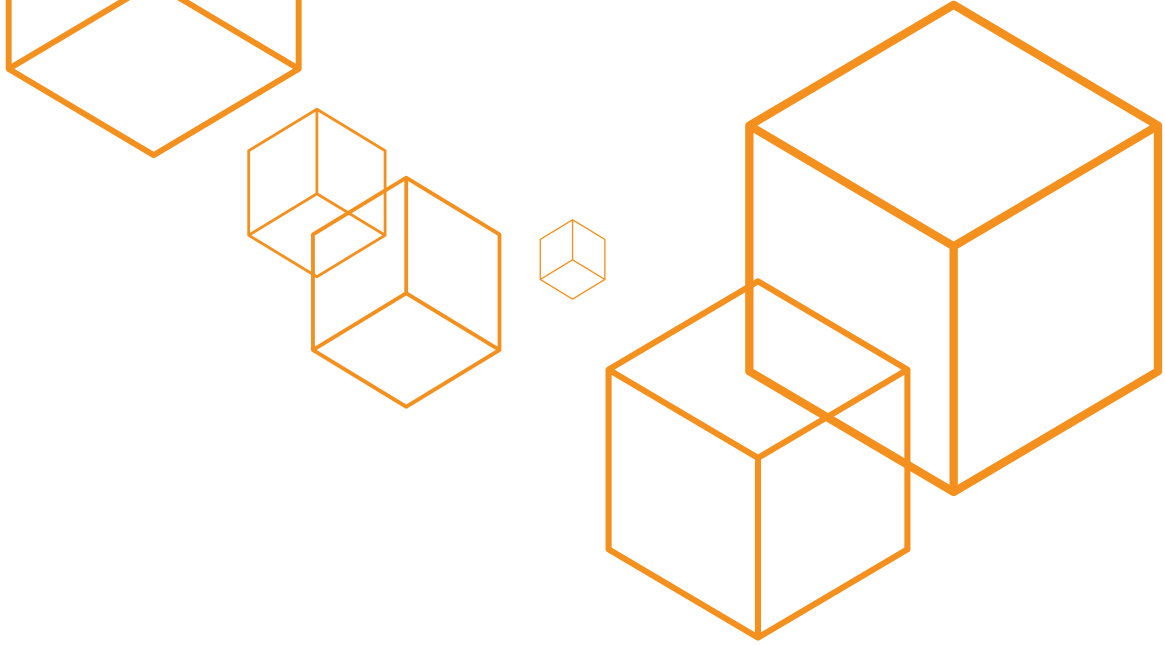
Helen & Hard AS Photo: Jiri Havran

In practice it can be hard to avoid using some substances and chemicals with known harmful or polluting effects that are still lawful ingredients in building materials. The authorities have identified some substances that should be handled with care and under controllable conditions. The authorities are compiling a "priority list" of the substances that should be phased out over time. The new European chemicals regulations REACH entail common registration and authorisation of new and existing chemicals. Norway has implemented the regulation through the EEA Agreement. REACH replaces part of the Norwegian chemicals regulations and is gradually being phased in in Norway.

The Government has set itself the goal of continuously reducing the use and emission of environmental toxins with a view to stopping all emissions by 2020. In 2009, the Government established a commission that will present an official report by mid-2010, with proposals for how this can be achieved. The commission shall propose concrete measures that can help ensure the 2020 target is met. The commission's proposals will be assessed in light of the conditions that prevail in the housing and building sector.

Focus area 3: Chart and minimise use of hazardous substances in building		
Sub-goal	**Measures**	**Ministry responsible**
Continuous reduction in emissions of environmental toxins with a goal of zero emissions by 2020.	Instruments to reduce emissions of environmental toxins shall be developed and shall target products at production, use and disposal.	MD
	National action plans, for example for PCB, must be followed up.	MD
	A public commission has been established, the Environmental Toxins Commission, which shall propose how emissions of substances that have a harmful effect on the environment can be stopped in keeping with the 2020 target.	MD
	The Ministry of Local Government and Regional Development will assess how the Environmental Toxins Commission's recommendations concerning phasing out pollutants should be followed up in the building regulations from around 2012. For example, a mandatory labelling system for building materials could be introduced through the Technical Regulations to the Planning and Building Act (TEK).	KRD

Sub-goal	Measures	Ministry responsible
The use of products and substances hazardous to health and the environment in building shall be reduced. More buildings and products shall be eco-labelled.	Information must be spread about the substitution obligation, and tools must be developed for assessing the environmental properties of materials and products.	MD
	Collaboration agreements and letters of intent shall be entered into with players that can ensure more eco-labelled housing.	KRD/FAD
	The Ministry of Local Government and Regional Development will provide incentives for more building projects to use eco-labelled building materials.	KRD
	Steps shall be taken to make it easier for consumers to choose environment-friendly building materials, products and substances with ethical and sustainable origins. This may include, for example, investment in eco-labelling schemes such as Svanen and Blomsten, and use of the Boligportalen portal.	Ministry of Children and Equality
Stimulate research, analysis, information and better statistics.	The Norwegian Mapping and Cadastre Authority will link data about soil contamination to the Cadastre from 2010, thus making relevant environmental information more readily available in planning work and processing building applications. The Ministry of the Environment will work to ensure that advisory material on the use of topical geodata (environmental data) will be prepared in a way that makes it easy to use these kinds of data in planning work. See figure 1 and section 1.7 for more information on statistics and the Cadastre.	MD
	The central government will collaborate with the construction and property industry on raising awareness and knowledge about substances, products and materials that pose a health and/or environmental hazard.	KRD/MD



Sub-goal	Measures	Ministry responsible
	In consultation with other ministries, the Ministry of Local Government and Regional Development will assess how the experiences gained in programmes such as the Environmental Secretariat for the Norwegian Building Industry and the Building Costs Programme can be applied in a continued collaboration with the construction and property industry in terms of environmental issues, energy and quality in the building industry.	KRD
The state as an example.	The plan of action for environmental and social responsibility in public procurement shall be followed up (cf. environmental policy for public procurement 2007–2010).	MD
	Statsbygg will improve its understanding of the environmental impacts when choosing products and materials, reduce its use of harmful substances and encourage choice of environmentally sound materials in the building industry. Statsbygg shall participate in development of user-friendly tools for choosing environmentally sound materials. Read more about Statsbygg's environmental work on Statsbygg's website, www.statsbygg.no.	FAD
	The Norwegian Defence Estates Agency shall set concrete environmental requirements for all newbuild projects from 2009, and will use the materials databank as an important tool to document statutory and regulatory requirements for choice of eco-friendly materials in 2009.	FD
	When allocating grants for nursing and care buildings, the Norwegian State Housing Bank will attach importance to the projects ensuring that they avoid using substances that pose a health and/or environmental hazard.	HOD/KRD

BOX 12. SUBSTANCES HAZARDOUS TO HEALTH AND THE ENVIRONMENT – HAZARDOUS CONSTRUCTION WASTE

The following areas require particular attention when charting environmental performance:

- Insulation against harmful abrasives.
- Insulation against brominated flame-retardants.
- Vinyl flooring containing phthalates.
- Environmental toxins in windows.

The regulations on construction waste are being transferred from the Pollution Control Act to the new Planning and Building Act in 2010 and will require environmental analysis of all buildings that are going to be renovated or demolished. The holder of the waste is responsible for knowing what is in the waste. The building and construction industry is thus responsible for ensuring proper handling of all hazardous waste. The industry must also be aware of its duty to substitute harmful products with more eco-friendly alternatives to minimise future hazardous waste.

The Norwegian Pollution Control Authority (SFT) and the industry have collaborated on identifying new types of hazardous waste in the building and construction industry. Among other things, they found large quantities of harmful phthalates in vinyl flooring. The building and construction industry must ensure that this waste is disposed of properly.

