



October 15, 2009

Written by: Bill Poleatewich, President, Dawn Solar Systems, Inc. and
Mark James, VP Sales & Marketing, Roof Hugger, Inc.

Energizing Building Envelopes:

(We all know that) Buildings of the future will be routinely clad with renewable energy systems that play an active role in building energy management. (The exciting news is that) Today's progressive designers of both new and re-roofing applications can easily implement building envelope systems that can heat and cool both air and water and produce electricity in one common area. MetalCon 2009, with its Solar Bay, live demo area and over 30 manufacturers with renewable energy exhibits brought this story to the this construction industry this year. Copper, zinc, steel and aluminum product manufacturers showed the products, accessories and systems available now to build or retrofit sustainable building envelopes.

The world is abuzz with the potential of solar power to measurably impact the level of fossil fuel and reduce the rate of climate change. Known as photovoltaic (PV) systems, these systems convert sunlight into electricity and though expensive when compared to today's conventional power generating systems, manufacturers are driving the production costs down as they bring new renewable energy products, known as building integrated photovoltaic's (BIPV) to the building envelope marketplace. Dow's new PV roofing shingle, Eagle's Solar roofing tile, PV laminates for roofs and walls available from Uni-solar, Ascent, and Solopower and Schuco's PV curtain wall system are but a few examples of the evolving PV technologies making their way to the building community.

The shy cousin of PV power is solar thermal energy. Solar thermal systems produce heated air or water from the sun's energy for use in domestic, space or process heating applications. Suitable for both new and retrofit installations and highly cost effective today, these systems lack the sizzle (and the rebates) of PV systems that produce electrical power and reinforce the national electrical grid. However, architects adopting building integrated solar thermal (BIST) systems have a vast array of building cladding materials, finishes and colors on their design pallet and when a building's cladding material becomes the solar absorber, owners are delighted by the additional financial incentives available under the Federal Investment Tax Credit program. Manufacturers such as Roof Hugger, Dawn Solar, ATAS and Englert produce systems for open frame and sheathed buildings made of recycled and recyclable materials. Such systems approach the ultimate in sustainable design; by increasing the R-value of the wall or roof

ROOF HUGGER® ENERGY EFFICIENT RE-ROOFING TECHNOLOGIES

Roof Hugger, Inc. • P.O. Box 1027 • Odessa, FL 33556-1027
P: 800-771-1711 • www.roofhugger.com • F: 877-202-2254

assembly, they reduce building heating and cooling loads and can operate counter cyclically to take advantage of seasonal cooling or night sky radiational cooling to chill building systems or processes at night. Above sheathing ventilation can be used to cost effectively increase a buildings' energy efficiency by seasonally cooling the building envelope and during the heating season directing that warm air into the building for space heating.

Solar thermal and PV systems can be synergistically engineered into one integrated PV-thermal envelope assembly. Called BIPV-T, these systems are capable of producing 2-4 times the energy available from a pure PV system. The solar thermal system cools the PV system increasing the PV systems efficiency, while cooling the building envelope and putting otherwise waste heat to work in the building. BIPV-T systems are available today in either dark blue or black, but keep your eye out for more color options in the next year or two. The entire BIPV-T system is eligible for the Federal ITC and related state and local rebates and incentives.

Oak Ridge National Labs (ORNL) is working on the next generation of sustainable energy envelope systems. Building on a deep knowledge base acquired over many years of research and development, with federal funding and industry sponsorship, ORNL is working with industry partners and trade associations such as the MCA, CRRC and others to develop, test and commercialize the next generation of roofing and curtain wall products.

Innovative product components called Phase Change Materials (PCM's) are now being specified in mainstream products such as drywall. ORNL is working on the integration of PCM's into optimized envelope systems, increasing their ability to store thermal energy and transfer it to the building when needed in conjunction with cool roofing, PV and ASV applications. PV paints for roll to roll/continuous coating and PV inks and related printing processes are on the horizon.

It is important to understand that all of these systems are applicable for not only new construction, but even more so for existing buildings. According to the DOE's Energy Information Administration, there are approximately 5,060,000 commercial and industrial buildings in the United States, representing some 82.2 billion square feet. These buildings consume 74.7% of our building energy demand or 29,189 Trillion BTU's per year. Needless to say, the opportunity to reduce our building energy consumption in this nation is with upgrading existing buildings. A well known term in the metal construction industry is "Retrofit". Simply speaking this term represents the unique ability to improve a building's aesthetics, functionality and performance by employing

an engineered light gauge sub-framing system over the existing roof and then finishing it with a new metal roof. Why a metal roof? The answer is easy; metal roofing has a service life of nearly double of its nearest membrane roof system competitor, it provides the designer the ability to employ cosmetic upgrades improving the building's value and it is the ideal surface and assembly to install renewable solar energy applications.

If you design or construct buildings, you should be looking at fully integrated energy efficient metal roof systems. These are the "Future of Metal Roofing".