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Department	School of Engineering and the Built Environment
Supervisors	Dr Mina Jowkar
Funding Status	Funded PhD Project (Worldwide)
Application Deadline	14/04/2022
Project Title	Application of mobile constructions as an innovative strategy for building retrofit alteration and addition across the UK
<p>Building sector in the UK contributes to nearly half of the UK energy use and about 30% of the national Greenhouse Gas (GHG) emissions. According to Committee on Climate Change (CCC), to meet the UK zero emission target by 2050, 29 million of existing homes in this country must be made low carbon, and resilient to the future climate change. This highlights the need for a more focused attention to optimise retrofit strategies across the UK. Additionally, given the carbon-intensive process of constructing new buildings, retrofit plans can also provide the opportunity for alteration and addition of the existing buildings rather than constructing new buildings.</p> <p>Nevertheless, reports and statistics show that UK building stock is relatively old, 50% of which accounts for residential buildings built before 1970. Retrofit and alteration of such old properties tends to be challenging in the UK as they indicate early mass urban living in this country and, consequently, have strong cultural and architectural value. Thus, more considerations are required to sustainably renovate and alter the function of these buildings whilst maintaining their aesthetic and cultural value. This requires using technologies and innovative solutions to minimize GHG emissions whilst improve amenities for the buildings' occupants in a cost-efficient way.</p> <p>This project aims to investigate the application of nearly zero-emission mobile constructions as enablers of building retrofit and alteration across the UK. This project will address various aspects of such mobile constructions including energy consumption, environmental impact, cost-efficiency and occupants' comfort and wellbeing.</p> <p>This study will be carried out through a combination of building performance monitoring (simulation and actual measurement) and field experiment. After a thorough literature review, this includes 1) data collection on the environmental and energy performance of some (selected) existing buildings; 2) propose and finalize the method of construction of the mobile building; 3) modelling, validation and simulation of the indoor environment and energy performance of the spaces including the mobile construction 4) laboratory examination of the optimum scenarios resulted from simulation; 6) final simulation and laboratory examinations to evaluate the performance of the retrofit strategies using the mobile construction.</p>	
Indicative Bibliography	[1] Committee on Climate Change (2019), UK housing: Fit for the future, London, Committee on Climate Change [2] World Green Building Council (2017), Global Status Report 2017, UN Environment and the International Energy Agency [3] Power, A. (2008). Does demolition or refurbishment of old and inefficient homes help to increase our environmental, social and economic viability? Energy Policy, 36(12), pp.4487-4501.
Funding notes	This project may be funded by a scholarship of the School of Engineering and Built and Environment. Please see School-funded PhD scholarships - RESEARCH AND INNOVATION (napier.ac.uk) for information on the scholarships and how to apply for them.
Enquiries	For informal enquiries about this PhD project, please contact Dr Mina Jowkar, m.jowkar@napier.ac.uk
Web page	https://www.napier.ac.uk/research-and-innovation/research-degrees/application-process

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