PCBs used to be used in paint, plaster, flooring, etc. A new study published by the Geological Survey of Norway (NGU) shows that there are higher levels of PCBs in current buildings and installations than previously estimated. Calculations indicate that there are still just under 140 tonnes of PCBs in existing buildings in Norway, of which PCBs in paint and plaster etc. constitute approx. 100 tonnes. It is therefore important to take samples before buildings are redeveloped or demolished.

The results of analyses of vinyl flooring indicate that some types of floor coverings contain more than 10 per cent of DEHP phthalates – a group of substances used primarily to soften plastics and that are found in many products in daily use. Vinyl flooring is categorised as hazardous waste if it contains more than 0.5 per cent DEHP.

Upper secondary school Videregående Steinerskole Skjold, Bergen Photo: Bent Rene Synnevaag Architect: 3RW arkitekter AS

5 Ensure good indoor climate in buildings

A good indoor climate is a matter of comfort and health. The indoor climate should feel comfortable, which means good light, the right temperature, no draughts or unpleasant smells – and it should not expose us to substances that pose a health or environmental risk. Indoor climate is affected by very many different factors – ranging from the conditions outdoors and noise exposure, via layout solutions, to technical aspects of the buildings and choice of materials. How buildings are furnished, used and operated also plays an important role. Along with emissions of gases from components and materials in the building, indoor temperature, ventilation and use of the buildings, the most common challenges are related to humidity in buildings. Among the most serious consequences linked to people's health is exposure to radon emanating from the ground. A poor indoor climate must be assumed to have major socio-economic consequences.

The correlation between indoor climate in buildings, comfort and health is complex. At the beginning of the 1990s, the World Health Organisation (WHO) turned the spotlight on this and the at times serious health consequences believed to be caused by poor indoor climate. Since then, the state building authorities, the health authorities and the construction and property industry have collaborated to improve indoor climate in Norwegian buildings. This has resulted in development of new regulations and information campaigns. The Homes and Health campaign started in 1993 and was evaluated in 2002. The 1993 campaign has resulted in improvements in indoor conditions. Over the last 15 years, we have acquired new and better knowledge about choice of solutions and how building materials affect the quality of the indoor climate. In 2009, a revised compendium for the Homes and Health campaign was published. The purpose of the revision was to make everyone aware of the issues: developers, the building industry, owners and operating staff. The compendium concentrates on demonstrating important correlations between poor indoor climate and the consequences for people's health and perceived comfort, and how we can help ensure that new knowledge is applied to improve indoor conditions.

Focus area 4: Ensure good indoor climate in buildings		
Sub-goal	**Measures**	**Ministry responsible**
Good indoor climate.	Consent must be obtained from the Norwegian Labour Inspection Authority for construction, alteration, reorganisation, etc. of buildings to ensure that physical factors in the working environment meet all the requirements linked to ensuring the employees' health, working environment, safety and welfare.	AID
	In 2009, the Norwegian Labour Inspection Authority has inspected several hundred schools, with indoor climate as one of the focus areas. Inspections shall be carried out in connection with specific campaigns and whenever work-related illness is reported.	AID

Sub-goal	Measures	Ministry responsible
	When allocating grants for nursing and care buildings, the Norwegian State Housing Bank will attach importance to the projects ensuring a good indoor climate and reduced use of substances that pose a health and/or environmental hazard.	HOD/KRD
	In 2009, a broad review is being undertaken of environmental health care, including indoor climate issues. It will include an assessment of knowledge and expertise in this area, the need for advice, whether the regulations need amending, organisation of the service, inspection systems, etc. (cf. the national strategy for prevention and treatment of asthma and allergies).	HOD
	In connection with the revision of the Technical Regulations to the Planning and Building Act in 2010, requirements will be introduced concerning documentation of important factors that will enable good operation of buildings.	KRD
	The National Office of Building Technology and Administration will take the initiative to prepare a Norwegian Standard for thermal comfort. The Standard shall be published by 2011.	KRD
	In consultation with the Radiation Protection Authority, the National Office of Building Technology and Administration will carry out information and training activities in 2010 on factors that affect the indoor climate, aimed at the building and construction industry. Some of the activities will be organised under the Homes and Health programme.	KRD/HOD
	The National Office of Building Technology and Administration will work to ensure that pan-European testing methods are defined for indoor emissions of harmful substances by 2012. The requirements will be included in the Technical Regulations to the Planning and Building Act.	KRD
Radon levels in buildings shall be minimised.	In 2010, a minimum requirement will be introduced in the Technical Regulations concerning radon prevention in new buildings (see the strategy to reduce radon exposure in Norway).	KRD

Steinsvik arkitektkontor AS Photo: Ecobox project database

Sub-goal	Measures	Ministry responsible
	An assessment will be undertaken in 2010 concerning introduction of statutory limits on radon concentrations in day-care facilities, schools and rental accommodation, pursuant to the Radiation Protection Act.	HOD
	The population shall be informed about radon, the health risks it entails, detection and what they can do to minimise radon in their homes (see the strategy to reduce radon exposure in Norway).	HOD
	No new buildings owned by the Norwegian Defence Estates Agency shall have above-normal radon levels. Requirements concerning measuring radon radiation will be incorporated into project plans.	FD
	A system shall be devised to ensure that information about recorded radon levels in the Radiation Protection Authority's internal system is linked to the national geographical infrastructure in Norway Digital by 2011 at the latest.	MD/HOD

Pilestredet Park, Oslo Photo: Marte G. Johnsen Landscape architect: Bjørbekk & Lindheim

6 Prevent waste generation and increase reuse and recycling of building materials

Each year construction of new buildings, renovations and demolition work generate approx 1.5 million tonnes of waste. This is nearly as much as the total volume of household waste in Norway. Large quantities of this waste are not disposed of properly. Most of the waste consists of materials that are relatively clean and can be dumped, burnt or reused, but new types of hazardous waste from building and construction are constantly being discovered (see box 12).

The ban on dumping biodegradable waste came into force on 1 July 2009. The ban entails that biodegradable waste such as paper, wood, wet-organic waste, textiles and sludge must be disposed of by some means other than dumping. In connection with construction, renovations and demolition, the waste producer (the developer and responsible contractor) is responsible for ensuring that all construction and site waste is handled properly in accordance with the regulations. The dumping ban will also entail a considerable decrease in the amount of waste dumped; instead it will be used for energy recycling, for example.

A number of materials contain environmental toxins, such as PCB for example, and other types of hazardous waste that it is important to handle properly. 1. On 1 January 2008, the Ministry of the Environment's regulation on construction waste entered into force. The regulation requires preparation of waste disposal plans in all construction and demolition projects over a certain size. In connection with demolition projects, an environmental restoration description must also be prepared charting the hazardous waste. It is a general requirement for all projects that 60 per cent of the waste is sorted on site. The statutory waste management plan is currently warranted in the Pollution Control Act, but will be incorporated into the building part of the new Planning and Building Act when it comes into force in 2010.

