Sun Chart Worksheet

A Tool for Estimating Impacts of Shading, and Collector Orientation

The sun chart is a tool used to estimate the impact of shading on the annual performance of solar water heating or solar electric systems. The impact of shading on a solar collector is influenced not just by how much shading, but what time of day it occurs, and the tilt and orientation of the solar collector. In addition because deciduous trees loose their leaves during the winter, the impacts of shading may also depend on what is causing the shading.

To simplify this evaluation we will separate the impacts of tilt and orientation from shading. Graphs 1 and 2 show the impact of tilt, and orientation on annual performance of a solar collector. The Tilt and Orientation Factor (TOF) values range from 100% (no loss) in the center of the inner circle to less than 60% (over 40% loss) in the upper left and right corners. You will notice that TOF value is greater than 95% over a large range of collector tilt's and orientations. West of the Cascades (Graph 1) this is especially true because much of the annual solar energy arrives during the summer when the sun is high in the sky.

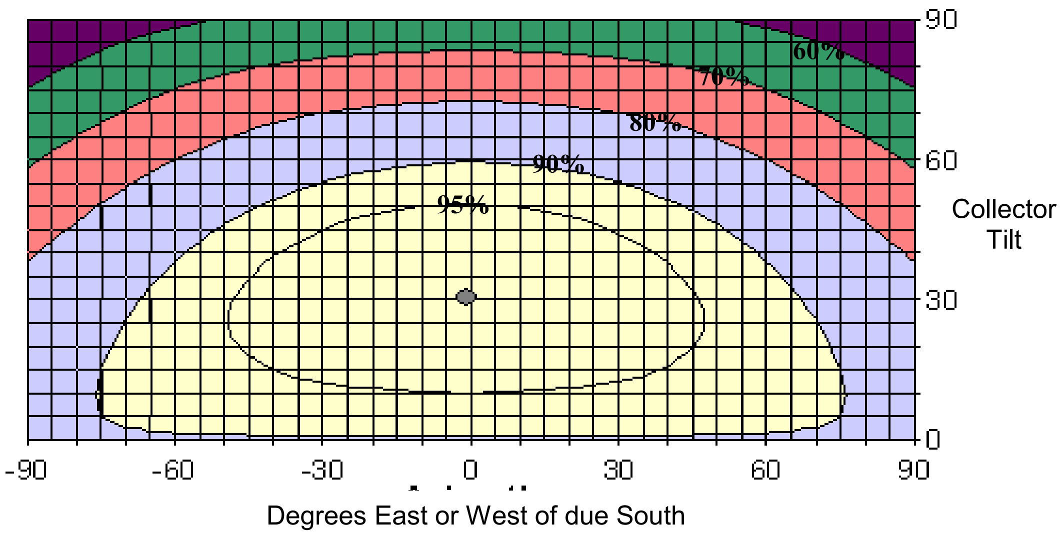
For the tax credit program place a dark **X** mark on the location graph that indicates the tilt and orientation of the collector. Estimate the TOF value to the nearest 1%.

Graph 1 – TOF values West of the Cascade Mountains

Tilt : ______________

Orientation :________
(E or W of South)

TOF Value : ________

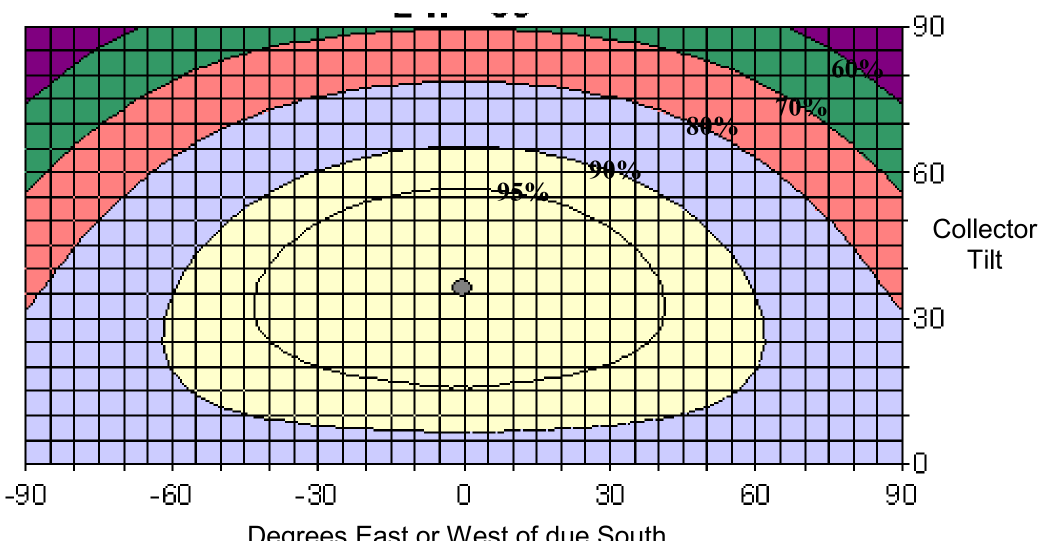


Graph 2 – TOF values East of the Cascade Mountains

Tilt : ______________

Orientation :________
(E or W of South)

