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Apr & May 2011, Issue 142

\$6.95 US • \$6.95 CAN



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Architectural PV Design Considerations

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Installation details and new module and racking options are making PV systems aesthetically appealing to a wider range of homeowners. Here are some options for creating great-looking systems.



Left: This custom patio array by Florian Solar makes electricity, and provides rain and sun protection.

Below: Solar awnings serve a dual purpose—generating energy and shading windows.



Courtesy Florian Solar

Awning or Patio Cover

Several array mounting methods avoid the home's rooftop altogether. The first—PV awnings—have the added advantage of providing shade. Many PV modules are about the same length as purpose-built window awnings, making them an attractive choice for shading windows on south-facing walls. Plus, using adjustable awning supports can make seasonal tilting easy—either to increase system output, or to decrease and increase shading as the season and solar gain needs dictate.

A PV awning system can be pricey, as the method may require custom engineering to match the mounts to the building attachment means, array weight, and local wind loads. Beefed-up hardware and attachment methods must handle all the cantilevered weight that tries to pull the array away from the building, and there is often increased labor involved in mounting custom systems. Assuming the awning is to be on the south side of the building, the energy produced should nearly match what a south-facing roof-mounted system would produce. The exception is when the sun's arc sweeps to the northeast or northwest, producing shade on the array by the building itself.

Another place where an array can serve two functions—producing energy while providing shade—is over a patio. Custom-designed PV patio structures are becoming more common, and some installation companies are specializing in their design. Whether this solution is practical depends upon where the patio is situated. Most patio shading structures do best if located facing south. But if on the other sides of the building, the tilt (negative on a north patio) and building shading will affect output significantly, and the array will likely be in the building's shade for significant portions of the day, especially in winter.

Solar carports can be another way to get more value out of your PV array investment. If the right spot is available, you can orient and tilt the structure for optimum solar gain and keep your cars out of the weather.

Bifacial modules, which produce power from both the back and front, can be an excellent fit for patio and carport applications. They allow some filtered light to pass through the array, providing soft lighting underneath. If a light-colored surface is used underneath, this can reflect light back to the underside of the array, helping to augment power production.

A purpose-built solar carport, optimized for both functions.