Photos: www.colourbox.com

Focus area 5: Prevent waste generation and increase reuse and recycling of building materials		
Sub-goal	**Measures**	**Ministry responsible**
Increase buildings' useful life.	Buildings must be of good quality, including choice of building solutions that protect against outdoor moisture and other external strains.	KRD
Reduce amount of waste generated.	A requirement of maximum 20 kg of waste per m^2 shall be considered for new buildings in the Technical Regulations in 2012.	KRD
More recycling and reuse.	Requirements concerning waste management plans and environmental restoration in connection with building and demolition activities will be transferred from the Pollution Control Act to the new Technical Regulations in 2010. Requirement that 60 per cent by weight of waste be sorted at the construction site.	KRD/MD
	In the Cities of the Future scheme, reuse analyses will be performed showing developments in consumption patterns and waste generation. See box 6 on Cities of the Future.	MD/KRD/OED
	Preparations shall be made in 2010 for introduction of municipal inspection of waste management, to help ensure that the new regulations are actually implemented.	KRD
	When allocating grants for nursing and care buildings, the Norwegian State Housing Bank will attach importance to the projects ensuring reuse of building materials.	HOD/KRD
All hazardous waste shall be handled properly. Generation of different types of hazardous waste shall be reduced.	Environmental restoration plans are required in renovation and demolition projects.	KRD/MD
	Inclusion of a mandatory labelling system for building materials containing hazardous substances in the 2012 Technical Regulations will be considered, partly to make it easier to sort out hazardous waste.	KRD
Stimulate research, analysis, information and better statistics.	The ministries and their associated enterprises shall help ensure that Statistics Norway's annual statistics on construction waste are circulated in the construction and property industry.	KRD/MD

Photos: www.colourbox.com

Sub-goal	Measures	Ministry responsible
	New building materials must be charted and classified according to their waste components, and increased use of these kinds of building materials should be encouraged. Information about the waste components in building materials must be systemised.	KRD
	Collaboration agreements and letters of intent shall be entered into with selected players in the construction and property industry to ensure good waste management.	KRD/MD
The state as an example.	Measures shall be implemented to assess the need for demolition and prevent mismanagement of hazardous waste in the building industry, and to achieve an average waste volume for new buildings of 25 kg/m2 gross floor space, and 60 per cent source sorting (incl. demolition).	FAD
	A requirement of 70 per cent recycling in all building and demolition projects will be introduced in 2010.	FD

Universet students' day-care centre, Tromsø Photo: Jiri Havran Architect: Steinsvik Arkitektkontor AS

7 General topics that affect environmental status in the housing and building sector

Areas other than those discussed in this plan will also be important for the work to make the housing and building sector more environment-friendly. Below is a brief presentation of the main ones.

7.1 Biodiversity

Norway wants to halt the loss of biodiversity. Planning on all levels in the housing and building sector strive to ensure protection of prioritised species and their habitats and selected types of natural environments, chosen to preserve the diversity of nature to the greatest possible degree. Every effort shall be made to ensure that projects are adapted to promote attainment of the goals in sections 4 and 5 of the Nature Management Act. However, measures that may have negative consequences for biodiversity must be weighed up against financial, social and cultural interests and the need for efficient resource management. This may entail that projects are allowed that entail the goals in sections 4 and 5 are met in a different way or at a different rate than would have been the case if biodiversity was the only interest that had to be taken into account. Like other activities that occupy land, the housing and building sector faces challenges in terms of protecting nature. Sections 28-8 and 29-10 of the building part of the new Planning and Building Act allow for regulations to be prepared concerning preserving biodiversity in building projects. A new feature of the planning part of the Act is that green infrastructure is treated as a separate land-use purpose (section 11-7, 3). In the land-use part of the municipal development plan, special zones can be defined for preserving natural areas and areas for outdoor recreation. Provisions may be issued concerning conservation of existing green areas and buildings.

7.2 Architecture and building practice

The Ministry of Local Government and Regional Development and the Ministry of the Environment share the overall responsibility for the Government's work to promote good building practice and site design. The Ministry of Local Government and Regional Development's definition of good building practice entails that buildings and installations are aesthetically pleasing, durable and suited to their purpose. Built objects interact with natural and manmade landscapes, sometimes blending in, sometimes creating an interesting contrast. Good building practice means that the interests of the physical and social environment, use of resources and energy, universal design and aesthetics have also been taken into account.

The state plays several roles in the effort to promote good building practice. The Ministry of Local Government and Regional Development and the Ministry of the Environment make the legislation and regulations that form the legal framework for building and renovation projects. Along with the Ministry of Cultural Affairs and a number of other ministries, work is being done to develop knowledge and information for local authorities, local politicians, the building industry and the general public. The state is a major property developer and manager and wants to be a pioneer and set a good example for others to follow. The state also encourages good examples through its awards for exemplary projects. The National Award for Good Building and Environmental Design is the most prestigious government architecture and building award. Each year the award goes to buildings or constructed environments that help raise, update or develop general building standards. Other state awards include the A.C. Houens Fond Certificate, the Urban Environment Award and the Beautiful Roads Award.

ABO Plan & Arkitektur AS Photo: Knut Egil Wang

Individual buildings, housing and living environments, towns, villages and communities that are designed and built in keeping with good building practice and good architecture increase people's sense of wellbeing and improve the individuals' living conditions. Good building practice promotes a sense of community and helps shape our cultural identity. Homes, buildings and installations designed with lasting qualities are often better cared for and will require less maintenance and renovation over time. Seen from this broad perspective, good building practice is therefore a central element in the development of a more eco-friendly and sustainable society.

Outdoor and recreational areas must be easily accessible from the local surroundings and be linked by continuous green infrastructure that leads from residential areas to natural areas. This will help preserve biodiversity and provides opportunities for physical activity. Housing must also be situated such that future climate challenges have been taken into account and with good access to public transport. Green roofs can act as a supplement to ground-level gardens and green infrastructure, and will diminish or slow down extreme precipitation, make outdoor areas on rooftops more attractive, help cool buildings down on hot summer days and provide greater insulation in winter. Green roofs can also help counteract urban heating and prolong the lifetime of the roof by protecting it from UV radiation.

In autumn 2009, the Government is going to present a document outlining its architectural policy. The vision is that good architecture will yield high quality of life and provide attractive, functional, universally designed buildings and surroundings. The document uses a very broad definition of architecture. In its widest sense, architecture encompasses all our manmade surroundings, including buildings, infrastructure, outdoor areas and landscape. From this perspective, architecture is a vital component in important central-government programme areas such as housing policy, urban policy, environmental policy, transport policy, etc.

Nowadays architecture faces many challenges that this document addresses: sustainability and climate change, change and transformation, knowledge and innovation. On this basis, this document outlines several priority areas for the Government's architecture policy, some of which are particularly important for the housing and building sector, such as:

- environmental and energy-efficient solutions must be a priority in architecture
- towns and villages must be developed with good architectural quality
- knowledge, skills and communication about architecture must be improved
- the state shall set a good example

In this document, the Government provides a general overview of existing planned measures and activities that the state is undertaking to promote good architecture. Thirteen ministries have collaborated on the architectural policy document. Follow-up shall be discussed regularly among the ministries involved and through conferences on the topic with a view to assessing status, discussing future strategies and inspiring the ongoing work within the field of architecture.

7.3 Universal design

The Government's strategy for sustainable development includes universal design as a sub-goal in area 6 – Sustainable economic and social development. Universal design also has an environmental dimension. Universal design is an important social quality and is of particular importance to people with impaired functionality. A building where universal design has

Photo: Snøhetta AS

been adhered to will probably have a longer lifetime and use. Good indoor climate and minimal use of substances that are harmful to health or the environment are essential to prevent impaired functionality caused by asthma and allergies. When buildings and areas are designed for use by as many people as possible, there is less need for remodelling and demolition, which is positive from an environmental point of view. There has been a strong focus on universal design in recent years, and the housing and building sector is key in the follow-up of the Government's action plan for universal design. In the new Planning and Building Act, universal design has been included in the objects clause, and it is a requirement that new buildings shall be adapted for use by all. The rules concerning accessibility have been tightened, and all new buildings, infrastructure and outdoor areas intended for public use must satisfy the universal design criteria. The new Act also contains a provision that allows introduction of regulations on upgrading existing buildings, infrastructure and outdoor areas intended for public use. In time, requirements that apply to categories of existing buildings may be established in separate regulations. Upgrading will be done via a gradual, prioritised approach.