TOF Value : ________



Sun Chart

Job Name: ______________________________

Contractor Name: __________________________

Date: ________________________________

Tilt of Collector: _____________________ degrees

Orientation of Collector: _______________ degrees

Roof Layout Sketch

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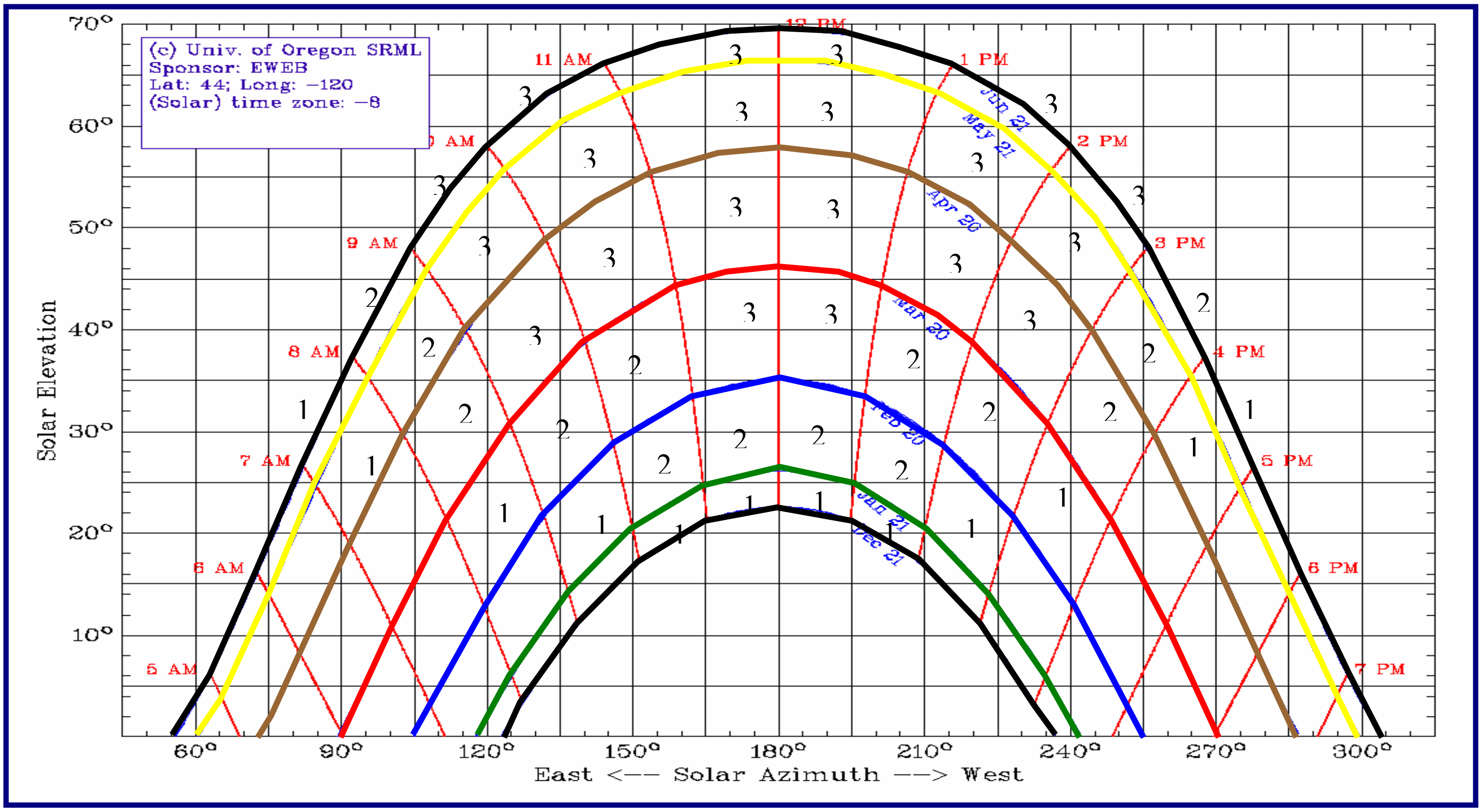

Draw an outline of the shading obstructions. This should be done from lowest point on the roof where the collector will sit. Indicate deciduous trees with a dashed line outline and fill with light shading. Year-round (solid) obstructions should be shown with a heavy dark line and heavy shading inside the shape. To calculate the percent shading, add all the values in the sections that are shaded (these may be fractional) of the sun chart. Shading caused by deciduous trees below the March 20th line may be counted as half values.

period\hour	7-8	8-9	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5	hour/period
May/Jun											
Apr-May											
Mar-Apr											
Feb-Mar											
Jan-Feb											
Dec-Jan											
Sum of hourly shading values											

Shading = sum of all values shown that are shaded. = ______________________

Total Solar Resource Fraction = (1-Shading) x TOF = (1- _____________) x _____________ = _______________