

Minnesota Green Communities Carbon Reduction

Background

According to the U.S. Energy Information Administration, “There is a high correlation between energy consumption and carbon emissions.” Residential energy consumption accounts for about 22 percent of total U.S. energy consumption. As the energy consumption for space heating declines due to improved energy codes, the electricity consumed by increasing appliance use is increasing, resulting in a relatively stable total energy consumption but a forecast increase in electricity consumption. Minnesota Green Communities criteria address each of these factors in a different manner. Criteria 5-1 requires that new construction single family units be at least 20% more energy efficient than code (for space heating) and multifamily units be 15% better than code (ASHRAE 90.1-2004). Rehabilitation projects are required to meet the 15% improvement if the building envelope and/or HVAC system are programmed for major improvements. Electrical energy consumption improvements are based on criteria requiring use of Energy Star appliances and lighting.

Approach

Because standards for determining carbon reduction are still evolving, and because energy consumption is dependant on both the building’s design/construction and the occupant’s behavior, carbon reduction will be addressed in a two phase manner. First, historic carbon dioxide generation rates by household for large or small multifamily units and single family units are used to estimate the amount of carbon dioxide that would have been generated. These historical norms are then compared with the amount of carbon dioxide estimated to be generated using the minimum reductions necessary to conform to Green Communities criteria. For the 80 projects meeting Green Communities criteria that were funded through 2008, **an estimated minimum reduction of 4.8 million pounds of carbon dioxide will be achieved by following Green Communities criteria.** Not quite half of these projects (37) are located in Greater Minnesota. These projects will save a estimated minimum of 1.8 million pounds of carbon dioxide.

The Minnesota Energy Challenge calculates that the average Minnesota family generates about 52,000 pounds of CO₂ each year. That translates Green Communities CO₂ savings into making between 90 and 100 Minnesota families Carbon neutral.

As projects are completed and operated for at least one year, evaluation data based on actual energy consumption will be used to update and improve the carbon reduction estimates that are necessarily based on generic factors.