7.4 Climate adaptation

Climate change will have consequences for buildings and outdoor areas. Rising sea levels and more wind, rain and snow, and damp will increase the likelihood of flooding and landslides and will increase the strain on materials and structures in the short term and over time. It will be important to chart and take account of climate vulnerability in risk and vulnerability analyses in planning and building projects. In the planning part of the new Planning and Building Act, which entered into force on 1 July 2009, all building planning is made subject to mandatory risk and vulnerability analyses. The Directorate for Civil Protection and Emergency Planning (DSB) is responsible for the secretariat for all the Government's work in this area, and has set up an online portal on climate adaptation. In Cities of the Future (see box 6), adaptation to climate change is one of four priority areas. The Directorate for Cultural Heritage in Norway (Riksantikvaren) is heading a Nordic collaboration project Effects of climate change on cultural heritage and cultural landscapes. The aim of the project is to better enable managers of cultural heritage sites to meet the predicted climate changes and to strengthen the collaboration among the Nordic heritage management agencies. The Government has appointed a commission to study society's vulnerability and needs for adaptation as a result of climate change. The commission shall identify and discuss the challenges and propose measures for how we can best prepare society for a different climate. The commission's mandate emphasises the needs of infrastructure and buildings. The commission has been given the deadline of 1 November 2010.

BOX 13. THE NORWEGIAN STATE HOUSING BANK'S BASIC LOAN SHALL ENCOURAGE ENVIRONMENTAL THINKING AND UNIVERSAL DESIGN

A significant proportion of the Norwegian State Housing Bank's total loans are given in the form of basic loans. In 2009, the Norwegian State Housing Bank loan ceiling was NOK 14 billion.

The basic loan is for funding new dwellings, renovating dwellings, converting buildings into housing, and buying new and used rental homes. As a basis for funding, the projects must have good, overall quality and meet the criteria of universal design and good environmental performance. The Norwegian State Housing Bank prepares its own guides.

The following are attached:

- Universal design; universally designed housing and living environments, including installation of lifts and other housing measures to improve accessibility.
- Environment; reduced energy needs beyond the current regulatory requirements, improving the indoor climate, radon measures, reuse of materials.
- Good building practice.

The quality requirements may be deviated from in some cases.

BOX 14. THE NORWEGIAN STATE HOUSING BANK SUPPORTS COMPETENCE BUILDING

The Norwegian State Housing Bank administers subsidies for competence building (cf. Proposition no. 1 (2008-2009) to the Storting, the Ministry of Local Government and Regional Development, chap. 581 item 78, which in 2009 amounted to NOK 57 million. The grant scheme can be used to support projects that will encourage environmental developments in the housing and building sector. The Norwegian State Housing Bank collaborates with the local authorities and players in the housing and building sector to achieve the environmental goals. The Norwegian State Housing Bank attaches importance to supporting projects whose findings can be useful to other projects and that in the long term may serve to help achieve the national environmental goals. Experimental and pilot projects with very high ambitions may be subsidised in addition to being granted a loan for up to 90 per cent of the costs.

The Norwegian State Housing Bank has supported projects that focus on the following topics:

- development of low-energy homes and passive houses
- development of eco-friendly technology for homes and buildings
- environmentally sound management, operation and maintenance
- lifecycle costs and a long-term approach
- development of a user-friendly online database to make it easier to choose environment-friendly materials and components
- database of good environmental projects
- reuse and recycling of building materials and products
- international collaboration projects.

Appendix 1 Relevant organisations and their websites

A number of ministries and government agencies have tasks, instruments and measures that affect the environmental status of the housing and building sector. The main ones are the Ministry of Local Government and Regional Development, which manages the Norwegian State Housing Bank and the National Office of Building Technology and Administration, the Ministry of the Environment, which is in charge of the environmental agencies such as the Norwegian Pollution Control Authority, the Directorate for Cultural Heritage in Norway and the Directorate for Nature Management, and the Ministry of Petroleum and Energy, which owns Enova. Other important ministries are the Ministry of Government Administration and Reform and the Ministry of Defence, which are responsible for construction and management of state-owned property through their subordinate agencies, Statsbygg and the Norwegian Defence Estates Agency respectively. In some specific areas, other ministries and agencies perform important tasks in relation to the housing and building sector that affect the environmental drive. Below is a list of the relevant areas of responsibility and tasks for the individual ministries and government agencies. The government players are presented in appendix 1, followed by a list of other organisations that exert an influence on the environmental status of the housing and building sector.

The Ministry of Labour and Social Inclusion (AID) is responsible for policy on working environment and safety issues. Working environment and safety work is organised under the Working Environment and Safety Department. Employers have a duty to ensure that the working environment is safe and satisfactory. Enterprises are themselves responsible for preventing accidents and harm as a result of work. The authorities shall contribute to this end by influencing enterprises to engage in systematic efforts to promote health, safety and the environment (HSE work). HSE work in turns affects the indoor climate in public and private workplaces.

The Norwegian Labour Inspection Authority is responsible for overseeing that enterprises comply with the requirements of the Working Environment Act. The Norwegian Labour Inspection Authority also oversees pupils' and students' learning environments at technical colleges, universities and university colleges. The Norwegian Labour Inspection Authority has the authority to close an enterprise if the indoor air quality is below the defined threshold value.

The Ministry of Children and Equality (BLD) is responsible for coordinating the Government's policy for people with impaired functional capacity and coordinates Norway Universally Designed 2025. Universal design defines physical restrictions for buildings and outdoor areas and thus affects environmental qualities. The Ministry of Children and Equality is also responsible for consumer policy and administers a number of Acts that regulate consumer affairs. Environmentally aware consumers are pivotal for ensuring that good eco-friendly solutions are used, and increased demand for these kinds of solutions will push the market in a more environment-friendly direction.

The Consumer Council of Norway's objectives are to work to increase consumer influence in society, to contribute to consumer-friendly developments, and to promote measures that strengthen the position of consumers. The Consumer Council of Norway works to ensure that the Government's policy helps pave the way for consumers to do their part to ensure sustainable development. The Consumer Council of Norway and the Building Costs Programme have developed a website linked to housing issues. The purpose of this website is to increase consumers' knowledge about issues linked to construction, purchase or renovation of homes.

The foundation Ecolabelling Norway administers the two official eco-labels in Norway: The Swan and the Flower. The eco-labels comply with the ISO 14024 standard on environ-

mental labels and declarations type 1, which means that the requirements are developed transparently, are life-cycle based and absolute. Increased focus on the environmental impact of the building sector has meant that Ecolabelling Norway has developed a number of criteria documents to allow eco-labelling of building and housing products.

The Ministry of Finance has the overall responsibility for Norway's financial policy, including taxes. The taxation system shall ensure sufficient income for the public sector. At the same time, taxes must be reasonably and fairly distributed. Taxes are also used as an instrument to reduce consumption of products that pose a health and/or environmental hazard.

Statistics Norway (SSB) publishes statistics on important aspects of Norwegian society. Statistics Norway presents statistics on construction and housing as a category in its own right.

The Ministry of Government Administration and Reform (FAD) has the ultimate responsibility for public construction and management of state-owned property. Through the subordinate agencies Difi and especially Statsbygg, the Ministry of Government Administration and Reform plays a central role in terms of the environmental efforts linked to the central government's own buildings.

The Agency for Public Management and eGovernment (Difi) is overseen by the Ministry of Government Administration and Reform and shall help develop the organisation and leadership of the public sector, with coordination among public authorities and services. Difi is responsible for implementation of the plan of action for environmental and social responsibility in public procurement, where the product groups building and property management are a priority. To provide public enterprises with the help they need, a support service shall be established in each county or region to assist central and local government agencies with issues concerning environmental criteria and public procurements.

