The main goal of the ENOVHEAT project is to develop, build and test a prototype of an innovative heat pump based on active magnetic regenerator technology. This device can be coupled to a ground source heat exchanger and an underfloor heating system to provide for the space heating needs of a low-energy house in Denmark. However, the use of a simple controller leads to modest performances because the heating system is running mostly part-load. This numerical study has tested the possibility of using heat storage in the indoor environment and building thermal mass as an effective strategy to improve the operation of the magnetocaloric heat pump. Indoor temperature set point modulation can take advantage of the building energy flexibility potential to maximize the full-load operation time of the heating system and therefore improve its seasonal COP. Results show that this control strategy can significantly increase the seasonal COP, ranging from 2.90 to 3.51 depending on the building thermal mass. Although the indoor temperature stability is reduced, it allows the magnetocaloric heat pump to reach energy use efficiencies which are similar to the ones of conventional vapour-compression heat pumps.
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