THE NORWEGIAN DIRECTORATE FOR CULTURAL HERITAGE

Climate strategy for cultural environment management

2021–2030

COVER PHOTO: New meets old in the spectacular stairwell of the Natural History Museum in Bergen. After extensive rehabilitation, the museum is open again and continues to write history in its purpose-built home dating from 1865. Photo: Adnan Icagic © University Museum of Bergen

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The Directorate for Cultural Heritage
Postbox 1483 Vika, 0116 Oslo
Visiting address / Dronningens gate 13
Tlf. / +47 22 94 04 00
Email / postmottak@ra.no

www.riksantikvaren.no

Written by / The Norwegian Directorate for Cultural Heritage

Design / fetetyper.no

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Cultural environment management is part of the solution

Climate change is the major challenge of our time. The impact of climate change will be extensive and wide-reaching for our cultural monuments and sites, cultural environments and landscapes, and is expected to increase in the coming years and decades. We are at risk of losing cultural environments as a result of decay and surface biological growth, and more frequent extreme events such as floods, storms, and landslides. This development poses challenges to the cultural environment management regarding its work to safeguard key cultural-historical values and interests.

We are all responsible for achieving the goals of the Paris Agreement. If we are going to be able to limit the negative impacts of climate change, cutting greenhouse gas emissions fast enough will be imperative. The good news is that rehabilitating, reusing and improving the energy efficiency of existing buildings can contribute to reducing emissions. If we take care of buildings and use them considerately and inventively, we will be able to reduce greenhouse gas emissions while preserving important cultural-historical values. The actors in the cultural heritage field have expertise in rehabilitation and reuse, and a growing number of good examples of the new use of buildings are emerging, with beneficial knock-on effects. Cultural monuments and sites, cultural environments and landscapes, tell us how various climate problems have been met before. They can therefore teach us how to deal with our current climate problems.

Throughout history, people have had to adapt to changing climatic conditions. Most cultural monuments and sites have traditionally been created and maintained in a manner that leaves a modest climate impact. The materials used have been eco-friendly, durable and sourced locally. The impact on the landscape has been limited to the absolute necessary. Cultural landscapes have traditionally been maintained in a way that preserved biodiversity. Against this backdrop, cultural environments provide important sources of knowledge for the sustainable use of resources. Cultural history can guide us in planning for the future and facilitate sustainable development. This knowledge has value that can be applied to other sectors in society.

However, we are still facing many challenges, and there is considerable need for a cohesive, purposeful management practice for cultural environments and the climate. This climate strategy is a tool for anyone working with cultural environments. The strategy aims to show how cultural environments can help reduce greenhouse gas emissions, and to help the actors in the cultural heritage field to be better equipped to deal with climate change in the years to come.

HANNA GEIRAN, CEO OF THE DIRECTORATE FOR CULTURAL HERITAGE

↑ **THE EDVARD MUNCH UPPER SECONDARY SCHOOL** in Oslo opened in 2015 in a building that previously housed the Norwegian National Academy of Craft and Art Industry. By using as many of the original building parts as possible, including a workshop hall from the previous school period, cultural and architectural values have been retained and preserved. To improve accessibility and circulation in the building, a new main entrance was built in the back yard, with a new lift tower and extended staircase in the main stairwell. Photo: Lene Buskoven, Directorate for Cultural Heritage

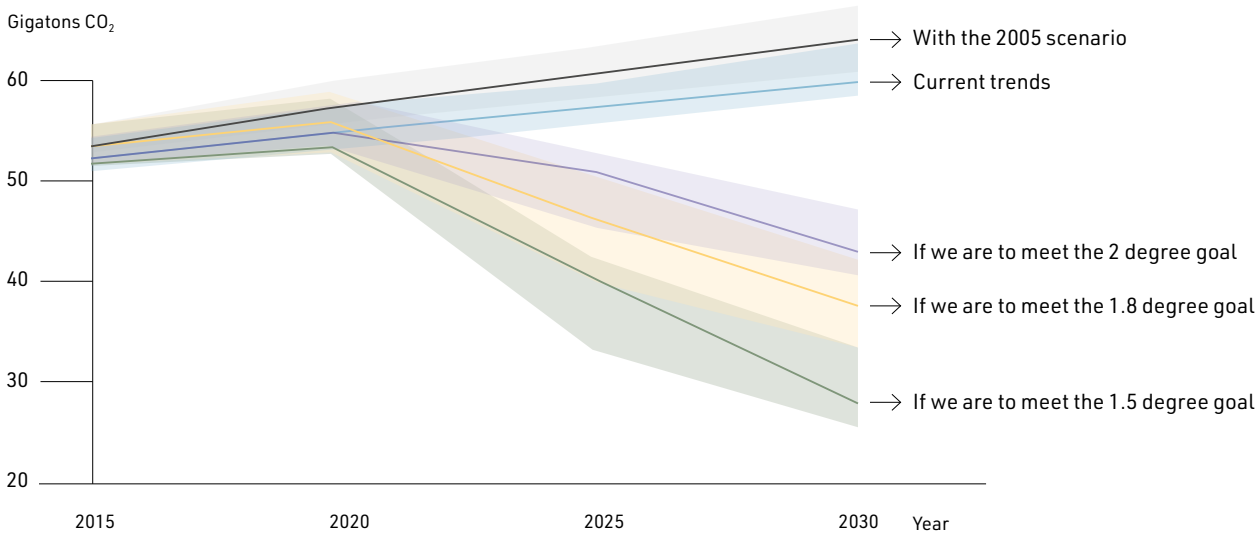
A changing climate

Moving towards 2100, Norway will face a warmer climate with more precipitation and extreme weather events. Climate change means we are in danger of losing key cultural monuments and sites, cultural environments and landscapes, referred to hereinafter as 'cultural environments'.

Measures to reduce greenhouse gas emissions and climate change adaptation will be vital to meet the challenges we face. The actors in the cultural heritage field must contribute to reduce greenhouse gas emissions and minimise the negative effects that climate change has on cultural environments. We must try to understand the consequences of climate change, and adapt accordingly. This will challenge the management practice of cultural environments and have consequences for our expert evaluations of preservation, use and development.

In some cases, management of cultural environments and climate measures will come into conflict with each other. Because climate change is the major challenge of our time, it will sometimes be necessary to prioritise measures for greenhouse gas reduction over cultural environment values. We will have to weigh different considerations against each other in our management practice. The main challenge will be to differentiate between key cultural environments where protection is prioritised, and cultural environments where climate consideration will have to take priority. The cultural environment management will have to be innovative, creative and contribute to solutions that will enable continued use of cultural environments. In the implementation of the climate strategy, this dilemma will have to constantly be considered to find sustainable solutions.

FIGURE 1 / GLOBAL GREENHOUSE GAS EMISSIONS IN VARIOUS SCENARIOS AND THE EMISSION GAP IN 2030



The figure shows the global cuts in greenhouse gas emissions needed over the next 10 years if we are to meet the climate goals of a maximum temperature increase of 1.5 or 2 degrees Celsius. Under the current policy scenario, we are moving towards an increase in emissions of up to 60 gigatons CO_2 by 2030.
Source: UNEP 2019. Emissions Gap Report 2019. United Nations Environment Programme (UNEP), Nairobi.

Climate change

The word 'climate' refers to the weather patterns common to a given location, such as temperature and wind speed. The climate determines the livelihoods of people living in that location. Natural processes and human influence both contribute to climate change.

The average temperature in Norway has risen by approx. 1.1 degrees, and precipitation by approx. 20% since 1900. These changes have accelerated since the 1980s. The major changes we are observing now are mainly caused by emissions of greenhouse gases from human activities, most significantly carbon dioxide (CO_2).

What do we know about the impacts of climate change on cultural environments?

Cultural environments will be exposed to more frequent extreme weather events, such as storms, avalanches, landslides, floods, heatwaves and droughts that can lead to forest fires. Rising sea levels, accelerated coastal erosion and higher levels of storm floods will affect cultural environments in exposed areas along the coast and under water. Climate change is also expected to increase the re-growth and reforestation of previously open cultural landscapes.

Higher humidity, combined with a rise in temperature, will increase the risk of damage to buildings through increased biological growth, including rot in woodwork. We can also expect higher levels of pest infestation. In addition, there will be a greater risk of chemical erosion and deterioration of stone and metals, and mechanical degradation from more frequent freeze and thaw processes. This will have consequences for ruins, rock art and archaeological finds.
A rise in temperature and higher precipitation will change the conservation criteria for archaeological cultural environments on land. The grade of degradation will increase for objects and ecofacts, resulting in an accelerated loss of scientific value. Higher sea temperatures and more frequent extreme events make underwater archaeological cultural environments particularly susceptible to faster biological and mechanical degradation.

More frequent and more powerful downpours will have consequences for many different types of cultural environments, and runoff management will be important in order to avoid damage. Archaeological cultural environments with a high content of organic matter, such as archaeological deposits in cities and agricultural areas, and finds in glaciers, boats and peat bogs, are particularly vulnerable. The thawing of the upper layer of permafrost, erosion and soil creep will also mean greater loss of and damage to the archaeological cultural environments, and cause problems for the foundations of buildings and other constructions.