Statsbygg (the Directorate of Public Construction and Property) is one of the largest property enterprises in Norway with a portfolio of buildings totalling approx. 2.6 million^2 gross area. Statsbygg works on planning, consultancy and assistance in civil engineering, property management and organising, planning and completing building projects for ministries, directorates, universities and colleges, etc. Statsbygg shall realise adopted socio-political goals related to protecting the environment, preserving cultural heritage, architecture and central-government planning interests. As builder, manager and developer of state-owned property, Statsbygg has co-ownership in the environmental challenges Norway faces. Statsbygg has adopted an environmental policy and environmental goals in order to improve its environmental performance and is environmentally certified in accordance with ISO 14001. Statsbygg works continuously to resolve the main environmental challenges in the construction and property industry by reducing its environmental impact through choice of products and materials, reducing pollution as a result of waste generation and management, and reducing energy needs and consumption in buildings. An important element in this work is Statsbygg's environmental management system with overarching environmental goals that are reviewed and revised regularly.

The Ministry of Defence (FD) is responsible for the activities of the defence sector and for the materials, buildings and infrastructure it uses. In connection with the modernisation of the Norwegian Armed Forces, a large number of buildings and firing ranges are being sold off, while existing buildings and infrastructure are being modernised and new ones are being established. The Ministry of Defence requires that its subordinate agencies include environmental considerations as an integral aspect of responsible management.

The Norwegian Defence Estates Agency administers roughly 4 million m^2 of buildings and 1,500 square kilometres of shooting ranges and training areas on behalf of on the Ministry of Defence. As Norway's largest property manager, the Norwegian Defence Estates Agency has a special responsibility for environmental developments in the construction and property industry. Environmental considerations are an integral part of quality and are included in the organisation's objectives, management and reporting routines. The Norwegian Defence Estates Agency helps fulfil the Ministry of Defence's sectoral responsibilities regarding environmental issues and supports the national and international commitments and environmental goals. Norway's environmental policy defines the main direction of the Norwegian Defence Estates Agency's environmental efforts.

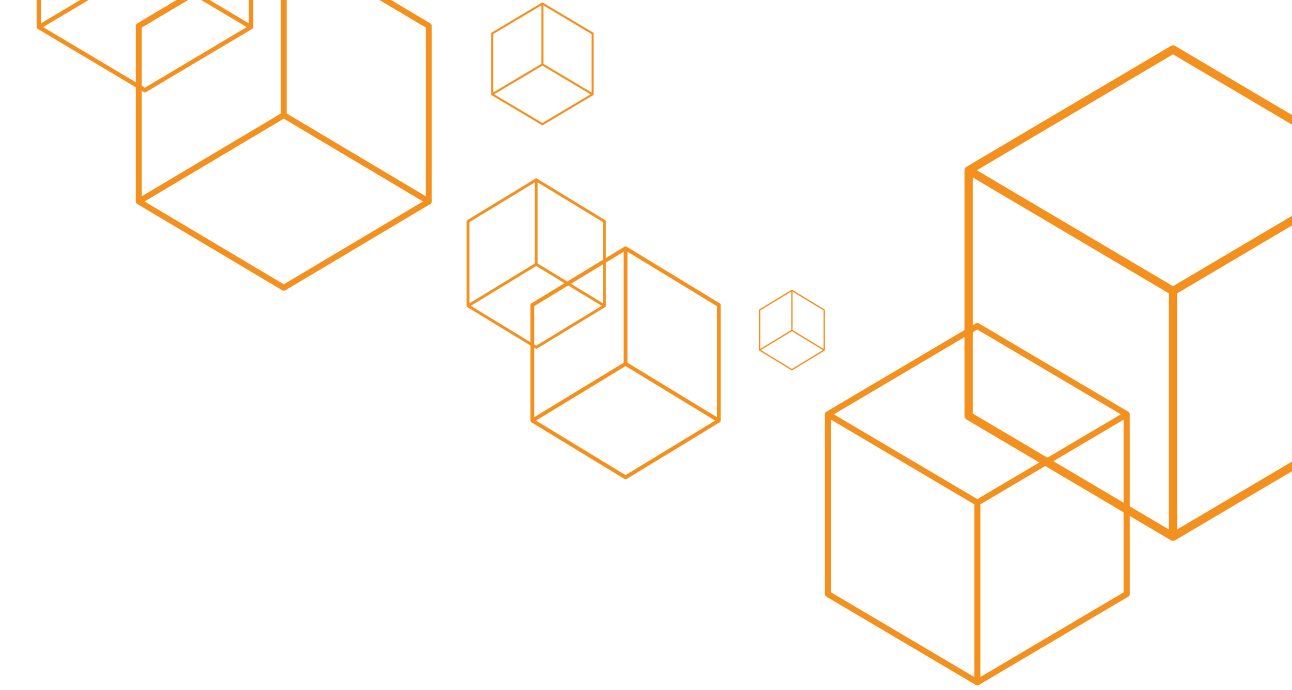
The Ministry of Health and Care Services (HOD) is a significant property developer and manager through the health trusts. In collaboration with the Ministry of Local Government and Regional Development, the Ministry has the political responsibility for the investment grant for nursing home places and sheltered accommodation, which contains criteria concerning giving priority to choosing environment-friendly alternatives in buildings. In addition, the Ministry has a general responsibility for factors that affect health, through the Act relating to the municipal health services and the Radiation Protection Act, among others (cf. for example the regulations relating to environment-oriented health care in nursery schools and schools etc., which contains requirements concerning the indoor climate and radon levels).

The Norwegian Directorate of Health is a specialist administrative body in the social security and health sector and has delegated authority in some areas of social and health legislation, including environment-oriented health care. The Norwegian Directorate of Health shall help ensure implementation of national health and social policy and advise central authorities, local authorities, health trusts and voluntary organisations.

The Norwegian Institute of Public Health is charged with maintaining a good overview over the health of the population and works to improve public health through promotion of good health and disease prevention. The institute shall publish information and give advice on how to promote good health and prevent disease and injury, including disease caused by poor indoor climate.

The Norwegian Radiation Protection Authority is Norway's expert authority on radiation and nuclear safety. The Norwegian Radiation Protection Authority monitors natural and artificial radiation and shall increase knowledge of the occurrence, risk and effects of radiation, including radon.

The Ministry of Local Government and Regional Development (KRD) is responsible for housing and building policy and administers the Government's goal of encouraging sustainable and lasting quality in housing, buildings and built environments. The Ministry of Local Government and Regional Development laid the foundations for the environmental focus in the housing and building sector in Report no. 28 (1997–98) to the Storting and in the last housing report – Report no. 23 (2003–2004) to the Storting on housing policy. This has been followed up through the Ministry of Local Government and Regional Development's environmental action plan for the period 2001–2004, and the environmental action plan for the housing and building sector 2005–2009. The Ministry of Local Government and Regional Development administers the building part of the Planning and Building Act and establishes the regulations for this part of the Act, including the Technical Regulations (TEK), with input from the National Office of Building Technology and Administration. The Ministry of Local Government and Regional Development is also responsible for designing the loans and subsidies administered



by the Norwegian State Housing Bank. The Ministry of Local Government and Regional Development has instigated and implemented a number of initiatives to promote increased environmental focus in the construction and property industry and is working to ensure coordinated policy in this area.

The Norwegian State Housing Bank has loan and grants schemes that affect and have an impact on attainment of the environmental goals (see boxes 14 and 15). The Norwegian State Housing Bank encourages construction of housing with higher environmental qualities than are currently required in the Technical Regulations to the Planning and Building Act. In order to meet the ambitious environmental goals that have been set, the Norwegian State Housing Bank encourages construction of exemplary projects that can demonstrate how the goals can be implemented in practice.

