



Advanced Roofing Building Integrated Solar System (Case Study)



Figure 1, ARI 55.5 KW BIPV Solar System in Ft Lauderdale, FL.

Summary

Advanced Green Technologies (AGT) installed a 55.5 KW DC, building integrated, roof mounted, hurricane resistant, PV solar system in Fort Lauderdale, Florida in July 2007. It was designed to deliver electricity to power Advanced Roofing's (ARI) headquarter building on at 2100 NW 21st Avenue in Fort Lauderdale. It is predicted that that the solar system should generate 83,566 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 Sarnafil PVC membrane roof. 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 336 PVL-136 (136 watts) laminates, connected electrically in 28 series strings of 12 laminates and 144 PVL-68 (68 watts) laminates, connected electrically in 6 series strings of 24 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 two PV Powered DC to AC grid-tied inverters, each rated 30 KW. The AC power is fed directly to two 100 amp breakers in the ARI building electric panel. 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.

Hurricane Resistance and Durability

As the leading hurricane resistant roof designer in Florida, Advanced Roofing expected a photovoltaic system to match. The PVL installation passed uplift pressures according to Miami Dade standards and approvals upwards of -400psf. For the height of this ARI building, the equivalent wind speed is over 200mph. The impact testing and durability was also vital to Advanced Roofing. The system has seen over 3000 visitors in 2007 alone, many of which walked directly on the TefZel encapsulated panels. During a storm, the impact of neighboring debris will not impact the long term durability and function of the PVL.

Building Demand

Since moving into the new headquarters, the peak demand has been approximately 57kW. During most days, the peak load of the building was met by the photovoltaic system. On non-working days, the excess generation is metered back to the local utility.

Shadow Tolerance

South Florida's summers are known for tropical weather and long periods of clouds. The AGT photovoltaic system offers superior shadow tolerance, producing electricity during cloudy weather. The location also offers adverse conditions being less than three (3) miles from the ocean. The salt spray and humidity have not affected the PVLs in any way.

About Advanced Roofing

Advanced Roofing has been in business since 1983 with an overriding commitment to excellence. Since 1983, Advanced Roofing has become the number one commercial reroofing company in Florida. As the sixth largest roofing contractor in the United States, Advanced Roofing is also one of Advanced Green Technologies' certified contractors for photovoltaic laminate installation.