



Solar Smart Arboriculture IN THE NEW ENERGY ECONOMY

By Daniel C. Staley

Solar energy is projected to provide about seven percent of the world's electricity by 2020, and with solar prices rapidly approaching those of traditional power sources, this growth should continue. Soon it will be normal to see rooftop photovoltaic (PV) panels throughout the urban forest, and preventing conflicts with solar energy collection will be an excellent business opportunity for professional arborists and tree care companies.

How can the arboriculture industry take advantage of this new energy future? Business opportunities for solar-friendly arborists will come from two main categories: avoiding future conflicts and mitigating current conflicts.

For thousands of years, societies have protected the right to heat and light from the sun through governance and legal systems. For example, the ancient Greeks created strict land planning schemes that oriented the built environment to receive light and solar gain. Although much of American land-use law has its origins in British Common Law, the doctrine of ancient lights (or "right to light") is not secured in the United States due to legal decisions made in the



How can arboriculture businesses take advantage of solar energy, projected to account for more than seven percent of the world's electricity by the end of the decade?

1950s. Thus, there is no coherent common law basis, right, or policy at the federal level addressing or affirming solar rights. This has created a hodgepodge of local statutes and case law, and local laws may or may not be useful for other jurisdictions to emulate for their community. Currently, many communities are looking to codify solar rights, and this lack of uniformity in the law presents an opportunity for arborists to help craft policy.

The normal solar installation practice to avoid tree-solar power conflicts is generally to exclude *all* trees from a defined zone to prevent impeding the solar access zone.

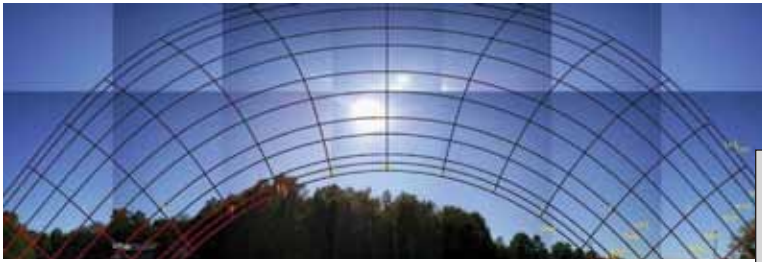
The main reason for this *exclusion zone* is to avoid any shading of solar panels, as a small amount of shade can affect panel performance. On many current PV panel designs, as little as five percent shading on a panel can decrease performance. The solar industry prefers exclusion because it does not have the expertise for proper tree species pruning, selection, and placement.

Further, most defined ordinances require 100 percent clearance in a time period, such as from 10:00 am to 2:00 pm, or from 9:00 am to 3:00 pm, local time. More than 50 percent of all daily power is generated between 9:00 am and 3:00 pm, and this time period requires a wider solar access zone. In addition, the difficulty of the layperson to imagine future tree growth and shading makes it easy to enact an all or nothing solution. This exclusion of any tree in the solar access zone foregoes the many benefits that well-sited small- or medium-statured trees can provide. Arborists can change this exclusion practice and recommend appropriate trees near PV arrays to a wide range of customers as a component of their business services.

Avoiding Future Conflicts

Knowing that most of the fear of potential conflict between trees and PV arrays arises from a lack of knowledge of what a future tree will look like allows the arborist to expand his or her search for new customers into a latent and rapidly growing market.

For example, one opportunity for arborists is to reach out to cities creating solar access ordinances. Arborists can define suitable species



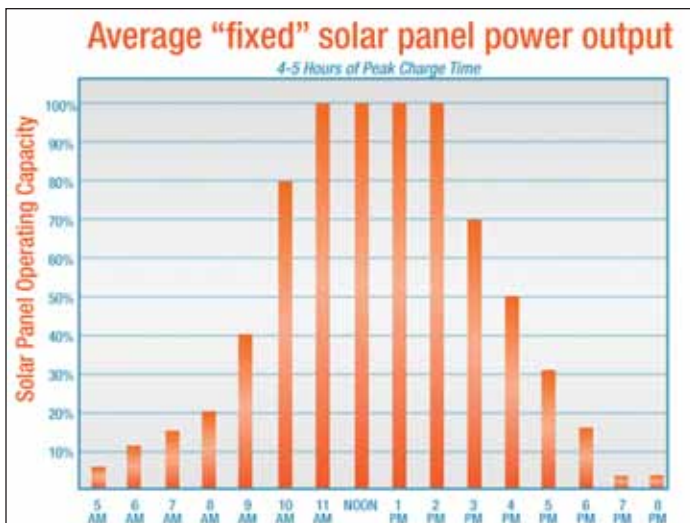
The solar access zone is the three-dimensional shape through which the sun moves and shines on a surface.

