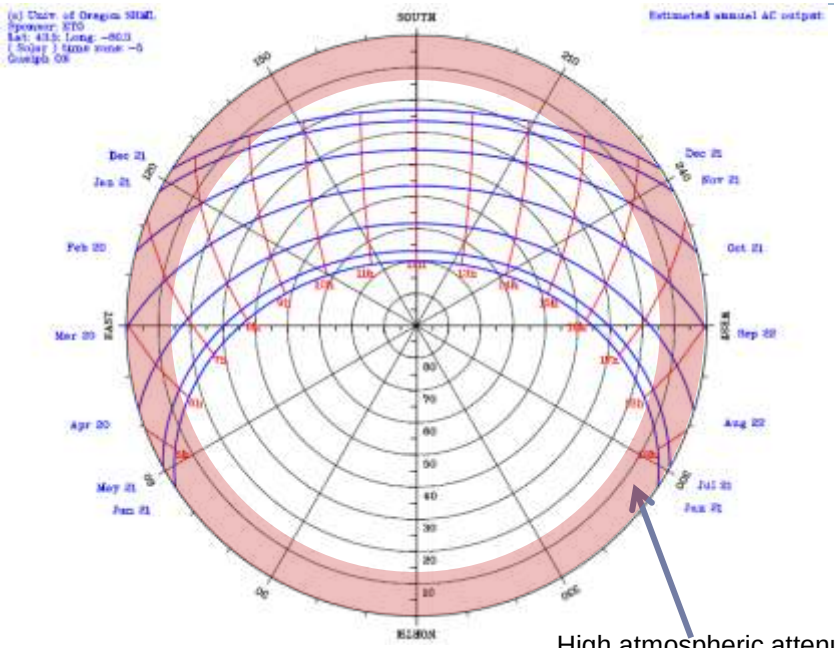
Solar Siting and Tracking

TRUE NORTH POWER NG

Summer and Winter Array Tilt Angles



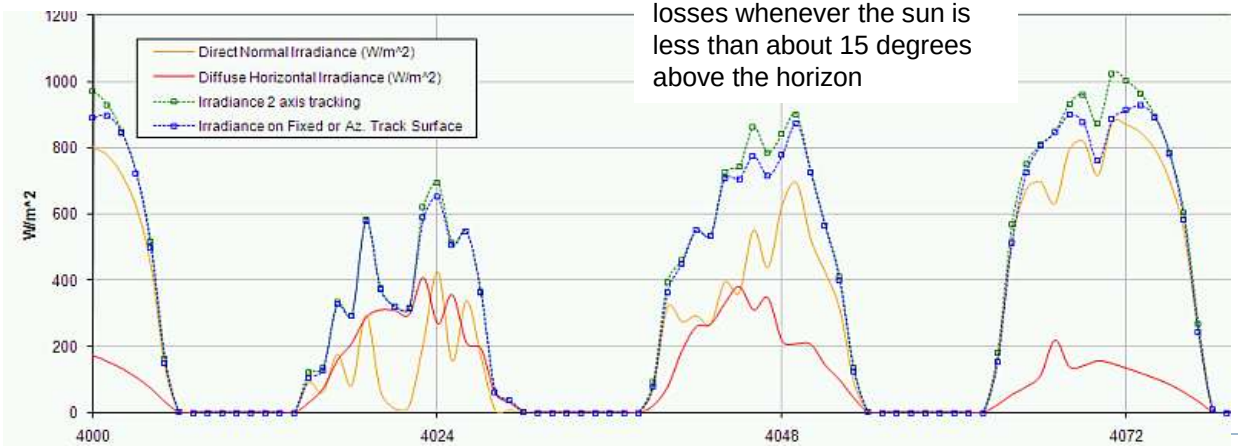
Adjusting the tilt of the array on a post, twice a year, to optimize for summer and winter, will gain between 8 and 11% more energy than leaving a fixed array on a steep roof all year, especially if panels are not cleared of winter snow or get hot in summer. Adjusting the tilt angle every month on an azimuth tracker only adds about 2-4% over a fixed tilt angle azimuth tracker, yet produces >95% of a dual axis tracker. This is for diffuse light regions like Ontario and most of the world.

Adjusting winter setting for Dec 21st (winter solstice) is not optimum since, in Canada at least, it is likely to be cloudy or snowing that month. Even with full sun all day the atmospheric attenuation at such a low angle and so few hours of sun that there little lost energy over a what would be collected had the tilt angle been left at Feb to Oct setting.

Atmospheric attenuation is also very high any time the sun is <15 deg above the horizon, so pointing steeply at early morning and late evening light is not nearly as valuable as the energy captured between roughly 7 am to 5pm in the summer, and 9 till 3pm in the winter.

(See Chart LEFT)

High atmospheric attenuation losses whenever the sun is less than about 15 degrees above the horizon



At left is an example of diffuse vs specular (direct sun) light and the value of tracking the sun precisely. Note that precise tracking is only valuable in specular light such as in desert and high sun areas. In most of Canada at least azimuth pointing systems gather nearly the same energy annually as "dual axis" trackers and use a lot less energy in the process by not "chasing" the diffuse energy around clouds and snow a lot of the time. If you adjust the array tilt angle only twice annually you'll capture >95% of the energy and revenue of a dual axis tracker with fewer parts and lower maintenance costs overall.

Prepared by: D Cooke, CTO