Investigation and description of European buildings that may be representative for “nearly-zero” energy single family houses in 2020 - DTU Orbit (06/12/2018)

**Investigation and description of European buildings that may be representative for “nearly-zero” energy single family houses in 2020**

As part of European energy politics and strategies for reduction of fossil fuels all new buildings should have a “nearly zero” energy consumption in 2020. This creates a strong need for research in cost-effective technologies and solutions that will contribute to the fulfilment of the ambitious energy reductions without compromising desirable daylight conditions and indoor climate. This development requires knowledge about the demands and possibilities of the low energy building mass of the future. An important basis for the research within this field will therefore be the establishment of a set of reference parameters that can be expected to be representative for the behaviour of the “nearly zero” energy building of 2020 in different European climatic zones. This paper provides an overview of how single family houses with a very low energy demand for space heating and cooling can be approached by rational and conventional means in three different European climates: Rome, Bratislava and Copenhagen. Special attention is paid to the role of windows and their contribution to solar gains in these well-insulated buildings of the future. By a neutral treatment of the window configurations towards different orientations, where the windows in all rooms are dimensioned based on the diffuse daylight access at the specific location, it is shown that an equal window distribution will allow fulfilment of an ambitious energy target, while simultaneously enabling a balanced daylight access across the building and a comfortable indoor climate. Furthermore, the analyses indicate that the ability of these well-insulated buildings to utilise solar gains is highly restricted, even at the location of Copenhagen. Window panes with a solar control coating seem to be an appropriate protection against overheating for all three locations.

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