The National Office of Building Technology and Administration (BE) is the central authority for Norway's national building regulations. It also supervises compliance with the rules concerning documentation of the properties of building materials, and administers the centralised system of approval of enterprises in the building industry pursuant to the Planning and Building Act. The National Office of Building Technology and Administration facilitates and promotes innovation and product development, and helps raise the level of competence in the government administration and the industries involved. The National Office of Building Technology and Administration collaborates broadly with the authorities, trade and industry, users and organisations. The National Office of Building Technology and Administration develops guides and provides information, training and knowledge sharing under its own auspices and in collaboration with others.

The Ministry of Culture and Church Affairs (KKD) is a developer of and provides funding for cultural buildings (new buildings and remodelling) and construction of sports facilities. It lays down requirements concerning architectural quality and functionality, and the projects must be sustainable and energy efficient. The Ministry is also the approval authority in connection with construction of new church buildings and is responsible for closing down churches. The main institutions within the Ministry of Culture and Church Affairs' sphere of responsibility within tasks linked to architectural policy are Norsk Form and the National Museum of Art, Architecture and Design.

Norsk Form is a foundation that works with design, architecture and urban area planning. Norsk Form works to ensure that architecture and urban development promote sustainable community development from both a social and environmental perspective. Within the housing and building sector, Norsk Form wants to contribute to conservation of resources and energy, development of new solutions, and prioritisation of universal design.

The Ministry of Education and Research (KD) is responsible for higher education policy and is the ministry with the most buildings in the civilian sector. The institutions organised under this Ministry have more than 3.1 million m^2 of floor space at their disposal. Of this, almost 1.6 million m^2 are self-managed properties, almost 800,000 m^2 are leased from Statsbygg, and the remainder is leased from private organisations and foundations. The Ministry of Education and Research commissions new buildings and renovations. Most of these projects are aimed at Statsbygg as the builder of state-owned property.

The Ministry of Agriculture and Food (LMD) influences the environmental status in the housing and building sector through its political objective of increasing use of wood as a climate-friendly and environmentally sound building material and more widespread use of energy-efficient solutions using bio-energy. The Ministry of Agriculture and Food is also responsible for agricultural built environments.

The Ministry of the Environment (MD) is responsible for Norway's environmental protection policy. This means it has the overall responsibility for the following instruments that the housing and building sector can use to improve environmental performance and promote environmental interests in its activities:

- The planning part of the Planning and Building Act and appurtenant regulations, national policy guidelines for land-use and transport planning, and national policy provisions for shopping centres.
- The Land Subdivision Act – which will be replaced by the Title Act on 1 January 2010.
- The Pollution Control Act and regulations pertaining to pollution, recycling and waste management, etc.
- The Cultural Heritage Act and regulations.
- The Environmental Information Act.
- Product Control Act and regulations.
- Funding for research and development.
- Information and knowledge development.
- The Nature Management Act, which entered into force on 1 July 2009.
- The Uncultivated Land Act, which enters into force on 1 September 2009.

The current action plan has been coordinated with the action plan drawn up by the Ministry of Children and Equality, the Ministry of Government Administration and Reform and the Ministry of the Environment for environmental and social responsibility in public procurement 2007–2010. The work on developing ByggSøk-plan, which is a tool for electronic preparation and processing of private zoning plans, is being done by the National Office of Building Technology and Administration on commission from the Ministry of the Environment. The Ministry of the Environment also heads an interministerial group to ensure coordination of the Government's combined efforts to chart vulnerability and adaptation to climate change. **The Directorate for Civil Protection and Emergency Planning (DSB)** under the Ministry of Justice and the Police performs the secretariat function for this work. One of the focus areas is the building and construction sector. Increased precipitation and moisture will put an extra strain on materials and structures in both the short and the long term. It will be important to chart and take account of climate vulnerability in risk and vulnerability analyses in building projects.

The Directorate for Nature Management (DN) is the national executive and advisory agency for preservation of Norway's biodiversity, outdoor recreation and use of natural resources. Main tasks include promoting use of the Planning and Building Act as an instrument for protecting the natural environment, using the Nature Management Act to preserve a representative sample of Norwegian nature, and ensuring protection of prioritised species and their habitats and selected types of natural environments. In addition to its statutory tasks, the Directorate is also responsible for identifying, preventing and resolving environmental problems through collaboration, advice and information vis-á-vis other authorities and groups in the population.

The Directorate for Cultural Heritage in Norway is the Ministry of the Environment's advisory and executive agency for management of cultural heritage monuments and sites. The Directorate shall provide expert assistance to the Ministry in connection with its work on cultural heritage. The Directorate for Cultural Heritage in Norway is responsible for ensuring that the Government's cultural heritage policy is implemented, and has the overall responsibility for the regional heritage management agencies' work in this area.

The Norwegian Pollution Control Authority (SFT) plays an important role in monitoring and publishing information on the state of the environment and developments. The Norwegian Pollution Control Authority sets requirements and limits for pollution and monitors that the requirements are

complied with. The Norwegian Pollution Control Authority manages and advises the county environmental agencies on pollution issues. The Norwegian Pollution Control Authority is also an important adviser for the Ministry. The Norwegian Pollution Control Authority is heading the Klimakur ("Climate Cure") 2020 project.

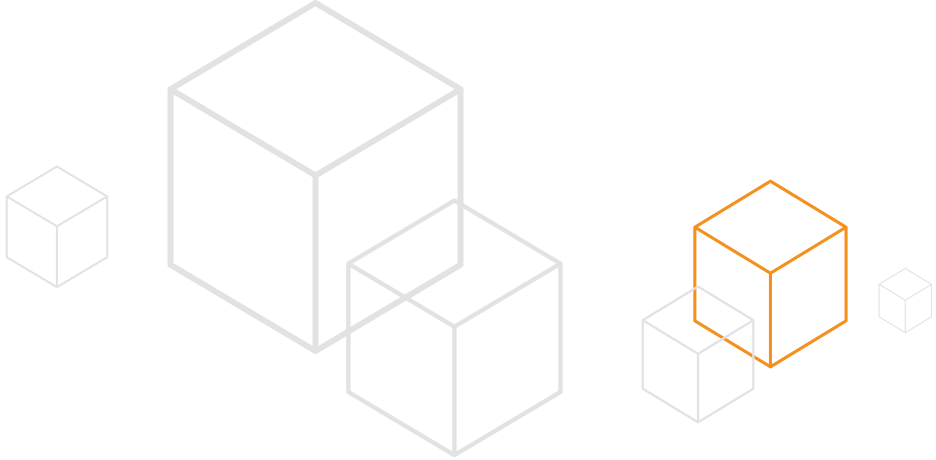
The Norwegian Mapping and Cadastre Authority is the national agency for mapping, property and geodata and positioning. The Authority shall ensure that society has a framework and infrastructure that enables as many players as possible to use geographical information as a necessary tool and instrument for government administration, as well as providing a foundation for production and service provision in the private sector. The Authority's main role is linked to operation of Norway Digital, registration of real property, operation of the Cadastre, nationwide tasks linked to mapping onshore and offshore, and positioning.

The Ministry of Petroleum and Energy (OED)'s principal responsibility is to achieve a coordinated and profitable energy policy, based on efficient and eco-friendly exploitation of Norway's natural resources. The Ministry of Petroleum and Energy's instruments to influence environmental performance in the housing and building sector are established in the Energy Act and regulations, the Energy Fund and Enova.

Enova SF's main objective is to contribute to environment-friendly conversion of use and production of energy. Energy conservation, renewable heat, renewable electricity and development of the domestic gas infrastructure are key elements in the energy conversion plan. Enova focuses its activities on the main areas energy consumption and energy production. The programme area housing, buildings and infrastructure comes under the area energy consumption. In the area of production, the programmes for district heating and local energy centrals are relevant for energy consumption in housing and commercial buildings. Enova's work on eco-friendly energy use in buildings is linked to its information and advisory work and to the support programmes. Enova enters into binding agreements with owners of buildings who are invited to carry out projects with concrete goals for reduced energy needs and conversion to renewable energy. Private individuals can also find tips and advice on energy conservation on the agency's website Enova Hjemme.