FRAMEWORKS

By signing the Paris Agreement in 2015, Norway has committed itself to reduce its greenhouse gas emissions and contribute to limit the global average temperature increase to below 2°C above pre-industrial levels and pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels. Norway has a goal of reducing greenhouse gas emissions by between 50–55% by 2030, compared with the emission levels of 1990.

There is a lot of potential for reducing greenhouse gas emissions, energy use and waste, in using, upgrading, and reusing existing buildings. This is reflected in White Paper 16 (2019–2020) New Goals in Cultural-Environmental Policy – Engagement, Sustainability and Diversity (the White Paper on cultural environments) and White Paper 13 (2020–2021) Climate Plan for 2021–2030. The climate plan highlights the importance of reusing buildings and building materials, and promoting the use of climate-friendly materials. Furthermore, the development of compact cities and towns is highlighted as an important climate initiative. This means that the potential for densification should be exploited before expanding to new development areas.

The White Paper on cultural environments emphasises the importance of the cultural environment management's participation in planning work and urban development projects, and that the cultural environment management should be active and clear in identifying the room for manoeuvre so as to ensure that cultural environmental interests are safeguarded. National expectations regarding regional and municipal planning 2019–2023 emphasise that densification must include quality of the surroundings, with the emphasis on architecture, urban space, cultural environment, green infrastructure, and other environmental values. The climate plan highlights the importance of ensuring that forests and other green areas are protected to boost the absorption of carbon, and that cultural landscapes must be maintained by grazing and Norwegian food production.

The White Paper on cultural environments also stresses the need for more climate change adaptation, and the need to understand how cultural environments are impacted by climate change. This must become a more important and integrated part of public planning. The cultural environment management must systematise and facilitate knowledge in order to provide an overview of cultural environments that are particularly vulnerable to climate change. The White Paper on cultural environments also stresses the importance of ensuring a diversity of cultural environments in land use and social planning, and how this will contribute to the national implementation of the UN's Sustainable Development Goals.

The government's climate and environment ambitions for government buildings and property in the civil sector

> The state must utilise existing buildings, and ensure the reuse of vacated properties.

> The state must reuse former building materials and ensure that others have access to reuse materials from government buildings.

> The state must work with industry to promote climate-friendly materials.

> The state must establish a common method for measuring the climate and environmental impact from buildings and properties in the state's civil sector, with the aim of future improvement and establishing common goals.

> State agencies must put great emphasis on the environmental benefits of reusing already developed land and existing buildings, and in locating close to city centres, towns and public transport hubs in line with the state guidelines for coordinated residential planning, land use and transport planning. This must apply when state agencies build, buy or lease premises.

Source: White Paper 13 (2020–2021) Climate Plan for 2021–2030, page 195.

International agreements and frameworks

International cooperation and implementation of the UN's Sustainable Development Goals and Agenda 2030 are key in addressing climate change. Most challenges and problems related to climate change are global, and important synergies must be achieved through international cooperation, research and knowledge exchange. Norway has made international commitments through the ratification of several UN and Council of Europe conventions, Including the UN Climate Convention and the Paris Agreement.

Norway has also ratified several international conventions concerning cultural environments, and international conventions with importance to cultural environment management[1]. Especially important is the work being done in the context of UNESCO's World Heritage Convention from 1972. UNESCO has been working on completing its Policy Document on the Impacts of Climate Change on World Heritage Properties since 2020. The policy document will guide the work on addressing the consequences of climate change for Norwegian World Heritage sites.[2]

FIGURE 2 / THE SUSTAINABLE DEVELOPMENT GOALS

Cultural environments are part of the UN Sustainable Development Goals, and a key resource in working towards achieving them. The climate strategy will be an important contribution to achieving several of the sustainable development goals and is particularly relevant for Goal 11, 12 and 13.

THE TWO PARTS OF THE CLIMATE STRATEGY

The reduction of greenhouse gas emissions and climate change adaptation will require different approaches and measures. The climate strategy therefore consists of two parts, each with its own goals and strategic initiatives:

I. Cultural heritage and the contribution to reducing greenhouse gas emissions

II. Cultural heritage and the management of adverse climate change consequences

Measures to reduce greenhouse gas emissions and to enhance climate change adaptation will reduce the risk associated with climate change. It is important to view the two parts together where relevant. That means identifying synergies and possible conflicts.

CLIMATE STRATEGY TARGET GROUPS AND STATUS

In order to address the challenges posed by climate change, there is a need for a strengthened, coordinated and clearer management practice across the different management levels and between actors. The Directorate for Cultural Heritage, county authorities, the Sámi Parliament and municipalities bear considerable responsibility and have many tasks regarding the management of cultural environments. They will therefore play a key role in this process. Museums, NGOs and private owners are also key actors. They hold first-hand experience of several of the climate change impacts facing cultural environments. The construction industry is also a crucial partner for achieving the reduction of greenhouse gas emissions. The Directorate for Cultural Heritage's climate strategy has therefore been developed in close consultation with regional authorities and other actors within the cultural heritage and climate field. The climate strategy is meant to be a tool for anyone working with cultural environments and help those involved in cultural environment management to be better prepared to deal with the impacts of climate change.

The climate strategy identifies challenges and prioritised focus areas in the climate change field that are of importance to cultural environment management. It has five goals, with related strategic initiatives. The strategy will form a basis for the Directorate for Cultural Heritage's evaluations and priorities on climate change, and will provide specific recommendations for public sector authorities, the county authorities, the Sámi Parliament, municipalities and the Governor of Svalbard.

The Directorate for Cultural Heritage will compile an action plan for its own activities to follow up on the climate strategy. Our knowledge of climate change is constantly changing, and being able to adjust course along the way will be important. The action plan will therefore be composed as a separate document and updated regularly within the time frame set for the climate strategy.

Terms

Cultural environment management – the work performed to manage cultural environments.

The cultural environment management – an umbrella term for the public authorities responsible for the management of cultural environments according to the Cultural Heritage Act, Planning and Building Act, Svalbard Environmental Protection Act and various grant schemes.

The cultural heritage field – an umbrella term for the areas linked to work within cultural heritage and cultural environment management. The actors working in the cultural heritage field include public authorities, museums, NGOs, private owners, research and educational institutions.

Goals and strategic initiatives

Reduction of greenhouse gas emissions

GOAL 1 Cultural environments are managed through coordinated land use planning, with the aim of reducing greenhouse gas emissions and safeguarding cultural-historical values and interests

Strategic initiative 1.1 Manage landscapes in a way that contributes to sustainable development and reduces greenhouse gas emissions

Strategic initiative 1.2 Manage land areas and cultural environments in a way that contributes to liveable cities and towns, and reduces greenhouse gas emissions

GOAL 2 Buildings are preserved and used so that greenhouse gas emissions are reduced and cultural environments safeguarded

Strategic initiative 2.1 Develop and share knowledge on how the restoration, rehabilitation and reuse of buildings can contribute to reducing greenhouse gas emissions

Strategic initiative 2.2 Contribute to the development of instruments and regulations to promote continued use and reuse of buildings and building components

GOAL 3 Improve the energy performance in existing buildings so that greenhouse gas emissions are reduced and cultural-historical values safeguarded

Strategic initiative 3.1 Be a driving force for making buildings more energy efficient, whilst safeguarding cultural-historical values

Strategic initiative 3.2 Contribute to more knowledge and expertise on the improvement of energy performance of buildings with cultural-historical value

Climate change adaptation

GOAL 4 Strengthen expertise to safeguard cultural environments in a changing climate

Strategic initiative 4.1 Develop knowledge, expertise and management practice in addressing climate change impacts

Strategic initiative 4.2 Identify climate-related risks and vulnerabilities for cultural environments

GOAL 5 Prevent and reduce climate-related loss of and damage to cultural environments

Strategic initiative 5.1 Strengthen the maintenance of cultural environments to prevent climate-related damage

Strategic initiative 5.2 Implement risk-reducing measures for cultural environments

Strategic initiative 5.3 Repair climate-related damage to cultural environments

Strategic initiative 5.4 Secure the scientific value of cultural environments that may be lost as a result of climate change

Strategic initiative 5.5 Improve the integration of cultural environment considerations in emergency planning and climate change adaptation

Cultural heritage and the contribution to reducing greenhouse gas emissions

In order to fulfil Norway's climate goals and commitments under the Paris Agreement, immediate cuts in greenhouse gas emissions and the implementation of climate measures with rapid effect are vital.

The UN's Intergovernmental Panel on Climate Change emphasises that we cannot reduce greenhouse gas emissions by using new technological solutions alone, but that a change in society as a whole is needed. Innovation must therefore be seen in relation to traditional and existing knowledge, which can represent relevant alternatives.

The actors in the cultural heritage field, with valuable knowledge and specialist expertise, should play a vital role in this process, and become a compelling voice in the transition to a low-emission society.

