UNIVERSITY OF DENVER

June 30, 2011

RE: AASHE STARS
University of Denver
Net Zero House

To Whom it May Concern:

This letter is written as an affirmation of the innovation of the 2010-2011 Residential Practicum House sponsored by Oakwood Homes, LLC. This year's practicum house was designed to achieve Net Zero energy consumption.

The innovative systems employed in this project included; super insulated building envelope with 12" thick exterior walls, low U value windows and doors, and Energy Star's highest efficiency rated appliances and fixtures. The heating of the house is provided by a geothermal ground loop system and the electricity by a Photo Voltaic panels.

While each system taken individually may not qualify as innovative, the combination of the systems applied to production building is greatly innovated. I know of no other Net Zero House produced by production builders that provides Net Zero at an affordable price. The total price for this option is an additional $30,000. When added to a 30 year mortgage at today's interest rates, the Net Zero expense adds $150 per month to the mortgage payment. When you consider the savings of as much as $180 per month in utility expense the Net Zero House is providing net savings from day one. This makes the home innovated not only in the systems but affordable to all home buyers which is a true innovation.

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OAKWOOD
HOMES

2011 Net Zero Energy Home Innovations
Letter of Affirmation

In collaboration with the University of Denver's Residential Practicum Class, we recently completed the construction of our first net zero energy home. This marks over 15 years of Oakwood Homes, LLC's partnership with DU's annual Practicum program, where students are actively engaged with Oakwood's management in the home's specifications, construction, marketing and cost control.

The design process began a year ago, with the decision to build a net zero energy home using the most cost effective materials and assemblies to achieve an energy efficient building envelope. This guiding principle differs from most other net zero energy homes, where cost is less of a priority and more expensive materials are used to insulate the home and reduce air leakage. By starting with energy efficient building principles in the design of the home, we were able to plan ahead for inexpensive or even free means of super insulation and air sealing.

To reduce the environment's impact on the indoor temperature, we needed to prevent air leakage through the attic, walls, windows and doors. Instead of more expensive spray foam insulation, we designed the exterior plywood sheathing sheets to meet at pre-determined locations to prevent gaps. We were then able to tape the seams to make the shell of the building virtually air tight. We used a similar method in the attic to prevent air leakage through lights and wire penetrations.

We designed the walls to be specially constructed using conventional framing materials to increase the amount of insulation they could hold, while also decreasing thermal conduction through these wood components. These double, parallel walls are more than three times thicker than a typical new home so the most cost effective insulation could be used in high quantities. Our design prevented us from being forced to use more expensive foam products to achieve the insulation value we desired.

These innovative construction techniques, in combination with energy efficient windows, an air source heat pump hot water heater and compact fluorescent light bulbs throughout, resulted in a home that is projected to use 90% less energy than an average existing home and 60% less energy than a code built new home. Because the heating and cooling requirements were so low, ground source geothermal was able to be done much more economically with a very innovative technique.

Typically, to use the earth natural relative heat (and cool in the summer) in a geothermal system, placing the pipes in the ground is very expensive. Either wells have to be drilled or a large area has to be excavated to be able to place the required amount of pipe, even on an average sized home. Because of our lower heating and cooling needs, the length of pipe needed was much shorter and therefore could simply be placed around the basement foundation. Since the ground was already excavated for the basement, we saved the enormous expense inherent to the other geothermal methods.

The average sized photovoltaic solar panel array we installed provides enough electricity to, over the course of a year, produce more energy than would be consumed by this all-electric home and its occupants, making it net zero energy. Not only will the future homeowner have zero energy costs, but the incrementally higher purchase price of the home makes economic sense for one of the first times in American history.

John Cheney
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