The Norwegian Water Resources and Energy Directorate (NVE) is responsible for the administration of Norway's water and energy resources. The Norwegian Water Resources and Energy Directorate shall ensure coordinated and environmentally sound management of water resources and promote an efficient and eco-friendly energy supply. The Norwegian Water Resources and Energy Directorate shall monitor and publish information on developments in watercourses, the energy system and the energy markets. The Norwegian Water Resources and Energy Directorate shall assist the Ministry of Petroleum and Energy in its follow-up of relevant EU directives. The Norwegian Water Resources and Energy Directorate is the supervisory authority for the energy labelling scheme.

Other organisations	Websites
Research centres	
Norwegian University of Life Sciences	http://www.umb.no/english
Norwegian Institute for Cultural Heritage Research (NIKU)	http://www.niku.no/index.asp?languagecode=9
Nordland Research Institute	http://www.nordlandsforskning.no/english.html
Western Norway Research Institute	http://www.vestforsk.no/www/show.do?page=4;20&lang=en
Eastern Norway Research Institute	http://www.ostforsk.no/
SINTEF Building and Infrastructure	http://www.sintef.no/Home/
Zero Emission Buildings (ZEB)	http://www.ntnu.no/ab/nyheter/zeb/eng
The building, construction and property industry	
NAL | ECOBOX	http://www.arkitektur.no/?nid=5699
The building, construction and property industry	
Norwegian Association of Consulting Engineers (RIF)	http://www.rif.no/default.asp?id=262
Standards Norway	http://www.standard.no/en/
Interest organisations	
Bellona	http://www.bellona.org/
Norwegian Society for the Conservation of Nature – Friends of the Earth Norway	http://naturvernforbundet.no/international/
Green Warriors of Norway	http://www.miljovernforbundet.no/render.asp?ID=42&segment=1&session=
Rainforest Foundation Norway	http://www.regnskog.no/Languages/English
The Ideas Bank Foundation	http://www.idebanken.no/english/main.html



International organisations, networks, etc.	
BREEAM (BRE Environmental Assessment Method)	http://www.breeam.org/page.jsp?id=13
European Commission's Directorate-General for the Environment	http://ec.europa.eu/dgs/environment/index_en.htm
The Europe Portal – Information about Norway's co-operation with Europe	http://www.regjeringen.no/en/sub/europaportalen/Norways-relations-with-Europe.html?id=115260
Green Building Policies Network	http://www.greenbuilding.ca
United Nations Economic Commission for Europe	http://www.unece.org/Welcome.htm
United Nations Environment Programme	www.unep.org/
United Nations Human Settlement Programme – UN Habitat	http://www.unhabitat.org/
U.S. Green Building Council	http://www.usgbc.org/DisplayPage.aspx?CMSPageID=124
Other relevant organisations and links	
Norwegian Electricity Industry Association	http://www.ebl.no/english/
Regelhjelp.no Guide to Regulations	http://www.regelhjelp.no/Templates/Common-Page____10084.aspx

Appendix 2 EU directives that affect environmental performance in the housing & building sector

Framework directive on energy labelling of household appliances

92/75/EEC

The purpose of energy consumption labelling is to provide consumers with information about appliances' energy consumption, allowing them to choose energy-efficient products. Household appliances sold in Norway must be energy-labelled in accordance with the European requirements on energy consumption labelling. Items displayed for sale or hire must have an energy consumption label.

Council directive on the performance of heat generators for space heating and the production of hot water

78/170/EEC

Regulates the performance of heat generators used for space heating and production of hot water and insulation of heat and domestic hot-water distribution. The goal is energy conservation that will affect overall energy consumption as more such systems are installed.

Environmental Impact Assessment Directive

85/337/EEC as amended by Directive 97/11/EC

On the assessment of the effects of certain public and private projects on the environment. The directive establishes requirements concerning assessment of the environmental impact of certain public and private projects that are likely to have significant impact on the environment.

Construction Products Directive

89/106/EEC

Lays down fundamental requirements concerning health, hygiene and the environment. Implementation of the directive encourages environmental certification of more construction products and increased use of these kinds of products.

Directive on freedom of access to information on the environment

313/1990/EEC

Grants all citizens the right to access environmental information from public and private enterprises on aspects of their operations affecting or likely to affect the elements of the environment.

Boiler Efficiency Directive

92/42/EEC and amended by directive 93/68/EEC

On efficiency requirements for new hot-water boilers fired with liquid or gaseous fuels.

Drinking Water Directive

98/83/EEC

Aims to ensure that materials used in the water distribution system do not give off substances in violation of the requirements concerning hygiene, health and the environment.

Directive on the energy performance of buildings

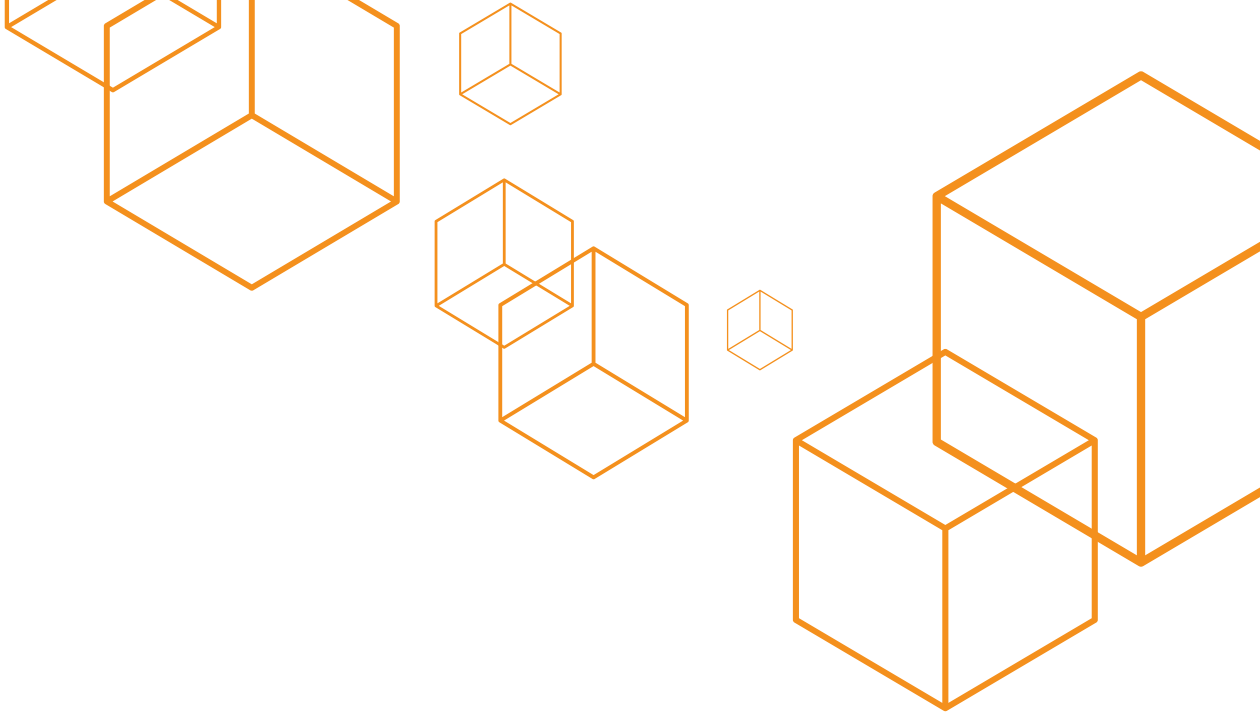
2002/91/EC

The purpose of this directive is to improve buildings' energy performance. The background for the directive is that there is potential for improving energy efficiency in the building sector that can help both to reduce emissions of greenhouse gases and improve security of supply.