↑ **SOFIENLUND** is a protected building at Skøyen in Oslo, which was originally located outside the city centre. It is now surrounded by roads and new, tall and dominating buildings. The photo shows one of the dilemmas that can arise between safeguarding a valuable cultural environment on the one hand, and urban development that can contribute to reducing greenhouse gas emissions on the other.
Photo: Marte Boro, Directorate for Cultural Heritage

GOAL 1

Cultural environments are managed through coordinated land use planning, with the aim of reducing greenhouse gas emissions and safeguarding cultural-historical values and interests

Climate-friendly land use and spatial planning is concerned with reducing emissions from transport and buildings, and limiting the loss of carbon-rich areas. How society manages and uses cities, towns and landscapes will be key to whether we manage the transition to a low-emission society. It will affect future generations and our surroundings well into the future. Coordinated residential planning, land use and transport planning will be an important tool for ensuring that the diversity of cultural environments and landscapes are included in that transition, and will be safeguarded in a long-term and sustainable perspective. The main principles of environmental management must be taken into consideration: the use and protection of resources, sustainability, sector responsibility, the precautionary principle and cost-effectiveness.

The cultural environment management must be included and provide clear input at an early stage of processes, so that expert advice can be taken into consideration. The cultural environment management must prioritise its own initiatives, look for new, climate-friendly solutions to problems, and be prepared to prioritise climate considerations. In some cases, climate consideration can lead to cultural environment values being set aside.

STRATEGIC INITIATIVE 1.1

Manage landscapes in a way that contributes to sustainable development and reduces greenhouse gas emissions

Coastal and mountain landscapes, wilderness and reindeer pastures, mountain hamlets and forests all have considerable cultural-historical value, and are valuable in terms of biodiversity, industry and outdoor activities. These diverse landscapes are also important in the context of climate change, and must be managed through holistic and long-term land use planning.

It is important that the climate effects of planned land use changes are calculated, assessed and used as a basis for future land use planning. The future management of landscapes must ensure carbon storage in peat bogs, forests and grazing land through protection and use. Traditional and experience-based knowledge on sustainable management and use of landscapes and natural resources must be enhanced. While many buildings in rural areas stand empty, large areas are lost to the building of holiday accommodation every year. The reuse of buildings and developed areas should be considered before new areas are designated for development. Negative consequences for cultural environments resulting from greenhouse gas reduction measures in other sectors must be limited. Renewable energy production, such as hydro power and wind power, should be developed without compromising the qualities of landscapes and cultural environments that are important to cultural heritage, traditional businesses and recreation.

It is important that the county authorities, the Sámi Parliament and municipalities prioritise cohesive and long-term land use management, where landscape and cultural environment interests are taken into account. The cultural environment management must contribute to research, generate knowledge, and identify areas where the reduction of greenhouse gas emissions and cultural environment interests coincide, and where there are clear conflicts of interest. Comprehensive tools for greenhouse gas calculation ought to be developed that incorporate land use and cultural environments. Forums for dialogue and skills development will be important.

STRATEGIC INITIATIVE 1.2
Manage land areas and cultural environments in a way that contributes to liveable cities and towns, and reduces greenhouse gas emissions

The development of compact cities and towns is a key climate initiative that can contribute to reducing the degradation of nature, farmland and cultural landscapes. Densification can also mean shorter distances between activities, leading to reduced greenhouse gas emissions from transport. However, it is important that densification does not lead to the unnecessary loss of cultural environment values, as this will weaken the attractiveness and liveability of cities and towns - places that support the well-being and quality of life of people who live and work there. It is important that the rehabilitation and reuse of existing buildings is prioritised before using new areas for development.

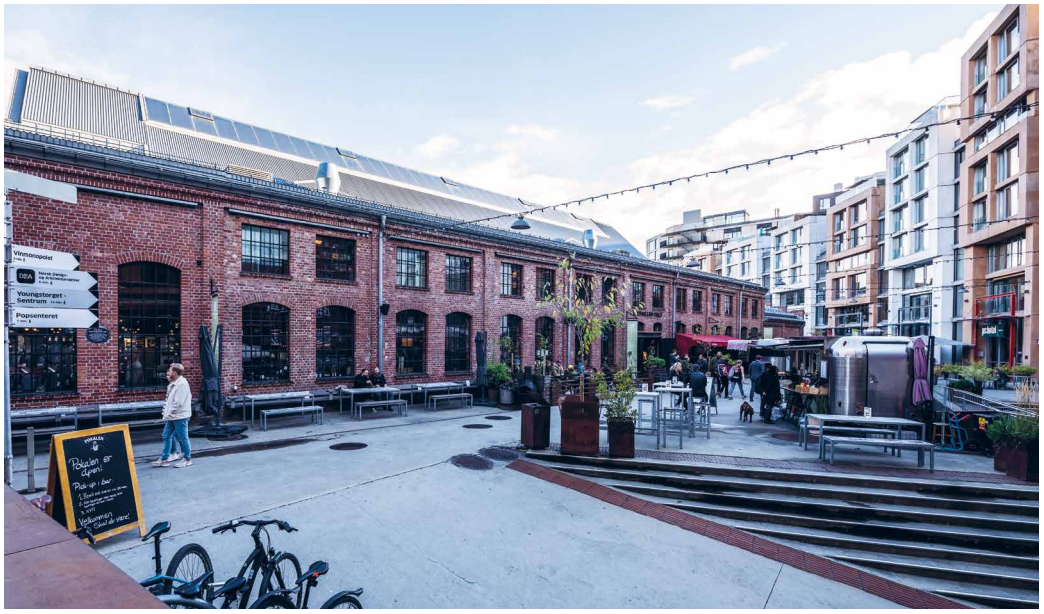
The cultural environment management must be included in the planning process at an early stage to identify the room for manoeuvre regarding changes, and to contribute to the development of liveable cities and towns. Collaboration must be encouraged between the actors involved in planning and urban development. Doing so will facilitate healthy dialogue and predictability. Comprehensive, coordinated land use planning must form the basis for land use throughout the country. Reduction of greenhouse gas emissions through more efficient land use must be weighed against the preservation and development of liveable cities and towns. The Directorate for Cultural Heritage's Strategy for Management of Urban Cultural Heritage will be an important tool in this process and provides clear guidelines for city and town development.

The Directorate for Cultural Heritage's Strategy for Management of Urban Cultural Heritage

The Directorate for Cultural Heritage's Strategy for Management of Urban Cultural Heritage is a policy document for the management and sustainable development of cultural environments in Norwegian cities and towns. The strategy is used by the Directorate when evaluating proposed planning proposals, projects and strategies, and is linked to the management of Cultural Environments of National Interest. The strategy is also used as a knowledge base for several of the Directorate's projects and initiatives both nationally and internationally.

The strategy describes challenges and includes goals and recommendations for the management of Urban Cultural Heritage that regional and local planning authorities can use in urban development. The strategy is also a useful tool for private and public developers and their consultants in planning and project proposals related to cultural environments in an urban context.

↑ **STADLANDET** is one of 46 selected agricultural landscapes. This is a landscape with considerable cultural-historical and biological values, created by the interaction between humans and nature through generations. It features mountain plateaus and steep cliffs facing the sea, in addition to green lowlands, peat bogs, species-rich meadows and pasture, with large areas of coastal heathland. Archaeological finds indicate farming activities dating back to the Late Iron Age. Photo: Leif Hauge



↑ **VULKAN IN OSLO** is an old industrial building. It now houses Mathallen (The Food Hall) and Dansens hus (The House of Dance), and new buildings and a hotel has been added. 'Energy wells' that provide heat in the winter and cooling in the summer have been installed. The wells store surplus heat for use on demand. Photo: Lene Buskoven, Directorate for Cultural Heritage

GOAL 2

Buildings are preserved and used so that greenhouse gas emissions are reduced and cultural environments safeguarded

The climate accounting of many new buildings will only become profitable after the building has been in use for many decades, compared with the upgrading and continued use of a similar existing building. When building a new building, emissions are released through the production of construction materials, the transport of materials and the various activities undertaken directly at the building site. By extending the lifetime of existing buildings, resources are better utilised because the emissions linked to that building have already transpired. Measures that give the biggest reduction of greenhouse gas emissions over 10–20 years will be important in achieving Norway's climate goals and international obligations.

The UN Intergovernmental Panel on Climate Change (IPCC) states that the construction sector has large potential for emission reduction. The sector has a lot of work to do in the transition to becoming more circular and climate friendly. Knowledge, practices and climate-friendly materials will have to be developed. To do so, innovation will have to be combined with traditional methods, materials and craftsmanship. The continued use and adaptive reuse of buildings is an important contribution to reducing greenhouse gas emissions from the construction sector. Buildings can also represent great cultural-historical, aesthetic and architectural qualities, values that are important for place experience and well-being. The cultural environment management must ensure that cultural-historical values are communicated and stated clearly and at an early stage.

