

September 2009

Proper Site Orientation To Help Give Solar Power its Day in the Sun

As solar power has become a viable source for small-scale energy generation (see April TOPICS), attention has focused on the glitz of new solar technologies. Although less glamorous, site orientation is no less important for an optimal return on investment. Historically most site planning decisions for building orientation have been based on physical site constraints and regulations such as zoning controls. Solar access has rarely been a consideration for most residential and commercial development, but it will be a critical factor as the new technologies become more commonplace.

Energy issues as a component of site planning started during the 1970's. Due to costs and level of sophistication at that time, most solar technology was **passive**, meaning it relied on capturing and using solar radiation without the use of mechanical systems such as pumps and fans. Typical solutions for residential structures centered on orientation for *capturing and storing* solar radiation by utilizing glass to absorb radiation and liquids or solids to store and re-distribute heat. Solar applications in commercial settings focused on *protecting* structures from solar gain (or increased temperatures caused by the sun's radiation), because more energy is typically used in commercial structures to remove heat than to create it.



While passive solar technologies still play an important role in energy efficiency, modern systems will increasingly rely on **active** solar technologies, which utilize external energy to power electrical or mechanical equipment. Active technologies are poised to change the historic approach of shielding commercial structures from the sun to one where access to unobstructed, direct sunlight is prioritized. Site orientation can maximize solar access, and thus the efficiency of the devices used to generate power, by taking into account certain factors. These factors include topography; shape, size, and layout of the project site; and shadows imposed by nearby structures.



Successful commercial facilities with an active solar component will need to balance aspects of traditional site development with the need for solar access. Current solutions involve combining cost-effective photovoltaic panels with simple tracking devices that allow maximum exposure to solar radiation. Location of these devices is driven by the fact that most available unobstructed space in commercial developments occurs on rooftops or the top levels of parking structures.

How should building owners and developers prepare for the up-and-coming technologies? Evaluate the solar access to your site as part of your pre-design site evaluation. Ask your architect or site planner to complete a shadow analysis to demonstrate where the most solar radiation is available throughout the daylight hours on your project site. Recognize the compromises necessary to maximize solar access while minimizing solar gain in your commercial structure; optimal installations will provide unrestricted solar access combined with techniques to minimize solar gain in the structure, such as green roof systems.

Tomorrow's developments will combine the best features of passive and active solar technology. By paying attention to the importance of site orientation and optimizing the efficiency of solar energy, today's developers can prepare to take advantage of the new technologies as they evolve.

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