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Report to the Plan Commission

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SUBSTITUTE – Establishing sustainability goals to guide the development of the Northeast Neighborhoods.

At the February 9, 2009 meeting of the SDE Committee there were a number of amendments and recommendations approved by the SDE Committee. Staff has prepared this report to provide the Plan Commission with additional information regarding goal number 2.

The resolution as amended by the SDE Committee calls for this area to be a zero net energy community. It is important to fully understand this concept before the Plan Commission approves of this language and recommends approval to the Common Council. First of all, the following link http://www.nrel.gov/buildings/zero_energy.html does provide some information from the National Renewable Energy Laboratory (NREL) regarding zero energy homes. Also, attached to this staff report is an NREL sponsored reports entitled *Zero Energy Buildings: A Critical Look at the Definition* and *A Renewable Energy Community: Key Elements*. These documents help provide a common language when talking about zero energy. Net zero or zero energy buildings/homes may be a good idea, but the details of such a program can be daunting. This is something that the Plan Commission needs to seriously consider. How will the City monitor/ track a net zero energy community? What happens if the development isn't net zero energy? For this neighborhood to succeed from a sustainability perspective, a program the lowers energy use and increases renewable energy must be a program where the standards are clearly understood because it is through reporting/tracking that you see energy savings and results.

The original resolution called for the consumption of natural gas and fossil fuel generated electricity to be reduced by 25% compared to current city wide household levels. There has also been a lot of discussion about how this goal relates to Energy Star Certified homes.

According to Focus on Energy's web site, WI Energy Star Homes are 25% more energy efficient than homes built to current code. However, this language is really used for marketing purposes.

Nationally, the DOE created the Energy Star Home Program. Energy Star Homes is the marketing side of the program, while Building America (<http://www1.eere.energy.gov/buildings/residential/>) is the technical work being done regarding energy efficiency at DOE.

In the past, FOE would compare homes built to code to an Energy Star home. FOE would let the builders know that the home was only x% away from achieving Energy Star Certification, again, this language is generally simplistic, for marketing purposes.

First of all, it is important to note that the WI Energy Star program is primarily about making homes very airtight, even though there are other standards that relate to mechanical ventilation, moisture control, and overall efficiency. FOE sets a standard and then builders must show that they met the standard. There are tests showing that the standard is met for air tightness, pressure flow, and ventilation. The current WI Building Code standard for air tightness is relatively weak when compared to what it might be in the future, and even compared to what many builders are attaining today. Even the new WI Code that will go into effect in April does not deal with air tightness. Up to the present, the WI Uniform Dwelling Code was a Wisconsin mix of model energy codes designed to meet our climate needs. The new WI Code is based on International Energy Conservation Code –2004 and does provide better thermal and equipment standards. They are prescriptive and still do not focus on air tightness. For example, the new code may increase the R-value in the walls and roof, but does not address how tight the home is. The WI Code and the WI Energy Star program really measure different things. It should be noted that the WI Code is better than building codes in many areas of the country.

The WI Energy Star Program focuses on air tightness because that is where program designers saw the lowest hanging fruit with regard to energy efficiency. Most of the builders that use WI Energy Star Program understand this. Concentrating on air tightness was also something that created a market transformation, something that pushed builders but didn't push them so far that they didn't participate in the program.

FOE is beginning to look at increasing wall thermal values in addition to air tightness as another standard that may see significant energy savings. There is a strong correlation between making shell energy improvements to a home and lower thermal load. That same strong correlation does not exist with electrical use - mainly because the occupants' habits play a very important part in electrical usage, so encouraging residents to use less electricity and to purchase Energy Star appliances is still a very important component. Of course the size of the home also has a lot to do with how much thermal and electrical load the home will require.

The most important element of any standards that increases energy efficiency is that the standards need to be performance based. There are a couple of examples of performance-based standards those include: Passivhaus (<http://www.passivhaus.org.uk/>) or in the US Eco-Lab (<http://www.ecolab.org/>). For example, Passivhaus has a standard of using only 15watts/cubic meter. To meet these types of standards homes must be engineered and tested.

Currently, the primary FOE residential existing home program that has a performance-based standard is the affordable housing program. This program is designed for major rehab on homes. The affordable housing program is called "Home Performance through Energy Star" FOE will provide additional funding to builders who meet standards for these three areas:

- 1) Tightness
- 2) Overall Thermal Usage
- 3) Ventilation

Developing a voluntary program, (perhaps in consultation with FOE) where the City of Madison develops performance-based standards that include testing could be an avenue that staff will want to consider when developing the neighborhood plan. The city is limited by the Uniform Dwelling Code, but by developing a voluntary program and setting targets for builders to reach, even if they do not achieve the standards, the building will be much better than code. Furthermore, the program could be extended to other types of housing such as row houses, or townhouses.

Plan Commission should consider the following language for goal #2 in the resolution:

“Reducing household consumption of natural gas and fossil fuel generated electricity by 25% compared to current building code standards through the use of renewable and/or carbon neutral applications, energy efficient construction, such as Energy Star or a performance-based standard, district renewable energy generation, conservation education and outreach, utility partnerships, or other energy practices.”

Staff also agrees with the report from the Planning Division Director to add a “whereas” clause which reads as follows:

“Whereas the Sustainable Design and Energy Committee has identified a goal of being a zero-net energy community (energy used by a community equals the amount generated through renewable energy applications) by 2050.”