STRATEGIC INITIATIVE 2.1

Develop and share knowledge on how the restoration, rehabilitation and reuse of buildings can contribute to reducing greenhouse gas emissions

For Norway to achieve its climate goals, more buildings must be given an extended lifetime though continued use and adaptive reuse. The continued use of entire buildings is the best solution rather than reusing individual building components, both in terms of reducing greenhouse gas emissions and preserving cultural-historical values.

The cultural environment management has expertise within the field of reuse that needs to be communicated to both public and private sectors – and to society in general. Good examples of climate measures from various building categories that can be applied to protected buildings should be provided. The county authorities should take an active role as advocates and advisors to the municipalities for planning and building projects, so that reuse can replace demolition and new construction more often. The Directorate for Cultural Heritage will support the county authorities in that process and contribute to local establishment in the municipalities. The cultural environment management will also have to contribute to the generation of knowledge. The Directorate for Cultural Heritage has a particular responsibility for producing new and updated research and knowledge, and relevant guides for regional management.

SHARE OF GREENHOUSE GAS EMISSIONS IN NORWAY THAT COMES FROM THE CONSTRUCTION AND USE OF BUILDINGS

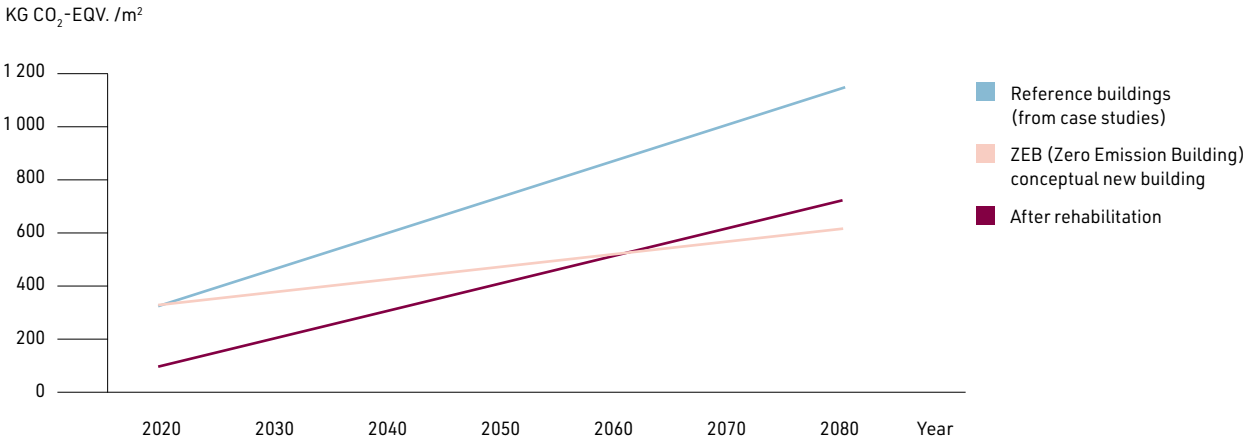
15,3%

The fact that Norway has lower emissions than the global average of 40% is mainly due to the fact that residential and commercial buildings in Norway are heated by electricity produced by hydropower.

Green is not just a colour – sustainable buildings already exist

On behalf of the Directorate for Cultural Heritage, SINTEF has analysed a number of case studies and carried out a systematic review of Norwegian and international publications on lifecycle analyses.[3] The report clearly shows that the most sustainable building is the one that has already been built. Furthermore, the analysis shows that rehabilitation is a better option than demolishing on a 30-year horizon towards 2050, as it can take up to 80 years for a new building to offset greenhouse gas emissions from the construction process. The SINTEF report therefore concludes that rehabilitation of existing buildings will be environmentally beneficial in the short and medium term. It also points to lifecycle analyses that assess environmental, social and economic consequences as an important decision-making tool. The report also highlights that cultural-historical values can be integrated in the method, and thus made visible and taken into consideration when assessing environmentally friendly initiatives.

FIGURE 3 / TOTAL GREENHOUSE GAS EMISSIONS OVER 60 YEARS



The figure shows accumulated greenhouse gas emissions over the next 60 years for each of the three scenarios in the SINTEF analysis. All emissions connected to material consumption are allocated to the 2020 construction year, while energy consumption in the operational phase is equally distributed over the next 60 years.
Source: Fufa S. M., Flyen, C. og Venås, C. (2020) Grønt er ikke bare en farge: Bærekraftige bygninger eksisterer allerede. SINTEF Fag 68.

Preserve buildings for the climate

Through their project *Bevar bygg – bevar klima* (Preserve buildings for the climate), the Innlandet County Authority is working towards a climate-neutral community development. Buildings and built environments will be given longer lives, higher utility value, and lower energy consumption through a range of measures, which consequently will reduce the need for new buildings.

Part of the project involved calculating the energy consumption and greenhouse gas emissions for 24 different buildings, and the climate benefits that could be obtained through continued use and upgrading. The finds were published in the report Greenhouse Gas Emissions from Upgrading Older Buildings, written by Asplan Viak. The report concludes that for most of the buildings, upgrading will give lower greenhouse gas emissions than demolition and building a standard new building that meets current regulations. Furthermore, it showed that the energy savings made per NOK invested were much greater from upgrading than from demolition and constructing a new building, and lastly that considerate upgrades can provide much better energy savings without compromising conservation considerations and architectural qualities.

↑ **THE PROTECTED MAGASINBYGNINGEN (STORAGE BUILDING)** at Kalvskinnet in Trondheim is an excellent example of appropriate new use on the building's premises. With minimal work done to the building, it was converted into a workshop for students studying traditional craftmanship at NTNU. The main upgrades were new wooden floors, lighting, internal windows and doors behind the original entrance. New activity now fills the old storage building, which can be seen by passers-by through the new glass doors. Photo: Aase Hogfeldt-Eskevik, Directorate for Cultural Heritage

↑ **HERMETIKKLABORATORIET (THE TINNING LABORATORY)** on Niels Juels gate, dating from 1931, has been transformed into a modern building with offices and a restaurant, and is a popular place to meet in the Eiganes neighbourhood of Stavanger. The building underwent a full rehabilitation, focusing on preserving elements worthy of protection, and combining them with the modern and functional. Strict criteria were applied to the materials used, and the owner opted to keep several of the building's original elements in addition to those protected through regulations. 'Hermetikken' received the 2018 preservation award from Stavanger Municipality and the National Trust of Norway. Photo: Base Gruppen

↑ **CONSTRUCTION OF THE MELKEFABRIKKEN (MILK FACTORY)** at Hamar was started in the 1860s. The factory produced products for Nestlé until 2008. Over the years, the building had been altered and extended several times. In 2014, the building was ready after a major reconstruction from factory to a new shopping and residential district. Parts of the building were demolished and the former courtyard was recreated. Large parts of the brick building, including the factory chimney, have been preserved. Photo: Vignir Freyr Helgason, Directorate for Cultural Heritage

STRATEGIC INITIATIVE 2.2
Contribute to the development of instruments and regulations to promote continued use and reuse of buildings and building components

In order to enable increased reuse of buildings and building components, there is a need to simplify and adapt current legislations and regulations, which are largely based on new buildings. The interpretation and practice of the Planning and Building Act and technical regulations (TEK17) results in opportunities that lie in the regulations not being fully utilised, and there is a need for clearer regulations. Other important focus areas are increased use of environmental certifications and a change in the stamp duty in favour of reuse of buildings, rather than new buildings. The Norwegian Green Building Council, the Federation of Norwegian Construction Industries and FutureBuilt are key partners in this respect.

Municipalities and county authorities will play a special role in safeguarding continued use and reuse of a larger proportion of buildings. An important priority will be to strengthen the expertise and tools available to public officers for calculating greenhouse gas emissions in building and demolition projects. Furthermore, efforts should be made to establish regional material banks that can provide access to traditional materials and the continuation of local building practices. This will improve the access craftsmen have to suitable materials and repair materials.

There is a need to develop instruments and incentives to promote continued use and reuse of buildings and building components. The cultural environment management has first-hand knowledge of existing challenges, obstacles and gains concerning continued use and reuse of buildings at regional and municipal level. The Directorate for Cultural Heritage must work to identify and explain these to the relevant authorities at national level. The Directorate for Cultural Heritage's network on cultural environments and climate change will be a key platform for dialogue and the exchange of knowledge and experience.

Cultural environment management is based on circular economic principles

The transition to a sustainable low-emission society requires efficient use of resources. The construction sector plays a vital role in the circular economy, and is one of seven priority areas in the EU's Circular Economy Action Plan.[4] The potential for greater circularity in the industry is considerable, especially within land use, maintenance, recycling materials and waste reduction.[5]

Measures aimed at extending the lifetime of buildings and ensuring that the resources they contain are used for as long as possible are important elements in a circular economy. Cultural environment management is fundamentally based on circular economic principles. Regular maintenance, good craftsmanship and the use of high-quality materials allow buildings and cultural environments to be used for a long time. Many cultural environments bear witness to the awareness of past generations concerning resource use, including the relocation and reuse of buildings, and recycling of materials from other buildings.

Norway's strategy for developing a green, circular economy was launched in the spring of 2021, in which keeping resources in use for longer is a key perspective.

