



*DESIGNED TO ADAPT. BUILT TO ENDURE.*

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**SUSTAINABLE SOLAR SOLUTION  
1,000 PANEL INSTALLATION**

November 2013

## Project Overview

For over 50 years, Polypack, Inc. has manufactured shrink wrap equipment offering packaging alternatives whose end result is source reduction. Shrink Packaging reduces the amount of packaging mass, and therefore reduces the amount of packaging waste that ultimately finds its way to our landfills. Continuing in a long-standing tradition of sustainability, in 2011 Polypack began a new kind of sustainability project, one that would ultimately result in a 1,000 solar panel array that can provide all of the power required to run the manufacturing facility, as well as the office space and attached automotive museum.

## Choosing The Right Option for the Region

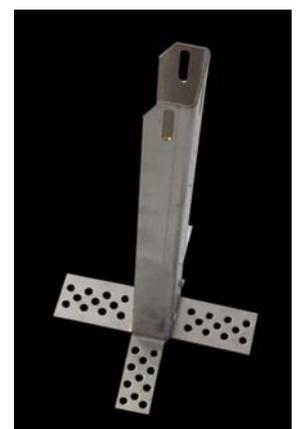
One of the challenges of renewable energy is that there is no "one size fits all" solution. Different locations lend themselves more to wind power, hydro power, tidal energy, geothermal energy, etc. Here in Tampa Bay, Florida, the obvious answer is the generation of power through the use of photovoltaic cells, more commonly known as solar panels. Unfortunately, as the saying goes, "There is no free lunch." While the entire Nation knows Florida as "The Sunshine State," we are also at the mercy of hurricanes and the associated high speed winds. The decision was made to pursue a long-term system that, like the equipment we manufacture, is built to endure.

## On the Winds of Change: Ushering A New Design Approach

One of the most important aspects of our solar installation is its unique design. Rather than employing the traditional method of bolting down mounting hardware to the roof, our design uses spray foam to secure the mounts in place on the rooftop. This approach delivers several benefits which makes it ideal for our application. The spray foam provides a unified mounting surface which is strong enough to sustain a Category 5 Hurricane. The spray foam also provides insulation to the facility, reducing the amount of energy required for heating and cooling throughout the year. The spray foam roof also reflects sunlight, reducing the amount of heat absorbed by the buildings during peak hours. The mounting hardware itself is also a unique design.



The mounting system for the solar panels was completely designed in-house by Polypack, Inc. The mounts are made from 11 gauge stainless steel and the legs of the mounts are perforated to allow the spray foam to permeate through the surface. They are manufactured from 304 stainless, which offers excellent corrosion resistance and long-term durability. Combined with the unified spray foam surface, the end result is a fully-integrated photovoltaic system capable of withstanding winds in excess of 157 miles per hour.





## Polypack's Photovoltaic System Profile

A one kilowatt solar panel will produce an average of 4.7 kilowatt/hour in Florida. After incentives from the federal government and incentives from the utility company, the investment will be paid off in six years. After six years, the energy produced is free.

### Cost Component Analysis (based on Polypack's installation):

|   |      |
|---|------|
| Solar Panels  | 20%  |
| Electrical Hardware (inverters, etc.)                 | 15 % |
| Hardware to Mount Panels                              | 5 %  |
| Labor, Electrical and Panel Installation              | 37 % |
| Roof Preparation (not applicable to new construction) | 23 % |

There are incentives, but there is a catch; they are deductible from the profit taxes. No profit : no incentives. The federal government gives a 30% credit to deduct from income taxes. The 30% is based on cost of installation of the solar panels. In Pinellas County the utility company distributes some money: first to ask, first to be served. It is 1 million a year. There is also a catch, the IRS will consider the money from Duke Energy as an income and income taxes have to be paid. It is a paradox.

How long will a photovoltaic installation last? Current estimates are a minimum of twenty years. The solar panels themselves represent only 20% of the total cost for an existing building and 25% for a new construction project. As with all technology, the price of the panels will go down and their efficiency will increase. As a result, after some time it is feasible to consider panel replacements in order to obtain more energy from the system.

**A business can easily go solar without being bankrupt, and if cash flow is tight, there are loans available. The following is a formula based on Polypack's experience and is subject to change.**

1) First number: A 1 kW system produces an average of 4.7 kWh per day in Florida.  
 $4.7 \text{ kWh} \times 365 \text{ days} = 1715 \text{ kWh}$ , rounded down to 1700 per year at the cost of \$ 230 per year (kW priced at 13.6 cents)

2) Second number: What is the cost to install one kilowatt of solar panels, after deduction of the 30% tax credit from the federal government? We can examine costs for installation on a new building, the costs for an installation on an existing building with some prep work required on the roof, and the costs of both options, with interest, if there is a bank loan involved.

2A) New building, no loan : \$1,200 with a savings of \$ 230/year = 5.2 years  
New building with a six year loan : \$1,320

2B) Old building with roof prep required: \$ 1,550 with a savings of \$ 230/year = 6.7 years  
Old building with roof prep required and a seven year loan : \$1,700



These numbers can be multiplied by the number of kilowatts installed in order to extrapolate for site-specific installations.

At the present time, Duke Energy pays only 2 or 3 cents per kilowatt for energy being sent back to the grid. As a result, there is no financial motive to overproduce.

**Now the good news...**

**A)** If there is a loan, the cash flow of the business will not be affected; the repayment of the loan is done with the financial savings on energy.

**B)** For 6 or 7 years, nothing happens, but when the loan is paid off the energy is free (as a footnote, depreciation of the installation or energy expenses are treated the same for the fiscal outcome, they are deducted from the taxable income).

**C)** The money invested in the solar installation will create jobs; those jobs will create revenue for the government.

**D)** Last, but perhaps the most important, is the reduction of carbon dioxide emissions in the atmosphere. All Scientists agree on the seriousness of the problem, with the exception of some residing on the payroll of fossil fuel companies. Our 270 kW installed will reduce the carbon emissions by 300 (three hundred) tons per year.

**There is no reason for *not* transitioning to a solar powered system, or to some other form of green energy.**

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