EUROPEAN UNION

EU MISSIONS

ADAPTATION TO CLIMATE CHANGE

August 2025

Simple measures and techniques help safeguard historic buildings in a changing climate

Ventilation measures reduce wall moisture in Norway's historic churches

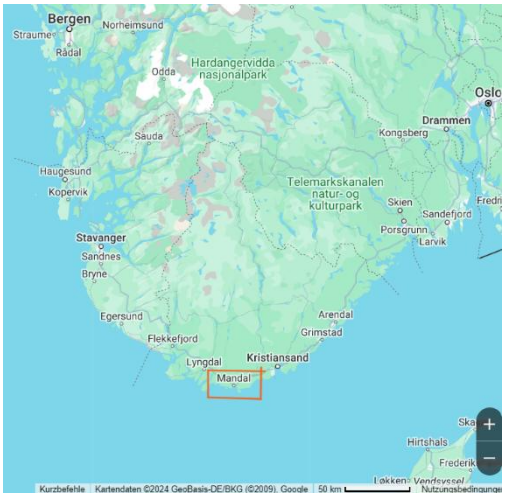
Changing the cladding's position prepared Mandal Church in Lindesnes for more humid weather conditions and helped preserve the building's future by reducing wall moisture caused by milder temperatures and increased humidity, which improved its stability.

Key Learnings

- **Assessing existing solutions**: The continued use of original materials and traditional methods is a fundamental preservation principle for historic buildings. Climate change challenges current practices, requiring the assessment and adjustment of existing solutions to preserve historic buildings in a changing climate.
- **Prepare for the future**: It is essential to manage building heritage so that it can withstand the increased stresses a changing climate will bring.

About the region

Lindesnes is the southernmost municipality in the region of Agder, Norway. The municipality has about 23.700 inhabitants (2025) and covers an area of 934 km^2. The region features a coastline with fjords, islands, and the notable Lindesnes Lighthouse, while inland areas include valleys like Audnadalen. It has a temperate oceanic climate with rapidly changing weather.



Climate Hazards

Droughts, Extreme Heat, Flooding

Sector

Buildings, Urban, Cultural Heritage, Water Management

Key system

Water Management

Climate Threats

Climate hazards in Lindesnes include risks of flooding, landslides, and coastal impacts from sea-level rise and storm surges, influenced by heavy rainfall and Norway's varied topography. Historical wooden churches in Lindesnes municipality are spread out across coastal and inland areas, facing challenges from changes in precipitation, increased humidity, and milder temperatures that negatively impact historic buildings. The churches share common issues such as mould and other humidity-related damage caused by heavy rain, flooding and rising temperatures. Inadequate maintenance, incorrect material use, and poor technical solutions further accelerate the deterioration of these buildings.

Figure 1: Mandal Church is Norway's largest wooden church, with 1800 seats. Image Credit: Unknown.

Adapting churches to the effects of climate change

Norway’s churches are important cultural landmarks, showcasing a thousand years of craftsmanship and architecture. Strengthening their climate resilience is key to preserving them, using new methods and technologies when needed. An important adaptation measure involved assessing the current state of churches in the municipality, which revealed that Mandal Church was in poor condition. Continuing to use original materials and traditional methods is a core preservation principle for historic buildings, but climate change challenges current practices. Existing solutions often require adjustments to preserve historic buildings in a changing climate. As one of Norway's largest wooden churches, Mandal Church features a structure made of bricks and timber, with wooden panels forming the cladding. Since 1821, a standard technical solution was to directly attach the cladding to the structure without leaving a gap for airflow, leading to inadequate ventilation. Decades of barely ventilated cladding caused extensive rot and fungal damage to the tower behind the western facade. New technical measures now preserve the historic building and adapt it to future climatic conditions.

Figure 2: An uncovered corner of Mandal church showing how the cladding was connected directly to the wooden construction. Fungi and rot had damaged the structure. Image Credit: Tanja Røskar/Multiconsult.

Implementing a restoration project to tackle the effects of climate change

The restoration project at Mandal Church aimed to better protect the church from future climate change impacts and avoid past mistakes. When the project team dismantled the cladding on the entire church, they found that 90% of it remained in good condition and usable. To improve ventilation, they remounted the cladding with a 25 mm gap outside the timber construction. This gap prevents rotting by ensuring airflow, which keeps the conditions dry despite increased humidity due to climate change. A diffusion-open wind barrier made of airtight cardboard was also added, placed on the outer wall to allow moisture to escape without letting drafts in. As well as contributing to moisture control, sealing air leaks is a simple yet effective measure that saves energy and enhances comfort in the building.

"Norway's churches have a special status as cultural historic buildings, bearing witness to 1.000 years of traditional craftsmanship and architectural history. It is therefore important to make them climate resilient to preserve them for future generations and consider new approaches and technical solutions when necessary.",

Directorate for Cultural Heritage in Norway

Summary

The restoration of Mandal Church in Lindesnes, Norway, emphasises the importance of adapting historic buildings to climate change. Simple measures, such as reusing old cladding and adding gaps to allow air flow, reduce humidity in the wood, prevent mould, and preserve historic buildings. Increased humidity and milder temperatures have caused moisture damage, primarily due to the lack of ventilation in the church's cladding. The restoration team assessed the building's condition and implemented a solution by remounting the cladding with a 25 mm gap, allowing airflow to prevent rot while maintaining 90% of the original materials. This approach both preserves cultural heritage and enhances the building's resilience to future climate challenges.

Further information

- https://eksempelsamling.ra.no/klimatilpasning/utlufting-av-kledning-hindrer-okt-fukt/ (in Norwegian)

Contact

Lindesnes joint church council

Funded by the European Union