← **THE NATURAL HISTORY MUSEUM** in Bergen is a good example of continued use, where the necessary technical updating for ventilation, fire prevention, universal design and surface treatment were implemented with particular focus on safeguarding cultural-historical values. The work was done while the whale skeletons hanging in the The Whale Hall were kept in place, some of which have been there since the building opened in 1867.
Photo: Aase Hogfeldt-Eskevik, Directorate for Cultural Heritage

↑ **MIDDELTHUNSGATE 29** in Oslo was built as the administration building for the Norwegian Water Resources and Energy Directorate (NVE), in 1962-64. Parts of the building are protected, including the exterior and interior, the main entrance, central stairwell, two office wings and meeting rooms. After a large rehabilitation, the building was again ready to be used as office space in 2011. The rehabilitation was based on protection regulations, environmental requirements, and universal design. While the building's original architectural qualities were preserved, the NVE building achieved its current rating of Energy Label B. Insulation in the walls and roof, technical upgrading of windows and on-demand control of lights and ventilation were some of the improvements made. Photo: Trond A. Isaksen, Directorate for Cultural Heritage

GOAL 3

Improve the energy performance in existing buildings so that greenhouse gas emissions are reduced and cultural-historical values safeguarded

The building and construction sector accounts for around 40% of Norway's national energy consumption. It is estimated that 80–90% of today's buildings will exist in 2050.[6] There is a great potential and need for making buildings more energy efficient, both those that are protected and those that are not. This will contribute to energy saved in the construction sector can be used in other sectors and help limit the need for increased power generation and encroachments on nature.

Improved energy performance in existing buildings makes them more competitive compared to new buildings in terms of greenhouse gas emissions, operational costs, comfort and indoor climate. Even though a measure may give energy savings in operation, it is important to calculate emissions from waste, transport and material production when planning and implementing measures for energy efficiency. It has been proved that small and medium-sized energy efficiency measures constitute significant effects with regard to greenhouse gas reductions and economy.[7] Such measures are also simpler to implement and can be carried out on a large number of buildings.

STRATEGIC INITIATIVE 3.1
Be a driving force for making buildings more energy efficient, whilst safeguarding cultural-historical values

Many measures for energy efficiency can be implemented whilst safeguarding cultural-historical values. The extent to which measures are possible and desirable will vary, depending on cultural-historic values, building type and age. Innovation and technological developments are often referred to in connection with energy efficiency. But it is also known that simple, traditional measures have considerable effect. The skills of traditional craftsmen within energy efficiency and the relationship with choice of material are particularly important and ought to be strengthened.

The cultural environment management has a responsibility to remain up to date and contribute to the development of new solutions, whilst still promoting traditional and well-proven measures. There is a need for instruments leading to greater use and faster implementation of appropriate energy measures for existing buildings. These should be adapted to different building categories, from small private houses to large buildings, and permit step-by-step measures.

STRATEGIC INITIATIVE 3.2
Contribute to more knowledge and expertise on the improvement of energy performance of buildings with cultural-historical value

Special skills are required to implement measures for energy-efficiency that safeguard cultural-historical values and do not cause damage to buildings. To be able to set realistic goals for the energy performance in buildings, there is a need to know the actual condition and realistic potential of different building types. Such analyses should include technical, environmental, financial and cultural-historical aspects. This will provide a good basis of knowledge for owners and public management.

The continuous development of technological solutions and materials requires testing and evaluation on how they are suited for buildings with cultural-historical value. The cultural environment management should seek to develop and promote methods that help building owners. There is a need for systematic and targeted dissemination of knowledge. The cultural environment management's communication work must to a greater degree be adapted to different target groups, from private to public sector building owners and users, property developers, consultants, and craftsmen. The Directorate for Cultural Heritage's catalogue of examples will showcase projects that can contribute to awareness and expertise within this field.

↑ **THE OWNERS OF VILLA DAMMEN** in Moss wanted to reduce their energy consumption in an environmentally friendly, considerate manner. Thorough evaluations were made, including thermal photography and pressure testing. These led to the implementation of relatively simple measures, such as insulating water pipes, sealing windows and doors, extra insulation in ceilings and of the basement, new heat sources and heat recycling from grey water. Today, the well-preserved house from 1935 has an electricity consumption at passive house level. Photo: Trond A. Isaksen

Bygg og Bevar

Bygg og Bevar (Build and Preserve) is a collaborative project between the Ministry of Climate and Environment and the Federation of Norwegian Construction Industries aimed at preservation, specialist skills and sustainable building management. Energy saving and environmental considerations are key elements. The programme spreads awareness of how old buildings should be maintained and rehabilitated in line with their age, construction, use of materials, style and local characteristics. The aim is to reduce damage to and loss of buildings with cultural-historical value, and to ensure that old buildings are used, properly managed, rehabilitated and developed in a sustainable manner.

Cultural heritage and the management of adverse climate change consequences

Climate change is increasing the impact on cultural environments. This is leading to several challenges in efforts to preserve and maintain them for the future. These challenges will increase in the years to come. There are big geographic differences regarding the effects and consequences of climate change. The threats are complex and constantly changing, and the impacts of climate change on different cultural environments are uncertain. This is particularly true for cultural environments under water, at high altitudes and in the high north.

Irreplaceable values in society such as cultural environments require extra attention in order to limit losses and damage. In the years to come, the cultural environment management will have to develop new practices and routines. Climate change will mean an increased need for resources and deliberate prioritising of what must be preserved, and what we will have to let go. To deal with the challenges of climate change, collaboration across all disciplines, specialist fields and sectors will be required, also outside of cultural environment management.

Climate change in Norwegian counties

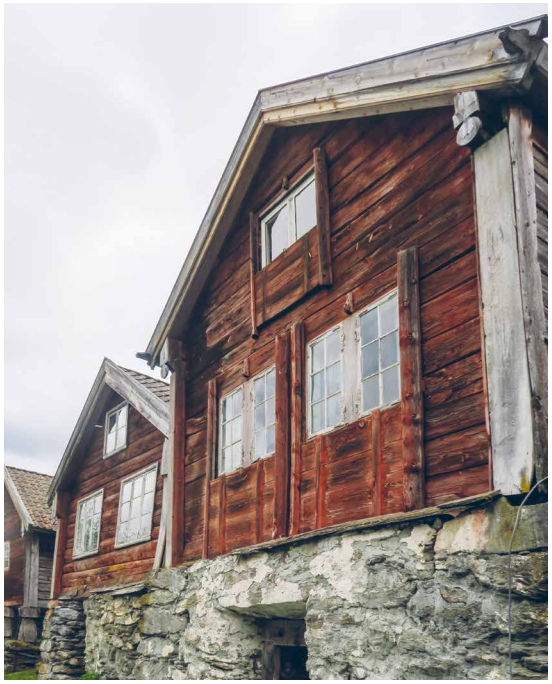
Climate change will vary from place to place. Awareness of local conditions, historical data and climate projects are vital for decision-making in climate change adaptation. More information on climate change in the different counties in Norway can be found at www.klimaservicesenter.no.

↑ **AERIAL PHOTO OF THE FLOODS IN FLÅMSDALENE IN 2014.** The flood washed away roads, buildings, soil and land. Flåm church, dating from the 17th century, was highly exposed to the flood. The churchyard wall kept much of the water away from the churchyard, but large amounts still entered the church and caused damage. Photo: Oddleif Løset, NRK

GOAL 4

Strengthen expertise to safeguard cultural environments in a changing climate

Actors in the cultural heritage field need to analyse the consequences of climate change, and the measures that are needed to prevent or reduce loss of or damage to cultural environments. Increased knowledge and expertise will result in a strengthened management practice, better use of resources and reduce the loss of cultural environment values. Throughout history, humans have had to adapt to prevailing climatic conditions. Historic climate adaptations will be an important source of reference for preserving cultural environments and can also be of relevance to other sectors in society. Interdisciplinary collaboration will become even more important to identify the potential negative impacts of climate change on cultural environments, and to preserve cultural-historical values.



← **HISTORIC CLIMATE ADAPTATION.** Some buildings at the village of Otternes Bygdetun in Aurland have shutters that can be placed over the windows when storms are expected. Photo: Ståle Arfeldt Bergås, Directorate for Cultural Heritage

STRATEGIC INITIATIVE 4.1
Develop knowledge, expertise and management practice in addressing climate change impacts

Sufficient knowledge and expertise are essential in developing robust management practices when addressing climate change impacts. Ensuring access to craftsmanship and suitable materials is an essential prerequisite for protecting cultural environments. The development of knowledge and new practices requires collaboration between different stakeholders, including public sector authorities, museums, research and educational institutions, the construction industry, owners and NGOs.

The actors in the cultural heritage field must actively communicate their research and development needs, initiate and take part in projects and interdisciplinary collaboration to ensure that the knowledge generated holds relevance for cultural heritage management. Historic climate adaptation, research and experience-based and traditional knowledge must be considered together, made available and applied.

