

## Printing Solar Panels In The Backyard

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*(Unedited Transcript)*

### Description:

Imagine what you might do if you could print your own solar panels. That's kind of the dream behind Shawn Frayne and Alex Hornstein's Solar Pocket Factory - although they see it more as the "microbrewery" of panel production rather than a tool for everyone's garage. With over \$70,000 of backing from a successful [Kickstarter campaign](#), the inventors are now working on refining the prototype. If all goes well, by April they'll have a machine that can spit out a micro solar panel every few seconds. In the meantime, Frayne stopped by Flora Lichtman's backyard with a few pieces of the prototype to explain how the mini-factory will work.

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FLORA LICHTMAN: Time to make some room on your wishlist. If you thought a 3D printer sounded good, how about this?

SHAWN FRAYNE: Ta-dah.

FLORA LICHTMAN: A machine that prints solar panels. This is one of its creators.

SHAWN FRAYNE: My name's Shawn Frayne. I write "inventor" when I go through customs.

<laughter>

FLORA LICHTMAN: And Shawn was kind enough to let me live this DIY dream by bringing a few pieces of his prototype to my backyard.

SHAWN FRAYNE: Yeah, this is about one half of a complete solar pocket factory...

FLORA LICHTMAN: The other half didn't fit in the suitcase.

SHAWN FRAYNE: ...that we smuggled over into New York City direct from Hong Kong and Manila.

FLORA LICHTMAN: That's where Shawn's colleagues are based. They're self identified "independent inventors" who team up to make stuff -- sometimes financed by big companies, and sometimes, like with this project, bankrolled by strangers.

SHAWN FRAYNE: We're launching this on Kickstarter, and as of this shooting we're at about 70k, and this is meant to pay for some of the equipment required for a Solar Pocket Factory.

FLORA LICHTMAN: The aim is to have a full working model done by April, and then they have this other modest goal --

SHAWN FRAYNE: Hopefully revolutionize how microsolar production happens in the world.

FLORA LICHTMAN: Currently, many solar panels like...

SHAWN FRAYNE: ...the two volt panels that go in your garden lights, or the 5 volt panels that would power your iPhone...

FLORA LICHTMAN: ...are made by hand in factories in China, India, and Bangladesh, Frayne says. Assembly line workers take laser etched silicon cells, that's the stuff solar panels are made of --

SHAWN FRAYNE: A bunch of people snap off little tiny pieces of the silicon, and you combine them together. The problem is that labor prices are going up, and the price of silicon has plummeted over the last couple years.

FLORA LICHTMAN: So small panels end up being much more expensive, per watt, than large scale panels, Frayne says. He says that automating the process could bring down the price. Enter the Solar Pocket Factory. You would start by feeding sheets of silicon into this module.

SHAWN FRAYNE: This one here replaces this step of snapping the laser scored cell into solettes.

<soundbite>

FLORA LICHTMAN: In the full prototype, the machine will catch the solettes, and bring them to this module where they're attached to a backing.

SHAWN FRAYNE: This device does the placement and the interconnection of the solettes. The solettes are pushed up.

<soundbite>

SHAWN FRAYNE: Each piece of silicon outputs around half of a volt. Light comes in, a photon dislodged an electron that hops to the other side of the solar cell, and then

there's enough that jump over to the other side that there builds up almost an electrical pressure -- a voltage.

FLORA LICHTMAN: -- And voila, you have electricity. And it turns out that you can take a bunch of these little solettes and wire them up in series to get the micropower output you want.

SHAWN FRAYNE: The bottom of the solettes are positive. The top of the solettes are negative. We need to connect the bottom of one solette to the top of a neighboring solette. So we're going positive to negative. Just like you would 4 batteries to get, you know, 5 volts.

FLORA LICHTMAN: So far, super gluing the solettes in a shingle pattern seems to work. In the full model, the panel will get a protective coating, will be baked in an oven, and then a testing device will make sure the panels work -- and then they'll be ready to go.

SHAWN FRAYNE: The goal in April is that we can do one placement per second. It means the machine can do between 300 thousand to a million panels per year, depending on the mix of voltage.

FLORA LICHTMAN: Although the Solar Pocket Factory fit in my backyard, the model is more like...

SHAWN FRAYNE: -- the microbreweries. They're not things that people necessarily have in their homes, but they're down the street and in their neighborhoods.

FLORA LICHTMAN: And the idea is that if people can get micro solar panels more easily, Frayne says, maybe more inventors will use them. It's a supply drives demand kind of argument.

<music>

SHAWN FRAYNE: Solar Pocket Factories, combined with Makerbots, combined with Shop Bots, we think, could, maybe, push more and more solar products out into the world. This is speculation.

<laughter>