

Research in Progress Abstract - Construction Practice (Non-Pedagogical Content)

# **Establishing Benchmarking of Framework for Contractors for building Zero Energy Buildings (ZEB) in U.S. Architecture/Engineering/ Construction (A/E/C) - A Case Study Approach**

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Buildings are major consumers and contributors of energy and greenhouse gas emissions respectively. Multiple researchers have indicated that increasing levels of greenhouse gas emissions are linked to climate change, which in turn can adversely impact the ecology, economics, and social dynamics on the planet in near future, if no affirmative action is incorporated. In order to reduce the adverse impacts of buildings, US Department of Energy (DOE) through an executive order, prioritize the creation of integrated systems which enables marketable Zero Energy Building (ZEB). Such buildings consume lower energy through efficiency gains such that the balance of the energy needs can be supplied by renewable technologies. However based on initial literature review conducted using snowball sampling technique, it was realized that the concept of ZEB is relatively new to the residential industry and very little or no precedents exist especially for the construction phase in which contractors are actively involved. The literature comprises mainly of studies which help to evaluate residential building designs and identify cost-optimal efficiency packages at various levels of whole-house energy savings along the path to zero net energy. Definition of ZEB, designing, life cycle cost analysis and adoption are the major bodies of literature available, however there is an absence of literature body on construction guidelines for a ZEB. The study aims to develop a benchmarking tool using case study based approach, for contractors to construct a ZEB, which can be used for future projects. Further, the study also aims to determine the generic process for the construction of ZEB currently followed by contractors. Last but not least, the study also identifies the change(s) in the construction process which occur when a contractor starts to build a ZEB in comparison to the traditional home. The study is intended to be conducted from a residential general contractor's perspective. The proposed study is divided into four major stages which are as follows: (1) Identifying and establishing the current standards in literature with regard to construction of ZEB; (2) Case study phase (Includes selection of cases, conducting interviews, and analyzing the results generated from the case study); (3) Creating a framework, this will act as a benchmark for the construction of ZEB; and (4) Validation of framework using Delphi technique, where experts in the field of ZEB will be involved. The research is in the process of identifying such experts.

**Key Words:** ZEB, Construction process, Case study