Information must be tailored to different target groups and made available through the appropriate channels. In addition to the normal dissemination practice of the cultural environment management, educational institutions, building preservation centres, the university museums and *Bygg og Bevar* will be important communication platforms.

Regional consultancy services and building preservation centres

Building preservation centres and other sources of expertise are already established in many places around Norway. They are important forums for the dissemination of knowledge on the management of cultural monuments and cultural environments. The existing building preservation centres possess valuable knowledge on how to protect cultural environments. They have expertise within craftsmanship, materials, maintenance and technical solutions. Such knowledge will be vital in the development of management practices in the face of climate change.

On behalf of the Ministry of Climate and Environment, the Directorate for Cultural Heritage will analyse the need for such knowledge centres. The Directorate will look at success criteria and relevant collaborative models to be able to test start-up grants to stimulate the existing specialist environments, and to establish new regional centres of expertise and consultancy services. A list of the established building preservation centres can be found at www.byggogbevar.no.

Management and research on archaeological cultural environments

The Archaeological and Marine Archaeological Museums and the Norwegian Institute for Cultural Heritage Research (NIKU) have a national responsibility for conducting archaeological investigations pursuant to the Cultural Heritage Act and associated regulations. They are key providers of knowledge when it comes to climate change and its effect on archaeological cultural environments. By documenting archaeological cultural environments through excavations, documenting preservation status and monitoring preservation condition, the museums and NIKU generate data that forms the basis for research, new knowledge and communication of the effect of climate change on archaeological cultural environments. This knowledge can teach us about how changing climatic conditions were managed in the past, what impacts climate change has on archaeological cultural environments, and measures that can help reduce the impacts.

Environmental monitoring

Environmental monitoring is an important tool for obtaining an overview of an environment's condition and development over time. It provides a basis for initiating measures to maintain that environment, or prevent loss and damage. The Directorate for Cultural Heritage initiates and coordinates the monitoring of cultural environments in various monitoring programmes. The actual monitoring is carried out by external institutions and experts.

The Directorate has environmental monitoring programmes in place on the status of loss, damage, changes and physical condition of different types of cultural environments.

The programme on *Environmental monitoring of the impacts of climate change on protected buildings* looks at the effects and consequences of climate change on the oldest and most valuable buildings, those from the Middle Ages, and the World Heritage sites in Røros and Bryggen in Bergen.

The programme on the *Status and monitoring of the condition of automatically protected archaeological sites in selected municipalities* monitors factors such as damage to automatically protected cultural monuments as the result of floods, landslides and the use of heavy construction machinery on wet, frost-free land. The programme will be able to record any increase in the scope of such damage, which can be related to climate changes such as wetter, warmer and more extreme weather.

STRATEGIC INITIATIVE4.2
Identify climate-related risks and vulnerabilities for cultural environments

To be able to safeguard cultural environments and implement necessary protective measures, good understanding of their condition, vulnerability and risk of damage is required. The lack of condition surveys and risk assessments can lead to the lack of implementing necessary measures, or that the implemented measures can enhance risk and vulnerability. Environmental monitoring is an important method to study the development of condition over time. It is particularly important to obtain an understanding of preservation status and knowledge of risk factors to archaeological cultural environments.

The cultural environment management and private and public sector stakeholders with responsibility for cultural environments ought to initiate condition surveys and risk assessments for individual environments, different cultural environment categories and cultural environments in certain geographical areas. Such assessments will provide a foundation for the prioritisation of individual cultural environments, and at an overall level. To obtain the best knowledge basis for decision-making, condition surveys and risk assessments must be performed at a suitable level of detail by personnel with sufficient expertise. The development of methods and guidance will be important.

↑ **SYSTEMATIC MONITORING** of rock art in the World Heritage site in Alta contributes to identification and better understanding of climate and environmental impacts. Photo: Eva Walderhaug, Directorate for Cultural Heritage.

GOAL 5

Prevent and reduce climate-related loss of and damage to cultural environments

Loss of, or damage to cultural environments resulting from climate-related impacts occur either over time or due to sudden onset events. This is not new, but climate change is leading to less predictability, causing events and damage to develop faster, occur more frequently, and to have greater impact. With a changing climate, greater efforts are needed to protect cultural-historical values. This will require more resources and challenge how we prioritise in the future. Follow-up from the cultural environment management, public sector and private actors with responsibility for cultural environments will be vital in dealing with the problems we face.

STRATEGIC INITIATIVE 5.1
Strengthen the maintenance of cultural environments to prevent climate-related damage

Good maintenance is the best way to secure the cultural-historical values of cultural environments. It is also often the most economic measure because reparation after damage is more costly than maintenance to prevent damage. Using the Sustainable Development Goals as a guide, society must protect the resources that cultural environments represent.

To reduce loss and make cultural environments more climate resilient, the cultural environment management, public sector and private actors with responsibility for cultural environments need to strengthen maintenance practices. Museums that manage buildings and constructions with cultural-historical value, along with private owners of cultural environments, are particularly important in this context. Public management must support this work through guidance, access to craftsmanship and a flexible and solution-oriented management practice. Communication will be key, and guidance has to be easily accessible, targeted and updated. This includes guidance on methods, material use, craftsmanship, and traditional climate adaptation solutions. There is also a need to develop instruments and incentives contributing to maintenance.

Museums and the built heritage

Several museums manage a large number of protected buildings. They work actively to strengthen expertise in maintenance, risk assessment and documentation. They also work to increase the understanding of traditional craftsmanship as a key element in the development of sustainable building preservation, and knowledge of climate-friendly solutions.

Climate change is leading to many challenges in safeguarding the thousands of buildings worthy of preservation in their collective care. The museums are important to many of the building preservation centres. They play a vital role in the dissemination of knowledge about the maintenance of cultural environments to prevent climate-related damage.

STRATEGIC INITIATIVE 5.2
Implement risk-reducing measures for cultural environments

Implementing risk-reducing measures is the best way to address the increasing risk of climate-related loss of cultural historical values, for cultural environments both above and below ground. There is a growing awareness of the necessity for risk-reducing measures and the securing of cultural environments, and the development of management practices will be important to meet this need. Guidance and knowledge of good technical solutions will provide a good foundation for this, along with examples of measures and awareness of traditional ways of addressing these challenges.

The cultural environment management and public and private actors with responsibility for cultural environments ought to initiate and implement risk-reducing measures for vulnerable cultural environments to a larger degree, and instruments and incentives ought to be developed.

↑ **INCREASED BIOLOGICAL GROWTH** on building facades is a growing problem due to Increased humidity and rainfall. Utstein Monastery, Stavanger Municipality. Photo: Johan Matsson, Mycoteam

World Heritage sites as beacons for best practice

Norway has eight sites on UNESCO's list of world cultural and natural heritage – with outstanding universal value. The Norwegian World Heritage Sites are to be developed as beacons for best practices within natural and cultural environment management with regard to condition, management, and formal protection. The goal is that the management of these World Heritage Sites should be at the forefront of how climate consideration is safeguarded in preservation work. The Climate Vulnerability Index (CVI) method will be introduced in 2021-2022 at the Vega World Heritage Site. The method is being developed to assess the climate-related risk for World Heritage Sites.

↑ **PHYSICAL WEATHERING** as a result of freeze and thaw processes can cause considerable damage to rock art on the surface of rocks, as seen here in the rock carving field at Ausevik in Kinn Municipality. Covering with insulating mats in winter helps to limit weathering. Photo: Eva Walderhaug, Directorate for Cultural Heritage

STRATEGIC INITIATIVE 5.3
Repair climate-related damage to cultural environments

Sudden onset events such as floods, landslides and extreme weather can cause considerable damage to cultural environments. Climate change will increase the frequency and impact of such events, and the extent of damage. When major events such as floods occur, there will often be a tendency to implement extensive repair work on cultural environments without necessarily following the normal assessments or procedures.

In addition to damage caused by sudden onset events, climate change leads to faster degradation of materials and elements such as building components and infrastructure elements. This must be countered by better maintenance, but improvements and replacement will also be needed. This must be closely monitored to prevent greater damage developing over time.

To meet these challenges, better follow-up and guidance from the cultural environment management will be needed after climate-related events. The cultural environment management ought to develop simple emergency plans to be able to quickly react and support municipalities and owners after major events. Instruments and incentives for implementing measures to deal with damage ought to be developed. Increased cooperation with the emergency services and recovery- and insurance companies will be an important contribution for implementing necessary preventive measures, salvage measures and initiating restoration after a damage.

STRATEGIC INITIATIVE 5.4
Secure the scientific value of cultural environments that may be lost as a result of climate change

In some instances, climate change will cause unavoidable loss of cultural-historical values, or there will not be enough resources to secure them. Documenting prioritised cultural environments before they are lost is vital, which will secure scientific values and help generate knowledge.

