

## NORWAY

### Climate change and the effect on Norwegian World Heritage sites

Norway has seven sites inscribed on UNESCO's World Heritage List. Three cultural sites are located along the coast: the cultural landscape of the Vega Archipelago, the Alta Rock Art, and the Bryggen (Wharf) in Bergen. The sea level rise, increasing numbers of days with rain and heavier rainfall, warmer temperatures and storms in these areas, which already have a high humidity, will expose the cultural sites to more negative conditions than experienced before. The new climate will cause direct damage caused by stronger winds affecting roofing and panels, and an increase in insects and fungi attacking wooden constructions. The foundations of harbour quays, piers and storehouses are not built to resist extreme storms, and will need more intensive maintenance.

The construction of the wharf, Bryggen, in Bergen is one example where this has already become clearly visible. Bryggen is threatened by rising sea levels. Due to heavy rainfall and storms in combination with high tide, a lot of the buildings experience flooding during the winter. Future forecasts predict tide levels that will flood the buildings nearest to the wharf more often. Rising tides could also threaten more of Bergen's old city centre. The winter 2006-2007 resulted in flooding 15 to 20 times, meaning that the constantly wet timber structures are now threatened by rot and fungus from this inundation combined with lengthy rainfall.

### Coastal heritage

The Norwegian coastline is extensive, heavily dissected by fjords. Traditional wooden coastal settlements, composed of wharfs, warehouses, dwellings, and farmhouses form a typical Norwegian vernacular architecture.

World Heritage site, Bryggen in Bergen, with Svensgarden flooded 2006 (Photo: Bryggen Foundation)



This vernacular architecture is threatened, as the use of wooden buildings for the fishing industry, trade and farming is no longer viable. Settlements are left empty without any maintenance. It is a challenge to find new adaptive uses, which might guarantee maintenance of this coastal heritage. The Norwegian Government has launched several programmes to safeguard coastal heritage, but the degradation of this unique Norwegian coastal heritage is still of concern. Improved cooperation between local and national authorities is needed by the owners, aiming for an alternative use for Norway's coastal heritage, which might guarantee dependable and consistent preservation and protection.

### Churches

In Norway, churches are far more important as cultural heritage than in most other European countries. This is because from the Lutheran Reformation in 1537 until the end of the 18<sup>th</sup> century, the church was almost the only institution building structures of any size and contracting adornment of importance from artists and craftsmen. Norway was a province under Denmark at this time, and the king, the court, and almost the whole nobility lived outside Norway. After the 1814 constitution, the state of Norway gradually developed its own administrative buildings and a royal palace. The mid-19<sup>th</sup> century was the most expansive church building period since the Middle Ages. These sacred buildings heralded a new era and united the new nation.

Most of the Norwegian churches are under some kind of statutory protection. 215 churches built before 1650 are protected by the Cultural Heritage Act. Changes undertaken in all the 309 churches built between 1650 and 1850 and in about 40% of the churches built after 1850, are also to be evaluated by the Directorate for Cultural Heritage.

Many of the churches, regardless of heritage importance, suffer

World Heritage site, Vega archipelago, warehouse and eider house, built for eider ducks to nest in (Photo: Kirsti Kovanen, 2002)





Odde Smelteverk (Photo: Harald Hognerud, Norwegian Hydro Power and Industry Museum (NVIM))



The Tyso hydropower plant (1906-16) is today a national monument and beautifully restored after its closure in 1996 (Photo: Axel Mykleby)

badly from a lack of maintenance over many years. The heart of the problem seems to be that municipalities are required to cover the cost of maintenance. Often the most interesting churches, especially those protected by the Cultural Heritage Act, are situated in remote, small and rather poor municipalities. Other churches were established by a once thriving community, such as the church at the World Heritage site Røros, the mining town. The church at Røros has always been special, even by wider European standards, but the lack of funding by a poor community is now a great threat to this church.

Through the years church buildings have been the losers when local budgets have been presented. The situation for many churches is now dire, due to a long period of financial neglect and increasing deterioration. The cost for repair and restoration of these churches is calculated to be 406 million Euros (3.3 billion Norwegian Kroner).

Due to demographic change and the high cost of maintenance, and because of negligence, church authorities are “open to” the sale and demolition of churches. A new, different use of churches is naturally a threat to their heritage values, and demolition will raze this important heritage, removing it from posterity.

Fire has been a serious threat to Norwegian churches for many years, especially during a period of growing Satanic cults. Many efforts have been made to provide churches with fire protections systems, but still many of these churches lack even an adequate fire warning system.

## Hydropower and large-scale industry in Odde

The town Odde is situated in the Hardangerfjord area on the western coast of Norway. The place is surrounded by two national parks; the Hardangervidda plateau and the Folgefonna glacier, which is the third largest glacier in Norway. Odde was one of the major tourist destinations of Norway during the 19<sup>th</sup> century, known for its beautiful scenery. The high mountains with several waterfalls and the ice free fjord made it ideal to establish large scale industry and to build a hydro-electric power plant in Tyssedal, once one of the largest in the world. The Tyso hydro-

electric power plant is today a national monument and beautifully restored since its closure in 1996, whereas the factories from the same period in the centre of Odde represent significant industrial heritage sites at risk.

The Odde Smelteverk AS (smelting works) from 1906 is located in the centre of the town of Odde. The works occupy half the town and were built for the production of calcium carbide and calcium cyanamide, and were amongst the largest of their kind in the world until the 1920s. In 1928 the ‘Odde process’ was invented here:

*The nitrophosphate process (also known as the Odde process) was a method for the industrial production of nitrogen fertilizers invented by Erling Johnson in the city of Odde, Norway around 1927. ... Although Johnson created the process while working for the Odde smelteverk, his company never employed it. Instead, it licensed the process to Norsk Hydro, BASF, Hoechst, and DSM. Each of these companies used the process, introduced variations, and licensed to other companies. Today only Yara (Norsk Hydro), BASF, AgroLinz and GNFC still use the Odde process.*

(From Wikipedia, the free encyclopedia, [http://en.wikipedia.org/wiki/Nitrophosphate\\_process](http://en.wikipedia.org/wiki/Nitrophosphate_process)).

From 1937 until 1998 the factories were owned by The British Oxygen Company and then sold to Philip Brothers Chemicals in New York. Since a bankruptcy in 2003 the works have been neglected and much of the equipment sold as scrap metal. The production line of calcium carbide with the big ovens were interim listed in 2004 as significant industrial heritage, but are now under pressure probably because they are considered too ‘big and ugly’. Many local politicians and the local workers’ union want to demolish the listed items, because they want the land for new buildings.

Industrial heritage is under-represented on the World Heritage List. International experts claim that the Tyso Hydropower Plant together with parts of the smelting works in Odde and its surrounds with the fjord- and waterfall landscape are unique in the world. The industrial heritage of Odde needs international attention to be saved.