

Evaluation of guidance documents for climate adaptation of the built environment in Norway

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Introduction: Anticipated future climate changes will lead to increased climate loads on buildings and infrastructure in Norway. To prevent damages, and prepare the society for the changes, numerous guidance documents have been developed the recent years.

Objectives: The objective of this study is to give an overview of existing guidance material for climate adaptation of the built environment. 86 guidance documents are mapped and analyzed by target groups and topics. The results are seen in relation to findings from expert interviews.

Methods: The findings are based on a thematic analysis of Norwegian guidance material and web sites for climate adaptation in the built environment. Further qualitative results are based on seven qualitative interviews and one group interview of experts in municipalities and public organizations with responsibility for promoting climate adaptation. The selection of guidance material was performed according to chosen principles, and limited to the research center Klima 2050-subjects (damage on infrastructure and buildings caused by water), with review from Klima 2050-partner organizations.

Findings: The main findings from the thematic analysis of guidelines are:

- There is a large amount of guidance material for climate adaptation of the building- and infrastructure sector. 86 guidance documents are mapped and evaluated in this study;
- A large share (70 %) of the investigated guidance documents are aiming at users on municipality level or are communicating climate adaptation on a general level;
- Only one (1 %) of the guidelines are aiming at private developers. Private developers generate 80% of regulation proposals in Norwegian municipalities. At this, there might be a need for guidance material aimed at private actors;
- Thirty-six % of the guidance documents deal with flooding or avalanches. A large amount of the documents concern measures of climate adaptation of roads. There are less guidance documents on climate adaptation of buildings and railways;
- Guidance material targeting decision processes are lacking; e.g. instructions that explain coordination between sectors, how to plan a decision process, what actors that should be part of specific meetings;
- A relatively high share of the guidance material communicates climate adaptation at a general level, focusing on background information rather than in-depth practical measures.

The main findings from the expert interviews on guidance material are:

- The interviews confirm an overwhelming amount of guidance material. This may cause confusion and uncertainty among users;

- The guidance material is not necessarily practically aligned. There is a risk that high academic level of language, terms, and configuration, are difficult to understand and employ for some users. Practical measures for climate adaptation are needed, especially in smaller municipalities with generalists rather than specialists;
- Employees in the municipalities lack time and capacity to seek and read guidance material on climate adaptation;
- Web pages on more specific subject areas seems to be more in use than general web pages for climate adaptation;
- Increased knowledge among the users would lead to a more effective use of the guidance material, and faster searches for the right documents.

This study is conducted as a basis for further case studies for Klima 2050 in municipalities and organizations, where the same subject areas will be studied from the user's perspective. Further analysis of the guidance material is needed, and should evaluate the practical versus academic text in the guidelines. The paper gives suggestions on how climate adaptation of buildings and infrastructure can, or should, be addressed and communicated in the years to come.