For archaeological cultural environments, this will in some cases mean the excavation and gathering of objects. The university museums will play a key role in this work, through the development of methods, documentation, conservation and analyses. Surveying, photography and other documentation will be relevant for collecting information about important buildings at risk. This will secure knowledge of how materials were used and treated, technical solutions and climate change adaptation. The documentation of landscapes should also be initiated, including re-photographing based on old photographs. In addition to traditional methods, Lidar, photogrammetry and various geophysical techniques will be important tools. Having a range of methods adapted to various types of cultural environments and situations will be important to satisfy the need for documentation.

Documentation will also provide a better foundation for prioritisation and knowledge of how the cultural environment management can prevent future losses. The cultural environment management should develop a more systematic practice in this area. Increased emphasis on securing scientific values will require instruments and incentives.

STRATEGIC INITIATIVE 5.5
Improve the integration of cultural environment considerations in emergency planning and climate change adaptation

The various public management areas and sectors are subject to responsibilities and tasks related to safety, emergency planning and climate change adaptation. This is stated in the regulation on municipal preparedness duty, the Planning and Building Act, and the state guidelines for climate and energy planning and climate change adaptation. The municipalities play an important role in this respect. Broad collaboration is important to identify the best possible solutions, so that measures do not increase the vulnerability of cultural environments, or cause negative impacts to cultural environments.

It is important that sectors and actors with responsibility for land use planning take cultural environments into consideration in their work on climate change adaptation. Measures in other sectors, such as drainage and runoff systems for flood defence, should not increase climate-related risk for cultural environments.

Consideration for cultural environments ought to be an integral part of emergency planning in the municipalities and county authorities. A clearly defined awareness of cultural environment interests when working with climate change adaptation and emergency planning will better protect vulnerable cultural-historical values.

← **PART OF THE TOWER** of Nærøy church collapsed in 2016. The Directorate for Cultural Heritage has contributed to financing the securing of the tower, and the Nidaros Cathedral's Restoration Workshop has compiled a status report with recommended measures and cost estimates. Photo: Hege Sejnæs Eilertsen, Directorate for Cultural Heritage

← **TAUBANESENTRALEN** at Hiorthhamn on Svalbard is an iconic building. Erosion has steadily eaten its way towards the building over the last few years. It reached under and close to the foundations of the small forge building in late 2020. The forge building has been temporarily relocated a few metres further inland, and efforts have been made to protect the building pending clarification of the next steps. Photo: Einar Lund Sørensen, Ministry of Trade, Industry and Fisheries

← **THE GLACIER ARCHAEOLOGY PROGRAMME IN** Innlandet has collected and preserved around 3500 archaeological finds. This arrow was found at Trollsteinhøe, in the north of Jotunheimen at an altitude of around 2000 m. It has been typologically dated to approximately 300-600 AD, and is believed to have been used for reindeer hunting. A great find, with feather flights, shaft and binding preserved. Photo: The Glacier Archaeology Programme, Innlandet County Authority

Follow-up and recommendations

THE DIRECTORATE FOR CULTURAL HERITAGE
The Directorate for Cultural Heritage advises the Ministry of Climate and Environment and implements the Government's cultural environment policy.

The Directorate is responsible for securing an integrated cultural environment management and develops guidelines and digital services. The Directorate is in charge of protection orders, objections and the consideration of appeals, and is responsible for the management of selected cultural environments of national value and for protected and listed church buildings. The Directorate is also responsible for the national distribution of grant funds to the county authorities.

Knowledge, expertise and management practice
The Directorate for Cultural Heritage will take the lead regarding knowledge and expertise within the climate field that is of importance to cultural environment management. The Directorate will actively contribute to national and international forums on the development and exchange of knowledge. The Directorate will collaborate with research and educational institutions, be involved in research projects to ensure management relevance and contribute to educational content.

Dissemination
The Directorate will establish and run an online knowledge bank that will gather and make available research, reports, guides, best practice and other relevant knowledge within the climate field that is of importance to cultural environment management. The knowledge bank will be available to everyone. The Directorate will develop its catalogue of examples with examples of measures to reduce greenhouse gas emissions and climate change adaptation for cultural environments.

Collaboration
The Directorate for Cultural Heritage will facilitate greater collaboration across sectors and between actors on issues related to the climate field that is of importance to cultural environment management. The Directorate will establish and run a network on cultural environments and climate change. The Directorate will facilitate knowledge exchange, skills improvement and innovation with the participation of the cultural environment management, research and educational institutions, and other relevant actors.

Furthermore, the Directorate will follow-up efforts to reduce greenhouse gas emissions by:

- being a driving force together with other actors for the development and dissemination of knowledge, instruments and regulations that promote continued use and reuse of buildings and building components
- being a link between cultural environment management and relevant state actors, research and development work and industry organisations, and highlight the challenges, obstacles and benefits of continued use and reuse of buildings
- contributing to the development and use of comprehensive and comparable greenhouse gas calculations when decisions are being made between reuse, demolition and new construction

- taking the initiative to establish and develop better incentives and grant schemes for rehabilitation, reuse and energy-saving measures in existing buildings
- assisting the county authorities, the Sámi Parliament and the Governor of Svalbard with follow-up and guidance
- developing expertise and best practices for land use management that contribute to sustainable development and reducing greenhouse gas emissions
- applying the principles for coordinated residential planning, land use and transport planning and compact city and town development as the basis for policy and priorities, so that greenhouse gas emissions are reduced, and cultural-historical values and interests safeguarded
- applying the Directorate for Cultural Heritage's Strategy for Management of Urban Cultural Heritage as a basis for prioritising and management practice for cities and towns, which will contribute to sustainable development and reducing greenhouse gas emissions
- ensuring that the conservation strategies developed also include reducing greenhouse gas emissions

The Directorate will follow-up efforts with climate change adaptation by:

- taking initiative to establish and develop incentives and grant schemes to better deal with the adverse consequences of climate change
- initiating and following up risk assessments for certain cultural environments
- contributing to risk assessments for all the World Heritage Sites in Norway
- developing and operating environmental monitoring programmes with particular emphasis on cultural environments and climate change, in cooperation with relevant actors, including the county authorities, the Governor of Svalbard and the Sámi Parliament
- developing guidance materials on maintenance, including knowledge of material use, craftsmanship and traditional climate adaptation solutions
- contributing to systematic and targeted practice for the implementation of risk-reducing measures
- ensuring that the conservation strategies developed also include climate change adaptation
- developing strategies and methods in order to secure and document cultural environments in a changing climate
- assisting the county authorities, the Sámi Parliament and the Governor of Svalbard with follow-up and guidance
- contributing to the county authorities' and municipalities' emergency planning through guidance and by making good examples available
- being a driving force for taking cultural environmental interests into account when other sectors plan and implement climate change adaptation and other measures, and ensuring that climate-related risks to cultural environments do not increase

PUBLIC PROPERTY MANAGERS

The public sector – including the State, county authorities and municipalities – owns many buildings and cultural environments that are worthy of preservation or are under protection. It is important that the public sector is an active driving force and takes the lead as a good example when it comes to management, use and adaptive reuse, by:

- recommending continued use and reuse of buildings that takes cultural-historical values into consideration, rather than demolition and new construction
- exploring opportunities for new use when publicly owned buildings fall out of use
- implementing energy-saving measures that take cultural-historical values in public buildings into consideration
- ensuring maintenance, damage repair and implementation of risk assessments and risk-reducing measures for the cultural environments they manage
- taking cultural environmental interests into account when planning and implementing climate change adaptation and other measures, and ensuring that climate-related risks to cultural environments do not increase

GOVERNOR OF SVALBARD

The Governor of Svalbard is the regional cultural environment authority in Svalbard, as stipulated in the Svalbard Environmental Protection Act. Within its areas of responsibility, the Governor of Svalbard should:

- contribute to developing knowledge, improving skills and developing management practice through participation in the network on cultural environments and climate change, and in relevant projects
- contribute to protecting vulnerable cultural environments exposed to climate change impacts, by:
  - carrying out maintenance to limit loss and damage, and repairs after damage to protected cultural environments in Svalbard
  - contribute to risk assessments for certain cultural environments
  - having a systematic and targeted practice for the implementation of risk-reducing measures

COUNTY AUTHORITIES AND THE SÁMI PARLIAMENT

In their role as regional cultural environment authorities, county authorities are responsible for safeguarding important national and regional cultural environments in their respective counties. They have the role of decision-making authority, planning authority, and are in charge of regional development. They have a responsibility for the management of most automatically protected cultural monuments, sites, ship finds, vessels with the status of protected by law or other measures, most properties protected through regulations, several technical and industrial facilities and non-ecclesiastical Medieval buildings. County authorities ensure that their municipalities take cultural monuments and cultural environments into consideration in their land use and social planning. They are also responsible for regional planning strategies, regional plans and regional planning provisions. They also process applications within several grant schemes for cultural environments.

The Sámi Parliament is responsible for Sámi cultural environments throughout Norway. The Sámi Parliament has the same role and authority for Sámi cultural environments as the county authorities have for non-Sámi cultural environments in their respective counties.

The county authorities and Sámi Parliament should contribute to knowledge development, skills development and the development of management practice through participation in the network on cultural environments and climate change. They should participate in relevant projects and make good examples available. The county authorities regional planning for cultural environments and other plans affecting cultural environments ought to be a key starting point for prioritising their efforts.

