Azimuth Drive vs Dual Axis Trackers

TRUE NORTH POWERING
Powering the Next Generation

Adjusting your PowerSeries Tracker for Optimum Energy Capture

Tracking Study and data analysis: Dr .WD Lubitz Asst Prof Univ of Guelph, School of Engineering: Effect of manual tilt adjustments on incident irradiance on fixed and tracking solar panels Published by Elsevier Ltd Dec 2010
Clearness Index Charts from The Atmospheric Science Data Center (ASDC) at NASA Langley Research Center. NASA Langley is responsible for the processing, archival, and distribution of Earth science data in the areas of radiation budget, clouds, aerosols, and tropospheric chemistry.

Here is a summary of what can be learned from the study which will help in understanding the charts that follow. The charts will assist you in deciding when a dual axis trackers add value as well as how often to change the array tilt and by how much:

The optimum tilt angle for maximizing annual production on a fixed south-facing panel should be equal to the latitude at low-latitude, high clearness sites (desert regions) and slightly greater than the latitude for sites in higher latitudes with very low clearness index.
ie At higher latitudes 40-50degees add from 5-8 Deg of tilt to the latitude for the winter array tilt angle.
Summer: 42degLat -5=37 ~degTilt
Winter: 42degLat +5=47 ~degTilt – Year round use 45deg

Azimuth tracking increases annual production on a surface by an average of 29% compared to a fixed south-facing roof or fixed surface at an optimum tilt angle. Tracking is more productive when compared to low slope (non ideal) fixed arrays or roof surfaces.

Dual axis tracking will only give you a maximum of about 4% more energy and revenue in summer and barely 2% in winter over a single axis Azimuth Drive tracker. This must be weighed against the added operational costs of a more complex system with more failure modes and greater power demand as well as additional potential maintenance costs due to the wear and tear on more moving components that are cycling more often. Compared this to a simpler Azimuth Drive tracker with fewer moving parts, fewer sensors and fewer operating cycles. Azimuth drive trackers also generally use less energy.

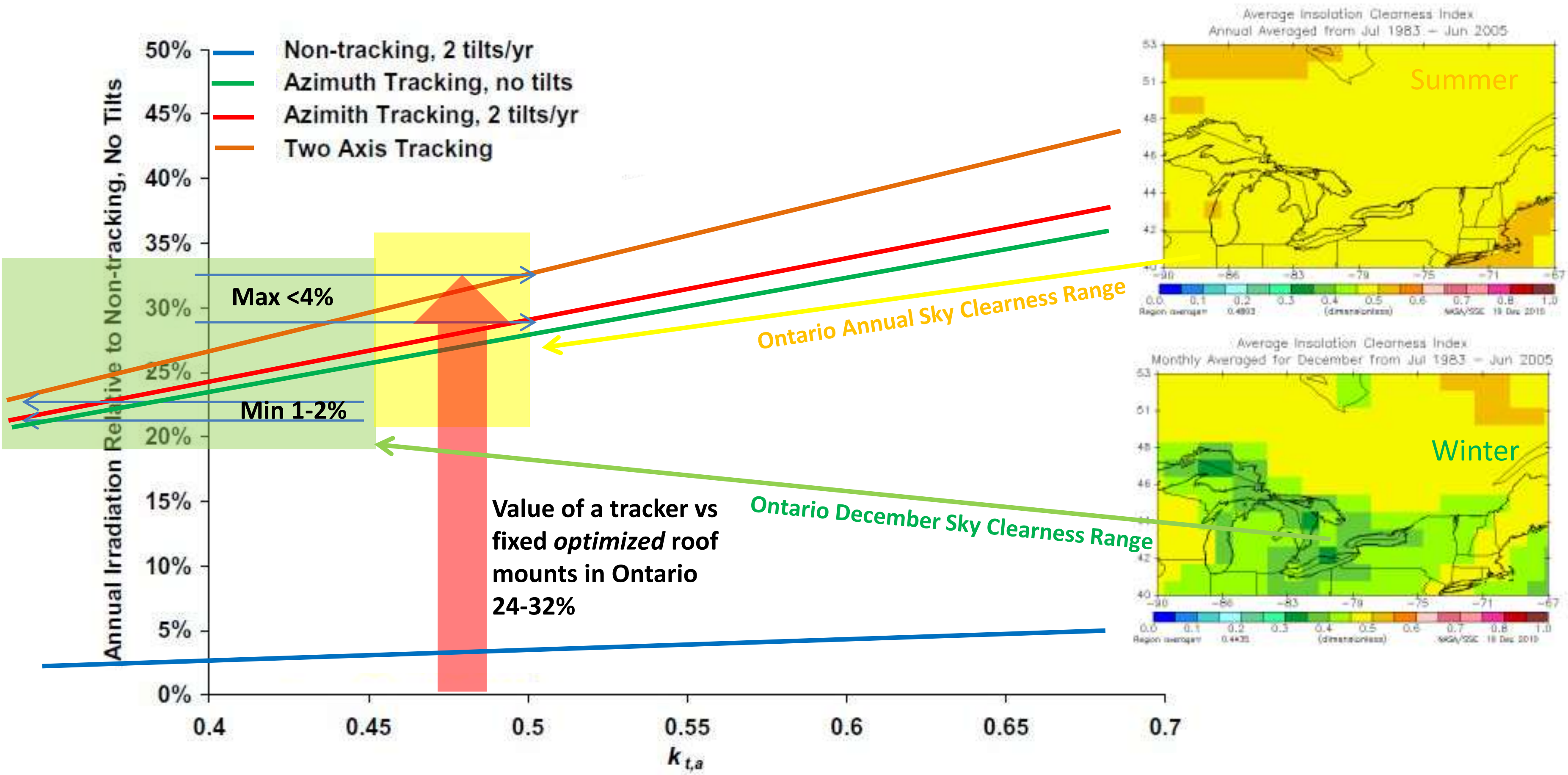
Compared to fixed mounts adjusting the array tilt angle twice a year generates more energy and revenue: (about 5%) for fixed or roof surfaces. Adjusting the tilts angle seasonally for an Azimuth Tracker only adds another 1% more energy so a fixed tilt angle for Azimuth tracker is all that is required for optimum performance, since a dual axis tracker may only expect to capture another 3-4% more energy over a single axis Azimuth tracker at a fixed optimum angle.

For diffuse light regions like most of Canada the charts below demonstrate that an Azimuth Tracker with a fixed tilt angle offers the optimum performance/cost solution. All True North Power trackers are designed with this in mind.

Channellox Layout

Added Energy Compared to Fixed South Facing Roof (X-Axis)

(K t,a)Clearness Index Charts from The Atmospheric Science Data Center (ASDC) at NASA Langley Research Center Average Values from 1983 to 2005



incident annual irradiation for several cases, relative to a fixed south-facing panel at optimum tilt angle, as a function of annual average clearness

The underlying Scatter Point data (from over 180 sites across N America Not shown) is from a recently published paper entitled "Effect of manual tilt adjustments on incident irradiance on fixed and tracking solar panels" by: Dr .WD Lubitz Asst Prof Univ of Guelph, School of Engineering: Published Dec 2010 by Elsevier Ltd Dec 2010 www.elsevier.com.