



Builder's paper published in American Institute of Physics

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After receiving an invitation and submitting my paper for peer review, it was published online on July 16 in the American Institute of Physics, Journal of Renewable and Sustainable Energy's Special Topic Issue, "Low-Carbon Society for a Green Economy" titled "Technology and information management for low carbon building."

The paper documents the reconstruction of the HGA House, detailing the means and methods of building a home with the goals of USGBC LEED for Homes Platinum, Carbon Neutral, and Net Zero Energy. The paper addresses the advantages of the open communication process of integrated design, how it was helpful in achieving certain goals and why a goal was not reached through a discussion of lessons learned.

The HGA House is a reconstruction after a fire. There is energy data three years prior and one year after construction with the same family. An actual energy analysis is performed eliminating the occupants of the home as the variable. There were different fuel types before and after, the energy analysis is performed using the energy unit, British Thermal Unit, (BTU). Further analysis is performed comparing cost per BTU and CO2 emissions per BTU for #2 heating oil, propane and electricity. The findings show the greatest impact for reducing energy costs and CO2 emissions comes by reducing electricity from the grid. The findings reveal a 70% reduction in energy for the HGA House.

Much work has been done worldwide to measure the greenhouse gas emissions during the operations stage of buildings however little work has been done to measure the embodied greenhouse gas or carbon emissions of the construction stage. We applied climate change sciences to develop a methodology to measure the embodied carbon in a Phase I calculation for the first time. In the process we discovered a surprise benefit of recycling required by the LEED for Homes Platinum certification. Through the EPA Waste Reduction Model, by landfill avoidance, a 107 metric ton offset was earned to mitigate the total carbon footprint. We show how purchasing carbon offsets equal to the carbon emissions, earns a carbon neutral certification of the construction stage.

The paper can be downloaded for free at: <http://jrse.aip.org/resource/1/jrsebh/v4/i4> or click the link on the front page of: www.hamptongreenalliance.org. I am very interested in suggestions and feedback. We are also searching for our next ground breaking project and will evaluate any suggestions.

Frank Dalene is the president and CEO at Telemark, Inc., Bridgehampton, N.Y.

New York Real Estate Journal - 17 Accord Park Drive #207, Norwell MA 02061 - (781) 878-4540