The county authorities and the Sámi Parliament should follow-up efforts to reduce greenhouse gas emissions within their areas of responsibility, by:

- ensuring that experiences and expertise on the importance of energy efficiency, rehabilitation and reuse of buildings are shared between the municipalities and other relevant stakeholders
- encouraging the municipalities and other relevant stakeholders to use comprehensive and comparable greenhouse gas calculations when decisions are being made between reuse, demolition and new construction
- integrating cultural environment interests into regional plans for coordinated residential planning, land use and transport planning, and regional energy planning
- providing regional planning guidelines for how cultural environments can be managed in the densification and development of cities and towns, to help reduce greenhouse gas emissions
- considering making demands for climate considerations to be incorporated in the design of measures and choice of materials in connection with grant management
- using their roles effectively in relation to other actors in society, and by developing regional instruments

The county authorities and the Sámi Parliament should follow-up efforts with climate change adaptation within their areas of responsibility, by:

- promoting the care and maintenance of cultural environments to limit loss and damage
- contributing to risk assessments for certain cultural environments
- contributing to systematic and targeted practice for the implementation of risk-reducing measures for cultural environments
- preparing emergency follow-up plans in the event of acute climate-related events that cause damage to cultural environments
- providing guidelines in regional plans for how climate change adaptation should be integrated into land use planning by municipalities, to prevent loss of and damage to cultural environments
- advising municipalities and other relevant stakeholders on integrating cultural environment interests in climate change adaptation work and emergency planning

THE MUNICIPALITIES

The municipalities have responsibility for identifying, valuing and managing cultural environments that are protected or worthy of preservation in line with national goals. They are responsible for preserving and facilitating the use of cultural environments through land use planning, processing building applications and long-term social planning. The Planning and Building Act is the main legal instrument. Municipalities also have a range of subsidiary programmes, and can grant exemption from property tax for buildings with historic value. Both overarching plans and regulatory plans are management tools that can ensure appropriate use of cultural environments in sustainable development.

Municipalities are advised to follow-up efforts to reduce greenhouse gas emissions by:

- contributing to the development of knowledge by participating in projects and making good examples available
- possessing expertise in energy efficiency, rehabilitation and the reuse of existing buildings
- promoting and sharing knowledge to their inhabitants on the importance of improving energy efficiency, rehabilitation and the reuse of buildings and cultural environments
- using comprehensive and comparable greenhouse gas calculations when deciding between reuse, demolition and new construction
- integrating cultural environment interests into plans for coordinated residential planning, land use and transport planning
- providing guidelines and provisions in municipal plans for how cultural environments should be managed in the densification and development of cities and towns, so that the management of cultural environments can contribute to the reduction of greenhouse gas emissions

The municipalities are advised to follow-up efforts with climate change adaptation by:

- conducting risk assessments for certain individual and cultural environment categories and for cultural environments in certain geographical areas
- promoting and disseminating knowledge to their inhabitants on maintenance, implementing risk-reducing measures and damage repair
- integrating cultural environment interests in their work with climate change adaptation in land use planning, emergency planning and follow-up of the government's planning guidelines for climate and energy planning and climate change adaptation
- providing guidelines and provisions on land use planning for climate change adaptation measures that can prevent the loss of and damage to cultural environments

Glossary

ADAPTIVE REUSE – used about buildings where change occurs on the premises of the architecture that already exists, with original use or change of use. In contrast to transformation, which often involves changing the building structure, "adaptive reuse" involves a fundamental idea of starting from the existing building structure, where the building forms the premises for its use.

ARCHAEOLOGICAL DEPOSITS – deposits accumulated through human activities.

CIRCULAR ECONOMY – a principle of systems and processes for maintaining the value of structures, products, materials and resources for as long as possible in a closed circuit, where the goal includes reducing waste and the need for new raw materials.

CLIMATE CHANGE ADAPTATION – understanding the consequences of climate change and taking measures to prevent or reduce damage while exploiting the opportunities such changes may entail.

CLIMATE PROJECTIONS – calculations of what the climate will look like in the future, based on climate models and earth system models. The models describe processes between oceans, air, land and earth using mathematical equations.

CULTURAL ENVIRONMENT – Any area where a cultural monument or site forms part of a larger entity or context. With White Paper 16 (2019–2020) New Goals in the Cultural Environment Policy – Engagement, Sustainability and Diversity, the Government introduced the term "cultural environment" as a collective term. It includes the terms "cultural monuments, sites, environments and landscapes" and is used to refer to the sector as a whole.

CULTURAL HERITAGE –A collective term covering both tangible and intangible cultural heritage. Intangible cultural heritage refers to practices, representations, expressions, knowledge and skills. The term is frequently used in international contexts.

CULTURAL MONUMENT OR SITE – Traces of human activity in the physical environment, including places associated with historical events, beliefs and traditions.

ENERGY EFFICIENCY – measures that improve energy performance in buildings, constructions, vessels etc., to reduce their energy requirement.

ENERGY PERFORMANCE – the measurement of how efficiently energy is produced, distributed, stored, converted and used. Energy performance can also refer to environmental impact and cost.

GREENHOUSE GAS ACCOUNTING (FOR BUILDINGS) – a calculation of greenhouse gas emissions from materials and energy that are part of the entire life cycle of the building from development, operation and maintenance to demolition.

GREENHOUSE GAS EMISSIONS – emissions of gases to air that affect the atmosphere's ability to retain heat, thus changing the climate. Carbon dioxide (CO2), methane (CH4) and nitrous oxide (N2O) are examples of greenhouse gases.

LANDSCAPE – An area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors.

LIVEABLE CITIES AND TOWNS – cities or places that are good to live in, that have surroundings that contribute to a high quality of life. Assessments of the degree of liveability include physical and non-physical indicators/dimensions, including sports and culture, safety and health, education and learning, mobility, the physical environment, nature, urban life and urban spaces, identity and commercial activity.

PROTECTION – This is the strictest form of preservation, authorised by the Norwegian Cultural Heritage Act and the Svalbard Environmental Protection Act. Cultural monuments, sites and environments can all be protected, either automatically protected, protection through an individual protection order, protection through regulations or temporarily protected.

REUSE – the term ”reuse” is used here about buildings, building parts or materials reused in their original form. This may involve new use or unchanged use (with new users). See also ”adaptive reuse”.

RISK – in everyday use, the terms ”danger” and ”risk” are often used interchangeably. Even though a danger can potentially cause damage or destruction, a risk is the likelihood that such damage or destruction will occur under defined circumstances. In other words, risk can be described as the chance of something happening that will have negative consequences for cultural environments.

SCIENTIFIC VALUE – value attributed to cultural environments which are of particular importance as a source of knowledge and understanding of the past.

SUSTAINABLE DEVELOPMENT – development that satisfies current needs without compromising the chances of future generations being able to satisfy theirs.

WORLD HERITAGE – Cultural heritage and/or natural heritage that is inscribed on UNESCO’s List of World Heritage. The World Heritage properties form a common heritage of outstanding universal value to all humanity, across national borders.

WORTHY OF PROTECTION / WORTHY OF PRESERVATION – A cultural monument, site or cultural environment that has undergone a cultural-historical assessment and has been identified as worthy of preservation. Most cultural monuments, sites and environments deemed worthy of preservation are not formally protected pursuant to the Cultural Heritage Act, the Planning and Building Act or a binding agreement.

NOTES

[1] Conventions concerning the cultural environment ratified by Norway: https://www.riksantikvaren.no/arbeidsomrader/konvensjoner/

[2] https://whc.unesco.org/en/climatechange/

[3] Fufa S. M., Flyen, C. and Venås, C. (2020) Grønt er ikke bare en farge: Bærekraftige bygninger eksisterer allerede. SINTEF Fag 68. https://sintef.brage.unit.no/sintef-xmlui/handle/11250/2719890

[4] The European Commission (2020) Circular Economy Action Plan For a cleaner and more competitive Europe. https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1583933814386&uri=COM:2020:98:FIN

[5] Deloitte (2020) Kunnskapsgrunnlag for nasjonal strategi for sirkulær økonomi. Delutredning 1 – Potensial for økt sirkularitet. https://www.regjeringen.no/contentassets/7ca1a81f57cc4611a193570e80c4dafd/deloitte_kunnskapsgrunnlag-sirkular-okonomi_potensialer.pdf

[6] Fufa S. M., Flyen, C. and Venås, C. (2020) Grønt er ikke bare en farge: Bærekraftige bygninger eksisterer allerede. SINTEF Fag 68. https://sintef.brage.unit.no/sintef-xmlui/handle/11250/2719890

[7] Fortidsminneforeningen (2019) Bærekraftig klimaforbedring av eldre hus.

The Directorate for Cultural Heritage
Post Box 1483 Vika, 0116 Oslo
Visiting address / Dronningens gate 13, Oslo
Tel. / 22 94 04 00
Email / postmottak@ra.no

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www.riksantikvaren.no