Noise Directive

2002/47/EC

Establishes requirements concerning noise in and outside buildings. The purpose is to prevent and limit the harmful effects of noise.



Directive on the assessment of the effects of certain plans and programmes on the environment

2001/42/EC

Establishes requirements concerning impact assessment of the general plans that define constraints for development projects and zoning plans that may have significant consequences for the environment, natural resources or society.

Waste Directive

2008/98/EC, 1999/31/EC and 94/67/EC

Defines technical and environmental requirements for management of waste and requirements concerning knowledge of polluting properties of waste. The Waste Framework Directive 2008/98/EC contains recycling targets for construction waste and requirements concerning management of hazardous waste. Landfill directive 1999/31/EC, waste incineration directive 94/67/EC.

Renewable Energy Sources Directive

2001/77/EC

Directive on the promotion of electricity produced from renewable energy sources in the internal electricity market. The purpose is to increase consumption of electricity from renewable energy sources to the indicated levels. Switching to renewable energy reduces emissions of greenhouse gases. The directive is part of the European climate policy strategy.

Directive on the cogeneration of power and heat

2004/8/EC as amended by 92/42/EEC

On the promotion of cogeneration of power and heat based on a useful heat demand in the internal energy market. The purpose is to improve energy efficiency and security of supply by promoting highly efficient combined power and heat generation (cogeneration). Entails potential for increased energy efficiency, reduced emissions of greenhouse gases, reduced net loss and greater security of supply. Energy efficiency is improved through combined production of power and heat where this is more economical than separate production of power and heat.

Water Framework Directive

2000/60/EC

Applies to freshwater and coastal marine waters. The purpose of the directive is to preserve, protect and improve the qualitative and quantitative status of all water bodies. The goal is that all water bodies shall fulfil environmental targets linked to pollution and biodiversity by 2015.

Urban Waste Water Treatment Directive

91/271/EEC as amended by 98/15/EC

Sets environmental requirements for the waste water management sector. Entails sanitation of waste water.

Directives on the classification, packaging and labelling of dangerous substances

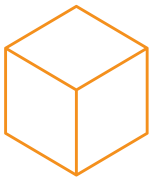
67/548/EEC, 99/45/EC

Provides rules for how dangerous substances shall be classified, packaged, labelled, etc.

REACH – new European chemicals regulations

regulation (EC) no. 1907/2006

The regulation came into force in Norway on 30 May 2008. REACH replaces a number of previous directives and regulations. REACH regulates registration of new substances, assessment, authorisation and restriction of existing chemicals, and prohibition and regulation of use of some chemicals. REACH will affect large parts of trade and industry, including companies that produce, import, use or distribute chemicals or processed products. Enterprises will have greater responsibilities for knowledge about and safety in connection with using chemicals.



Regulation on persistent organic pollutants (EC)
850/2004
Regulates production, sale, use, emission and waste management of substances embraced by the global Stockholm convention on persistent organic pollutants (POPs) and the UN-ECE POPs protocol under the Convention on Long-range Transboundary Air Pollution. It prohibits recycling and reuse of POPs waste and waste containing POPs, and requires quantitative analysis of PCB emissions.

Emission Trading System Directive
2009/29/EC
This directive applies to the third period of the European emission trading system and builds on the existing emission trading system established by directive 2003/87/EC. More changes may be required to adapt the system to the UN climate change regime from 2013. The purpose of the directive is to reduce emissions of greenhouse gases in a cost-efficient way.

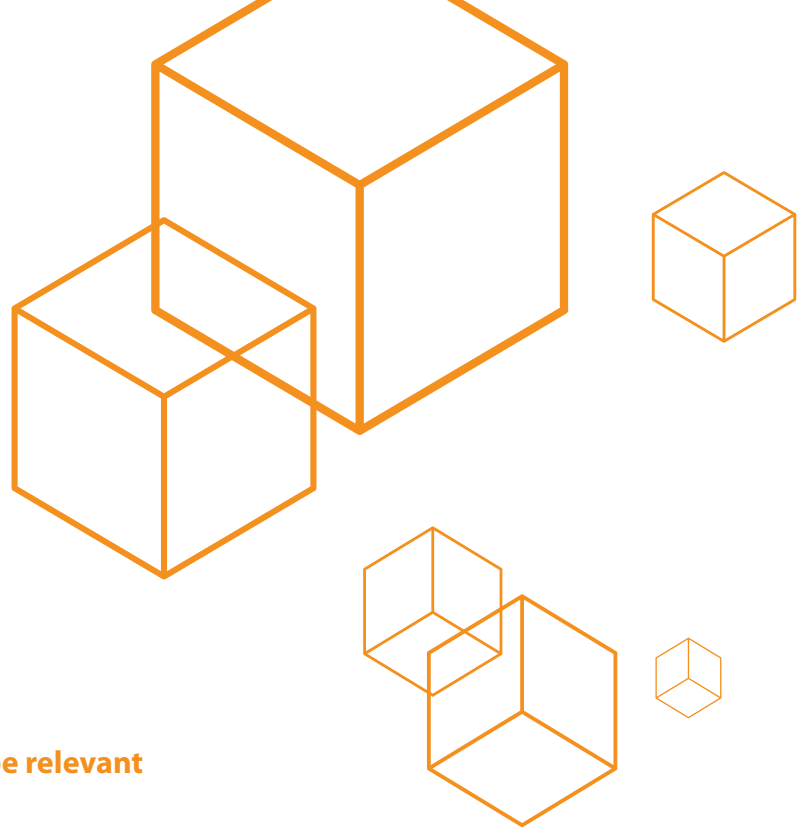
VOCs in Paints Directive
2004/42/EC
Supplement to directive 1999/13/EC limitation of emissions of volatile organic compounds due to the use of organic solvents. The background is a wish to reduce the content of solvents in certain paints and varnishes.

Public Procurement Directive
2004/18/EC
Requirements concerning environmental protection have been integrated into the public procurement directives. Purchasing authorities can help protect the environment and promote sustainable development.

Eco-design Directive
2005/35/EC
Framework directive for setting eco-design requirements for energy-using products. The background for the directive is that production, distribution and waste management of energy-using products have a major impact on the environment. Reference is made to directive 2004/18/EC on the coordination of procedures for the award of public works contracts, public supply contracts and public service contracts.

Directive on waste electrical and electronic equipment
2002/96/EC
Makes producers and importers responsible for funding the collection and disposal of waste electrical and electronic equipment (WEEE). The proposed revised directive was presented by the Commission on 8 December 2008. The proposed revision is intended to simplify the rules and tighten the requirements concerning collection of WEEE.

Renewable Energy Directive
09/28/EC
The renewable energy directive shall promote use of energy from renewable sources in the EU. The directive covers use of electricity, use of energy for heating and cooling, and energy used in the transport sector.



Other directives that may be relevant

Energy Service Directive

2006/32/EC

Regulates energy end-use efficiency and energy services. Aims to help reduce greenhouse gas emissions and ensure security of energy supply. The objective is to improve the market for end-use energy efficiency by removing existing market barriers and imperfections that impede the efficient end use of energy.

Directive 2007/2/EC on Infrastructure for Spatial Information in Europe – INSPIRE

The directive will provide a legal framework for establishment and operation of an infrastructure for geographical data. The proposed directive focuses on the needs within environmental policy, but the general geographical data infrastructure can also be used in other sectors.

Services Directive

2006/123/EC

The Services Directive is supposed to contribute to fulfilment of the targets laid down in Article 2 of the Treaty, of promoting throughout the Community a harmonious, balanced and sustainable development of economic activities.

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