

HeroX – Tech Assistance

1. I've been around roll forming machines for most of my career in the form of gutter machines. The roll forming machines we'll need for this project will be three times this size. The 48' wide x 500 ft. long sheet metal rolls that will feed this machine will weigh in excess of a ton. Equipment will be needed that can handle the enormous size and weight of these rolls. This is a way out of my experience level and we'll need someone that can outfit a manufacturing plant.
2. There will be certifications required for affixing a solar array to a roof.
 - A. Underwriters Laboratories (UL) for one. Although the MiaSole Flex Series – 02WS Solar Module already has UL approval We will be attaching it to a mounting panel that also has an Enphase Energy micro-inverter attached. This also has UL approval but when used together this now is considered a Smart Module. I remember from my solar schooling that Smart Modules have different rules they go by, I just don't remember what. It's possible because there is no DC Voltage on the roof, module grounding may not be required. And I'll need help sorting all this out.
 - B. The National Electric Code has many requirements for the installation of solar electricity, and I will need help with the labeling and code requirements.
 - C. The same thing holds true with Factory Mutual (FM) requirements. Although the panel locks just like the DECRA Shingle HD stone coated steel tile roofing system which already has FM I-90 approvals, Code compliance organizations will probably require a separate wind tunnel uplift test. This would especially be true for high wind areas along the coast. Dade Co. FL. Comes to mind.
3. Sheet metal rolls come in 24" & 48" widths. The width of the above MiaSole Module is 39.1". The male and female lock plus nailing fin on my panel is 3.123". To minimize Sheetmetal waste the solar module would ideally be 44.8" wide. Convincing MiaSole to change their production widths will take some help from an outside official source.
4. Ideally, I would like to have panels of 250 to 350watts. I will need somebody to figure out the watt densities of the various sized panels so optimum lengths could be calculated. These variations I believe will be necessary to get optimal coverage on Hip roofs placing panels between hips and valleys and not wasting area at those places.
5. Roll Forming Machine Manufacturer.

I anticipate having three designs available for sale. Initial estimate obtained 3 years ago was mid \$ 70,000 for the main panel.

 - a. Surface mounted. This option will be attached directly to the roof. The metal for the Starter Strip and the Head Flashing at the top can be field fabricated and or the Starter Strip can be bought at Lowes or Home Depot or direct from a fabricator. (GOOD)
 - b. Mounted on lift studs. This will raise the panels off the roof surface and allow air to flow from the starter to the top and can vent out through either end of the head flashing. This circulating air will keep the panels a little cooler and as heat has such a damning effect on kWh production, I believe it's certainly worth the expense. (BETTER)
 - c. The final design will mimic the second except the Head Flashing will be designed to accept Solar Roof Motorized Vents. When the Sun shines, the hotter the Solar Modules get and the harder the vents work, cooling the array and increasing the production (BEST)

For option 3 it will be necessary to maintain a manufacturing facility that will be able to house 3 roll forming machines. One for the panel profile, one for the starter strip which will now be 1

3/4" above the roof. This piece of metal will secure the panel and also drape to the roof to keep wild life from nesting under the PV Array. It will also need to be vented with slats small enough to vent air but not so large as to allow rodents to pass.

The third roll forming machine will be to form the head flashing. On this option the coil material will have to be thicker to handle the weight of the solar vents. Can Vouchers be used for equipment purchases?

6. Enphase: Micro-Inverter Manufacturer. Flexible Thin-Film CIGS produce different electrical outputs than that of Polycrystalline Silicone. For that reason, micro-inverter manufacturers are going to have to be enticed to spend the time on making inverters for this particular application. Flexible Thin-Film Modules to date have only been used in commercial applications with string inverters. This is a whole new application and I'll need help convincing them of that Plug & Play quantities will be worth their while.

To get maximum output I would suspect a Micro-Inverter for each panel would be optimal. This will assure that Maximum Power Point Tracking (MPPT) levels will be at their optimal values. It's also possible that 2 or 3 panels could be supported by 1 Micro-Inverter. This needs to be determined by the electrical engineers.

7. As with anything else, quantities count. The higher the quantities committed to up, the better the price will be and the more likely they'll engineer a micro-inverter specifically for our needs. Existing off the shelf micro-inverters will be used in the meantime if available, If not, then we'll have to use DC Optimizer's.