and placement in these areas that can be defined as *solar safe zones*—a fixed area with a maximum tree height to avoid conflict with PV arrays. The zones also change according to structure height, and taller trees are possible closer to a taller structure. The average arborist can use free software widely available to customize these zones for clients. Much of this software is intuitive and fairly simple to use, and many computer-literate arborists will find they will need only a short learning period before making client-ready diagrams.

Another opportunity for arborists is to reach out to the solar installation industry and advise on whether or when young trees nearby will grow into the access plane and reduce power generation. This is particularly important to companies that lease roofs to generate power. The leasing business model requires an expected generation rate over the life of the loan on equipment. Trees growing into an access plane reduce power generation, which may affect the ability of the leasing company to repay its loans on schedule.

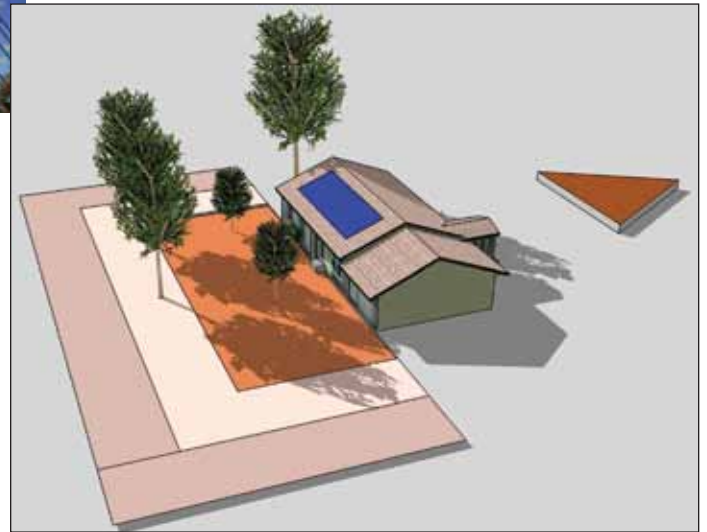
Arborists can also reach out to the green development community to provide custom solar safe zones with proper species selection and placement to shade walls, provide aesthetics, and avoid conflicts. Leadership in Energy and Environmental Design buildings depend on proper shading in summer and solar gain via windows in winter. Arborists are uniquely positioned to ensure green buildings perform as expected and achieve certain benchmarks of urban sustainability.

Solar-smart arborists can provide consulting services to new homeowners or businesses looking to install solar panels while finishing their landscaping. Arborists, using their expertise, can advise new homeowner on whether the plants in their plans will grow into the solar access plane or approximately how many years will pass until solar corrective pruning is necessary.



The average power curve shows when the most power is received from the sun.

With a little networking and some time spent learning how to use a new software tool, we can be valuable, solar-smart arborists for the solar industry, the green building industry, and governmental bodies as well.



Solar safe zones are defined areas around a structure that delimit a maximum mature height for vegetation to maintain clearance for roof-top solar panels.

Mitigating Current Conflicts

How often have we seen a new solar PV array installed and a tree cut down shortly thereafter? Or several years after installation a tree is butchered simply because it grew taller? To be sure, not every conflict will result in saving a tree. But there will be times where a solar-smart arborist can perform careful clearance pruning to prevent a tree from needing to come down. And solar-smart arborists can also perform recurring pruning services to ensure some young trees stay out of solar access planes as they grow and mature.

Performing initial solar-smart clearance pruning—and maintenance—on existing trees will soon be a valuable service. This service will be based on the arborist's knowledge of the solar access plane, the property owner's concerns, and the time frame required for clearance. Such considerations will be an important business model for arborists in the near future. Another important service, hopefully not too often, will be for selection and replacement of trees removed from the solar access zone for a PV array. These replacements may need arborists to perform periodic pruning on these new trees.

Falling prices and new business models that are increasing installation strategies means renewable energy is likely here to stay. Trees and solar panels can coexist with thoughtful planning and care. Arborists can expand their business offerings by embracing the challenges that come with tree shadows. Will you be the first solar-friendly arborist or tree care company in your market?

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All graphs and photos are courtesy of the author.