Minnesota's Solar Resource

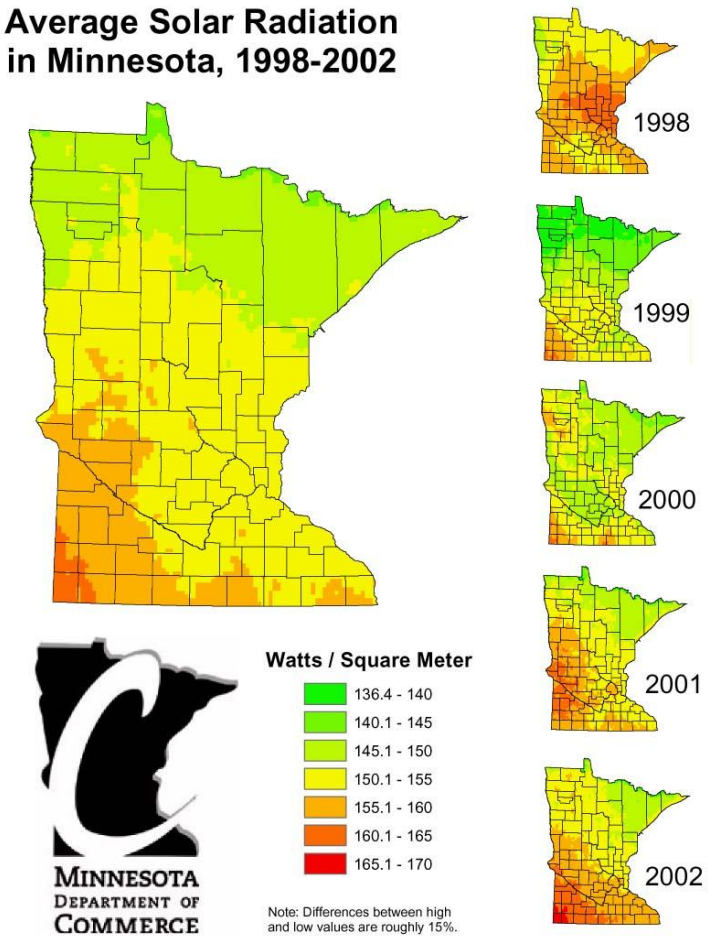
Minnesota has an excellent solar resource. Although the Twin Cities are renowned for their climatological extremes, the percentage of available sunshine is relatively consistent throughout the year. The sky is clear to partly cloudy 58% of daylight hours. Only November and December are cloudy more than 50% of the time. Daylight hours are clear to partly cloudy more than 60% from May to September.[1]

From early-November through late-January, the sun angle at the Twin Cities' latitude is very low, the sun is above the horizon less than 9 hours per day, and more than half of the days are overcast. The solar resource during the late fall/early winter months is minimal. For the remainder of the year— as the sun angle increases to its maximum of 70°, ample daylight is available, and 63% of days are clear to partly cloudy— solar energy is ample.[2]

The amount of solar energy, or "insolation," is measured in British thermal units (btu) per day per square foot of surface area (btu/day/sq.ft.). Using this measurement, calculations have been made for insolation at many geographic locations so that it is possible to estimate the amount of solar energy available at a given location and time of year.

While the Twin Cities has significantly more solar energy available during the summer than during the winter, this locale's annual average daily insolation compares favorably with that of other locations. The combined daily annual average insolation for horizontal and vertical surfaces at other American cities is:

Denver	2,904 btu/day/sq.ft.
Los Angeles	2,753 btu/day/sq.ft.
Miami	2,415 btu/day/sq.ft.
Minneapolis/Saint Paul	2,168 btu/day/sq.ft.
Nashville	2,163 btu/day/sq.ft.
Washington	2,122 btu/day/sq.ft.
New York City	1,950 btu/day/sq.ft.
Seattle	1,913 btu/day/sq.ft.[3]



1 Minnesota Climatology Working Group, State Climatology Office – DNR Waters & University of Minnesota. 30 years of data, from 1971-2000. Website: http://climate.umn.edu/doc/twin_cities/twin_cities.htm

2 Architectural Graphic Standards, 10th ed., John Ray Hoke, Jr., Ed., 2000. John Wiley & Sons, Inc., New York.

3 J.D. Balcomb et al., Passive Solar Design Handbook, Vol. 3, 1983. American Solar Energy Society, Inc., Boulder.