The Effect of Partial Shade on PV Systems

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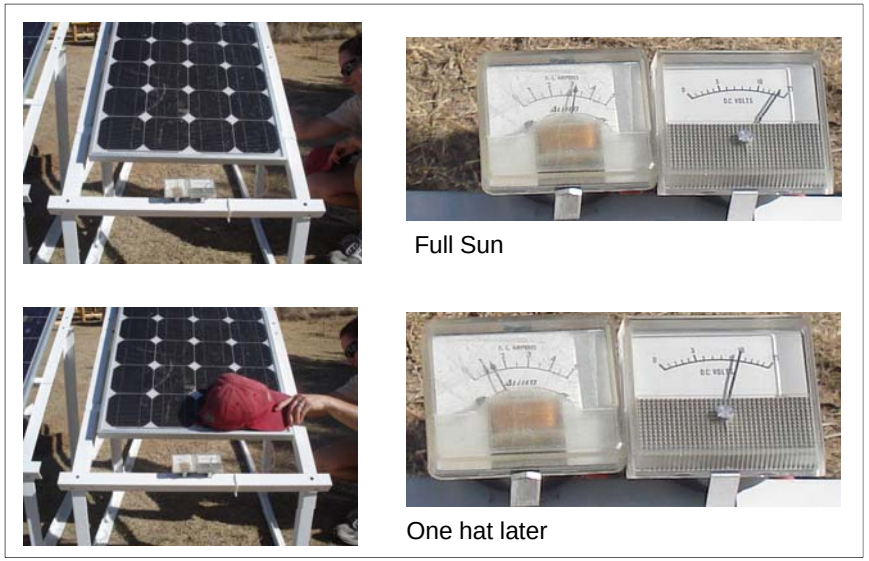
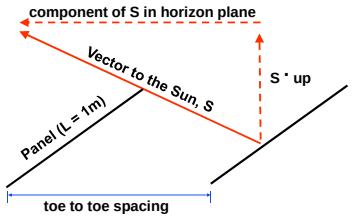
Partial shade makes a big impact.

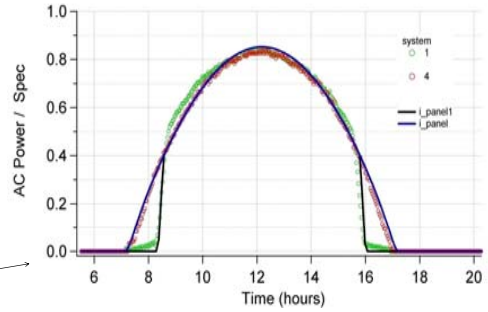
- 10 % shade can cause a 70 % reduction in yield.
- Shadows from panels, buildings, terrain, plants are common.

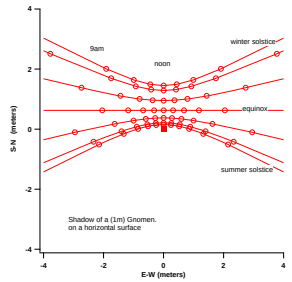


Modeling shadows on real arrays:



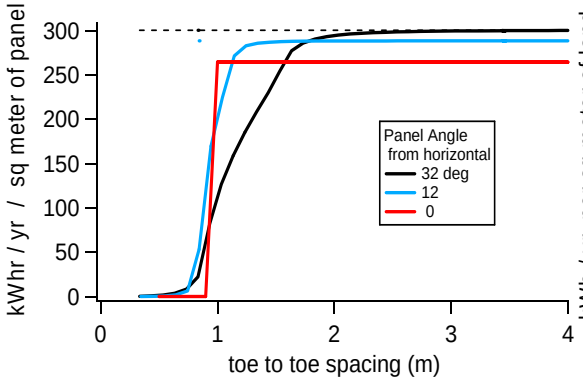
- Assumptions: simple astronomy, panels in rows, no clouds
- Predictions from this Model fit TEP data.
- With this model we can predict annual yields and design deployments to maximize yields.



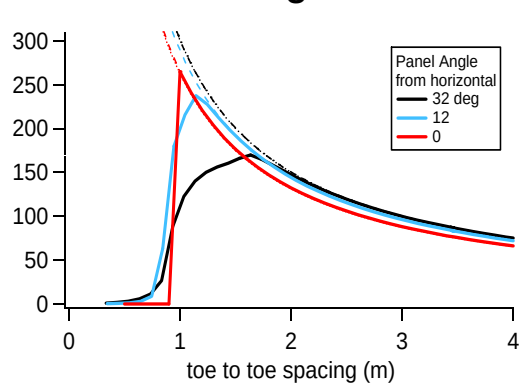


Extrapolations from this model:

Maximizing kWh/panel



Maximizing kWh/acre



These extrapolations assume 10% efficient PV systems and all sunny days.
Note: A typical PV system in Tucson produced 1750 kwhr/yr per 'rated' kW_{DC}
And one kW_{DC} typically requires 7.5 square meters of PV panels.