



## Hamlin Companies Building Integrated Photovoltaic System (Case Study)



Figure 1, HCO 107.7 KW BIPV Solar System in Benson, NC.

### **Summary**

Advanced Green Technologies (AGT) installed a 107.7 KW DC, building integrated, roof mounted, hurricane resistant, PV photovoltaic system in Benson, North Carolina in January 2008. It was designed to deliver electricity to power Hamlin's sheet metal fabrication shop in Benson. It is calculated that the photovoltaic system should generate 157,045 kilowatt-hours of energy per year. The solar system is meeting and exceeding design expectations, showing an excellent electrical energy performance.

### **System Design**

The solar system is designed with Uni-Solar PVL triple junction, thin-film, amorphous silicon, flexible solar laminates adhered directly to the Johns Manville TPO membrane roof. The roof was retrofitted to a TPO roof from metal construction. This building integrated application of the solar laminates makes them hurricane resistant in accordance with the Miami-Dade County building code. There are a total of 792 PVL-136 (136 watts) laminates, connected electrically in 66 series strings of 12 laminates. All electrical connections are via a roof bonded wire management system. The series strings are then connected in parallel through four fused combiner boxes. The DC power from the combiner boxes is connected through three PV Powered DC to AC grid-tied inverters, each rated 30 KW. The AC power is fed directly to the Hamlin building electric panel via a line tap on the utility side per NEC code. Surplus AC power is net metered back to the utility grid. An energy data monitoring system is also included to report and track the solar system performance. The electrical installation was completed by Hypower, Inc.

### **Electrical Stability**

The Hamlin Companies sheet metal shop is the leading duct manufacturer on the east coast. Intricate fabrication and welding machines are installed at the Benson location. It was critical to the design that the photovoltaic system matches the electrical stability from the utility. The PV Powered inverters harmonize with the utility grid and provide added electricity to the building. Through NC Green Power, Hamlin Company will be able to receive payments for the RECs on all energy exported to the grid.

### **Building Demand**

The Hamlin Company has a large energy demand at the Benson location. Even though the photovoltaic system cannot provide all of the energy demand, Hamlin Company has been able to take advantage of generous tax credits, lock in electric costs from the photovoltaic system, and become more environmentally friendly. On non-working days, the excess generation is metered back to the local utility.

### **Maintenance**

North Carolina suffers from severe pollen during certain times of the year. The combination of photovoltaic laminates and the Johns Manville TPO offer an easy to maintain product. The photovoltaic laminates made by Uni-Solar are encapsulated in a TefZel product. Combined with the Johns Manville TPO, the system offers an easy to maintain product for Hamlin Company.

### **About Hamlin Company**

Established in 1954, the Hamlin Roofing Company of today is one of the Southeast's most highly respected and experienced commercial roofing contractors. Hamlin Roofing Company has the backing of over 25 roofing materials manufacturers, receiving numerous awards for excellence in design as well as application. At Hamlin Roofing Company, we understand the business side of roofing. Your roof is an important investment, and many building owners and managers know the importance of protecting that investment. Whether we installed your roof or someone else, we can make your roof a "Hamlin Roof." And in concert with the other Hamlin Companies - Hamlin Sheet Metal and Ultratech Industries - Hamlin Roofing is leading the industry with quality, value, and craftsmanship.