

Technical Assistance Request:

VEGAN PV is not fresh chum to be thrown into water teaming with sharky manufacturers looking for their next profit maker. VEGAN PV is about using inexpensive materials and sweat equity in local maker spaces to provide access to renewable energy for everyone. Technical assistance does not involve spinning a rolodex. Instead connectors should be looking for ways that they can grow a network of makerspaces and promote the maker culture. National labs should try to identify ways to help the average citizen develop a can do attitude and eventually a personal culture of sustainability.

There are several maker spaces and hacker spaces in Europe that focus on electronics and printed circuits. I haven't found American counterparts yet but that would be helpful in promoting the design of string and micro inverters that can be manufactured by local makers. No, I'm not looking for a manufacturer. I'm looking for a kindred spirit who has or can produce a simple design for an inverter that can be licensed by makerspaces around the globe. Perhaps HEROX has their next challenge sponsored of course by a Nation of Makers.

A hackerspace in Edinburg, Scotland produces "Light logs" that keep track of daily sun exposure so that locals know when they have to sit in front of their sun lamps ... and for how long. At latitude of 60 degrees there's not much direct sunlight. In fact, in Edinburg, twice as much solar energy strikes south facing walls as it does a flat roof. Cities like Madison, Wisconsin, Minneapolis, Minnesota, and Seattle, Washington any place north of 45 degrees latitude get more energy striking the south façade than the roof.

How can the NREL help, you ask? Quite simply, you can help them revise their algorithms to include south facing walls. The California energy code makes us calculate the energy striking walls at various azimuthal angles, so this is nothing new. I tried to use Google's Project Sunroof on a project to renovate a fraternity house and pay for it with renewable energy tax credits and renewable energy credits and it was a disaster. It simply didn't work. Google estimated the electric bills based on a single floor area and did not recognize that there were four floors and 60 rooms, a commercial kitchen *and all of those beer coolers*. Google's system accounted for the angles of the gabled roof and could only suggest a very small amount of solar panels. There was a three story, south facing wall that at 40 degree latitude produce 80% of the energy striking a flat roof, enough to satisfy the "true" energy demand..

There's a chat line on the Google Project Sunroof website and that led to a phone call with someone who turned out to have developed the algorithm. When I asked why they hadn't considered south facing walls I got a snotty reply that Google told him not too. I asked for the name of someone at Google that I could talk to and he gave me a name but no contact information. I guess he felt badly and while I was still looking for a number to go with the name the nasty man called me back admitting that he had been the one who made the non-inclusion decision and pleas would I not call his client at Google. **A call from NREL would be taken more seriously and get things moving in the right direction.**

Because all of the VEGAN PV designs are being transferred to SOLIDWORKS and their "same as, but different" feature it would be easy to convert roof panels into Vegan Wall Cladding. NASA's historic data suggests that the optimum angle for solar panels is latitude plus 15 degrees. In Scotland that 75 degrees

form horizontal and very close to perpendicular. A simple modification to the offset between shingles would have them hanging a 75 degrees and a quick look at the design of VEGAN PV should convince you that they can be site adjusted for azimuthal angles that are not facing due south. **SO MAKE THE CALL.**

There will be a growing list of materials and electrolyte solutions that need to be evaluated and I'm most interested in the results of accelerated testing to determine how fast the carbon coated metals decompose in the alkaline solutions and at what concentrations. Customers can always watch their utility bills for a clue about refreshing their cells but it would be supportive to give them a schedule for element replacement.

Materials will vary from site to site and it would be helpful for "somebody official" to evaluate the rates of energy production ... for the record.

You could help with etching the polyimide panels with sintered aluminum but I'm currently committed to having Roy Ombatti fabricate a 3D laser printer for that purpose. Still, you could help with the prototypes.

There is some destructive testing to prove the structural strength of the concrete canvas and Hebel block components when they are incorporated into the VEGAN PV panels. I'm not sure that there's anyone there who does that. I can perform the calculations to start and conduct load tests if you can't help.

If you know of alternative materials that are universally available, less expensive, and won't make a maker's body parts fall off, I'm very flexible. There's Titanium Dioxide in my toothpaste but there are also new concerns about the safety of that product. That could be an interesting place to start.

Perhaps you can think of more ways to help.