

Dear Energy Star,

I ran window changes for a home that we had submitted to one of our programs using the Home Energy Rating System (HERS) software, REM/Rate. This windows in this home are fairly typical for what we have seen being built in Nebraska, in that a majority of the windows will face one direction, 67% in this case. The home may be a bit larger than the average, but not by much. The window to wall ratio may also be a bit more than average, being right at 20%, but that is good for a window comparison.

I ran three types of windows in this home, U-0.26 and SHGC of 0.20, U-0.27 and SHGC of 0.20, and U-0.28 and SHGC of 0.42. I also changed where the home faces to each of the four cardinal directions. I also ran the home as being built in International Falls, Minnesota.

Now, in only one circumstance, with the home in MN, and facing south, did the higher SHGC make a difference, and that difference was only a one dollar projected savings. In every other instance, 23 total, allowing the U-value to decrease by one point resulted in a savings for the consumer, yet allowing the maximum increase in the SHGC resulted in an additional cost to the consumer. Note also that I have given the widest range of SHGC change, 0.20 to 0.42. Had I set the SHGC of the windows to have a difference between 0.31 and 0.32, as the second recommended level of Energy Star would allow, we would have seen absolutely no potential for savings, and a cost to the consumer in every case. Note also that in the same instance for the south facing home in International Falls, lowering the U-value by one point results in triple the savings to the consumer as compared to allowing the SHGC to increase a full 22 points.

When we move to the southern portion of the North, Nebraska, we see that allowing the U-value to increase given a certain SHGC increase, clearly shows a substantial cost to the consumer in every instance!

In the Northern region, there is no foundation for allowing Energy Star for windows with increased SHGC, and certainly not at the level that is suggested by the current recommendations. This second Energy Star criteria for the North must be deleted.

Yes, the results show that facing a home south provides an advantage, but this is NOT a function of the windows! This is a function of facing the home. In the north, we need to face our windows south AND Reduce the U-value! However, this is not always possible for every consumer.

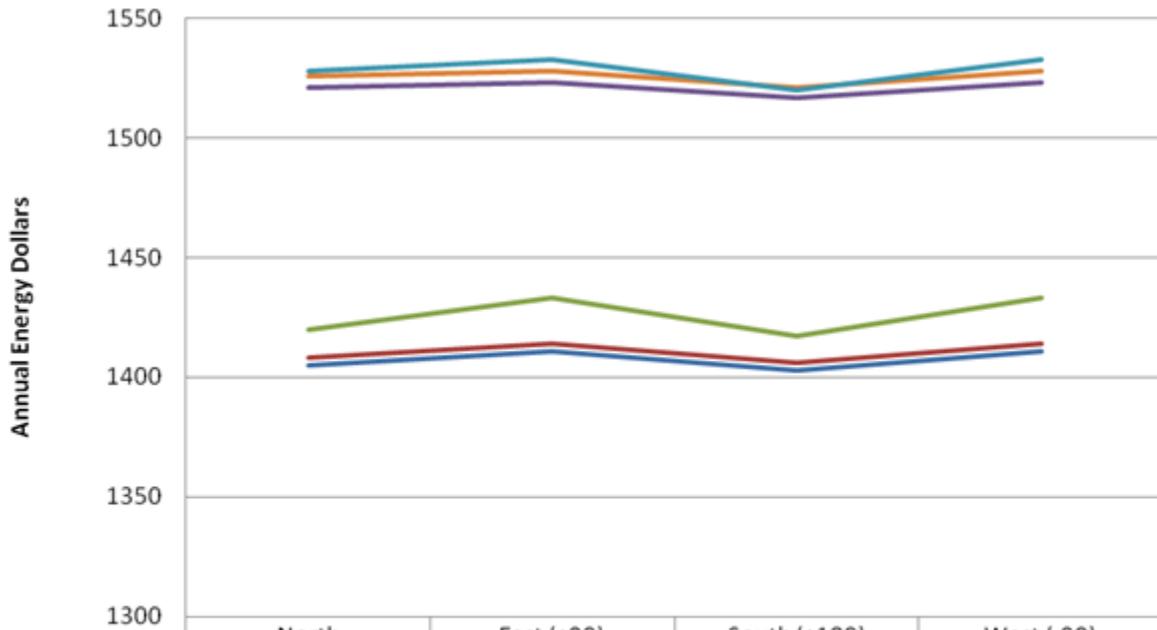
Which brings me to my second point, how did we get from an initial consideration of 0.22 U-value all the way up to 0.27? The results clearly show that reducing the U-value of windows has a positive effect in the North. The effect of one U-value point far outweighs the effect of even 22 SHGC points!

I ran one test with the windows set at U-0.22, SHGC 0.20. This reduced the consumers total utility cost by 1.6% compared to using the current Energy Star recommendation of U-0.27. While this may not sound like much, remember that this is the total cost to the consumer, for appliances, heating and cooling, lights, etc. The percent difference it makes on the window contribution is actually fairly dramatic.

The U-value for the windows should be set no higher than 0.24.

Bruce Hauschild, PE, CEM

U-value Vs SHGC Northern Region



	North	East (+90)	South (+180)	West (-90)
NE 2620	1408	1414	1406	1414
NE2720	1405	1411	1403	1411
NE2842	1420	1433	1417	1433
MN 2620	1521	1523	1517	1523
MN 2720	1526	1528	1521	1528
MN 2842	1528	1533	1520	1533