

Mapping of Renovation Potential in Rudersdal Municipality Based on a Sustainability Indicator Framework

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Abstract : Europe is currently in an energy and climate crisis, which requires more sustainable solutions than what has been used to before. Europe uses 40% of its energy in buildings so there has come a significant focus on trying to find and commit to new initiatives to reduce energy consumption in buildings. The European Union has introduced a building standard in 2021 to be upheld by 2030. This new building standard requires a significant reduction of CO₂ emissions from both privately and publicly owned buildings. The overall aim is to achieve a zero-emission building stock by 2050. EU is revising the Energy Performance of Buildings Directive (EPBD) as part of the "Fit for 55" package. It was adopted on March 14, 2023. The new directive's main goal is to renovate the least energy-efficient homes in Europe. There will be a cost for the home owner with a renovation project, but there will also be an improvement in energy efficiency and, therefore, a cost reduction. After the implementation of the EU directive, many homeowners will have to focus their attention on how to make the most effective energy renovations of their homes. The new EU directive will affect almost one million Danish homes (30%), as they do not meet the newly implemented requirements for energy efficiency. The problem for this one mio homeowners is that it is not easy to decide which renovation project they should consider. The houses are build differently and there are many possible solutions. The main focus of this paper is to identify the most impactful solutions and evaluate their impact and evaluating them with a criteria based sustainability indicator framework. The result of the analysis give each homeowner an insight in the various renovation options, including both advantages and disadvantages with the aim of avoiding unnecessary costs and errors while minimizing their CO₂ footprint. Given that the new EU directive impacts a significant number of home owners and their homes both in Denmark and the rest of the European Union it is crucial to clarify which renovations have the most environmental impact and most cost effective. We have evaluated the 10 most impactful solutions and evaluated their impact in an indicator framework which includes 9 indicators and covers economic, environmental as well as social factors. We have packaged the result of the analysis in three packages, the most cost effective (short term), the most cost effective (long-term) and the most sustainable. The results of the study secure transparency and thereby provides homeowners with a tool to help their decision-making. The analysis is based on mostly qualitative indicators, but it will be possible to evaluate most of the indicators quantitatively in a future study.

Keywords : energy efficiency, building renovation, renovation solutions, building energy performance criteria

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