In the UK, low-temperature geothermal energy is seen as a renewable resource able to contribute to the decarbonization of residential heating. Using vertical borehole heat exchanger (BHE) systems, heat can be extracted from the shallow sub-surface and used for hot water or space heating. Although the potential of vertical BHE has been well studied, we here investigate the potential of the sub-surface to provide the yearly average heat demand to a single house in Scotland. A 1D sub-surface heat balance is first calculated for typical climatic and geological conditions in the Midlothian Coalfield, Scotland, considering a heat consumption of 1700 W. 1D and 3D numerical models are then used to assess the relative contribution from axial and radial heat recharge together with the footprint area of a 30-year long heat extraction period from a vertical BHE embedded in a homogeneous purely diffusive medium. Results from the 1D heat balance first suggest that a geothermal flux of 0.65 W/m² alone would require ~20 000 m² to recharge the system, with solar energy (~1.8 W/m²) only contributing up to 11% of the heat recharge. In 3D, both axial and radial heat fluxes provide heat recharge to the BHE, permitting temperature equilibrium to be reached at the borehole location. However, the footprint area of heat extraction keeps increasing at a rate that depends on the ground heat conductivity, controlling in return the amplitude of the drop in temperature at the borehole. While increasing the BHE length permits larger radial heat recharge, increasing the borehole depth improves axial recharge, reducing the footprint area of heat extraction. This study suggests that although the sustainability of BHE exists from an engineering point of view, it cannot be reach naturally from the UK resource perspective. In a context where an increase in the number of geothermal heat schemes is expected, providing artificial cyclical heat recharge must be considered to constrain over the long term the areal impact of heat depletion around a BHE to the area of a typical UK property.