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# Become a Solar-energy expert

Advance the argument for incorporating photovoltaics in new construction

By Steve Coonen

The generation of clean electricity is an overbearing issue in today's American economy. With the requirements of reducing the use of foreign fuel, coupled with the need to reduce greenhouse gases, photovoltaics have become a market force within the construction industry. Solar electricity is the effect of generating electricity when exposing a semiconductor to light.

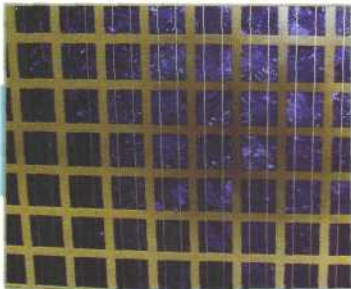
Recent increases in electricity rates and the advent of new federal tax incentives greatly

improved the economic justifications for including PVs into a structure, whether roof mounted, within a glass curtain wall or in a skylight system. As a result, the PV industry has seen a large increase in demand and is experiencing annual growth rates in the 60 percent range.

## Nuts and bolts

Photovoltaics' traditional "standard panel" format features 1/8-inch low-iron tempered glass covering a circuit of crystalline solar cells encapsulated in ethylene-vinyl acetate and sealed on the back with a polymer laminate. A rear-mounted junction box and aluminum frame complete the panel typically added on to a building roof in a retrofit installation.

The same package can be alternately provided with a rear back sheet of glass in lieu of the polymer and installed within a mullion frame system for new construction projects. When deployed as part of a glazing package, additional cost benefits are realized through the offset of the glass that would have been installed, as well as the labor within the building's construction budget.



Glass laminate  
with spread solar in an  
Open Energy project  
in Los Angeles

Photo by Solar Power Industries,  
Bele Haven, Pa.

The author is the vice president of sales, Open Energy Corp., Grass Valley, Calif., 530/271-7164, scoonen@openenergy.com.

## Have the bid package include the photovoltaic system within the scope of work of the on-site glazing and electrical subcontractors.

### High-profile brands

The PV industry has attracted such large international manufacturing companies as GE Energy in Newark, Del., Sharp Solar in Huntington Beach, Calif., British Petroleum Solar in Fredericksburg, Md., and Kyocera Solar in Scottsdale, Ariz., that have helped stabilize prices in spite of shortages of silicon caused by the heavy demand. Additional infrastructure in the silicon processing supply chain is expected to relieve some supply issues over the next 12 to 18 months. Many manufacturers of solar cells provide their wafers to original equipment manufacturers like Sunways AG of Germany or Open Energy in Grass Valley, Calif., who then provide custom glass packages designed to meet the requirements of the glass and glazing industry.

In the United States, cell manufacturing is provided by several companies, such as SolarWorlds of Camarillo, Calif., recently acquired from Shell Solar, Solar Power Industries of Belle Haven, Pa., and GE Energy. At the same time, keep in mind that the majority of the world's supply still hails from Japan and Germany, where the heaviest demands also are found.

The ability to package PV within a glazing system provides additional benefits to the building owner by having the bid package include the PV system within the scope of work of the on-site glazing and electrical subcontractors. This helps reduce costs further by not requiring an additional party on the project, such as the solar integrator who traditionally installs standard-panel systems. By integrating the PVs into the design and construction supply and installation sys-

tem already in place for a building's structure, the technical application and economics, as well as the aesthetic component, are greatly enhanced.

In Europe, most glass systems are reviewed for the option of including PVs in the design early, and their integration has become more standardized within the glass supply lines. In the U.S. glass industry, PVs can be found in product lines of such companies as Kawneer Co. of Norcross, Ga., the Vistawall Group of Terrell, Texas, and Super Sky Products Inc. of Mequon, Wis. Among contract glaziers, Walters & Wolf in San Francisco, Model Glass of Los Angeles and W&W Glass of Nanuet, N.Y., have all gained experience in providing solar electric glass within a complete glazing system. Providing clean generating power systems through these traditional building supply lines has given additional credence to the idea of integrating PVs into a complete building skin. Using the complete design and installation team that already exists in the construction process gives greater confidence to the general contractor who needs to supply a product within budget and on schedule.

Many technical and design improvements have been realized by members of the PV industry in recent years, and we have been able to grow up and into an existing glass industry, so complete integration can be realized. Manufacturers and installers of glass systems now can provide turnkey PV solutions to general contractors and their clients, the building owners, in an economic way and derive a clean look to the solar array that previously has not been available. □

Photo by Open Energy



Gold-colored solar cell matrix in glass or glass lamination.



Polycrystalline curtain wall with green solar cells in a building in Germany.