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Plastics News

May 9, 2018

Supply chain partners ready for Powerhouse shingles to shine

GENERAL POLYMERS
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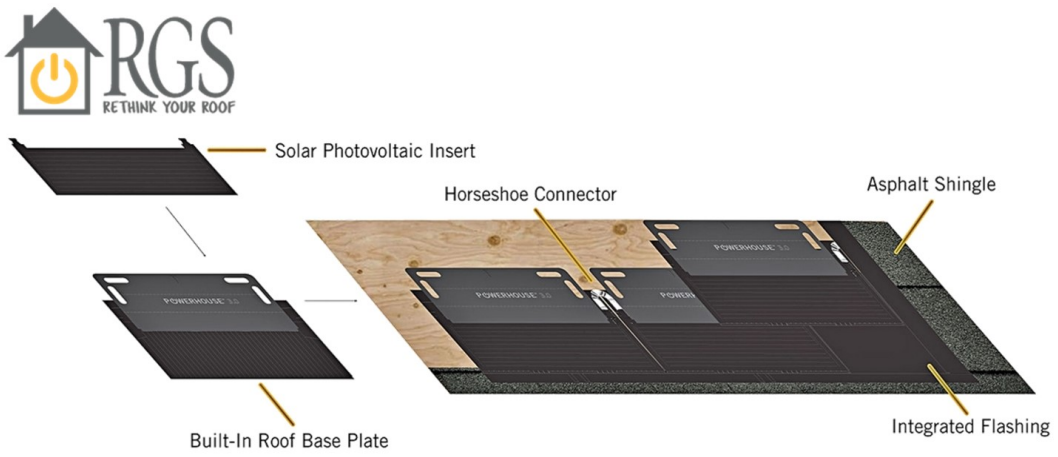
A new day is dawning for the Powerhouse brand of in-roof solar shingles shelved in 2016 by the former Dow Chemical Co. for a plan to license the commercialization rights, which went to RGS Energy in October.



The built-in roof base plate, system housing and end caps of RGS Powerhouse 3.0 will be made from a thermoplastic composite material.

The Denver-based company, formally known as Real Goods Solar Inc., now has three partners lined up to take the third generation of the series, RGS Powerhouse 3.0 system, to the next level — and an asphalt roof near you. The updated system uses traditional silicon solar cells that RGS says significantly reduce cost while improving panel efficiency.

Last month, RGS received Underwriters Laboratories' approval for the resin to be used in the composite base structure of the shingle, which acts as both a roofing product and a source of power for the home. The resin certification was achieved with support from one of its partners, General Polymers Thermoplastic Materials LLC, in Clarkston, Mich.

And this week at NPE2018, another partner, injection molder Creative Liquid Coatings Inc., is looking for more equipment to manufacture the innovative system suitable for both re-roofing jobs and new construction.

RGS estimates the potential market for the updated Powerhouse system is 7 million U.S. homes a year, and if it can capture 1 percent of the addressable market through sales to roofers and homebuilders, the business could see $1 billion in sales.

Kendallville, Ind.-based CLC was ready to manufacture Powerhouse 2.0 until Dow unexpectedly pulled the plug. The business is ramping up for production again and has a KraussMaffei MX 2300 and MX 3200 on order with delivery due in the fourth quarter.

"Other significant capital plans are in the works to support Powerhouse production," CLC General Manager Stephen Geist told *Plastics News*. "I don't have details yet to share. We are still exploring some options. We will certainly be doing some shopping at NPE."

Production could begin in the third quarter if RGS gets UL certification beyond the resin for the entire system, which consists of a base assembly and electrical connector into which a solar laminate is inserted.

A third partner, Risen Energy Co. Ltd. in Shenzhen, China, a Tier 1 solar cell and module maker, will supply the solar laminate, connectors and wire harnesses. The first two versions of Powerhouse used copper indium gallium selenide (CIGS) technology, but Dow developed the third iteration with traditional silicon solar cells to lower costs.

Dow holds numerous patents covering the technology and exclusively licensed them to RGS for a total of $3 million plus quarterly royalties of 2.5 percent of the net sale price of each licensed product.

"With its advanced, patented intellectual property and lower manufacturing costs than prior generations, Powerhouse 3.0 will be a major market differentiator for RGS, creating favorable high competitive barriers to entry that we've never enjoyed with our traditional solar business," RGS Energy CEO Dennis Lacey said in a news release last month.

Affordable adaptation

General Polymers was tasked with reformulating Dow's original resin on an economic scale. The company was started in 2016 to serve thermoplastic suppliers and small- to medium-sized users needing support for engineered resins. RGS Energy is their first solar customer.

For its solar client, General Polymers created a value stream map of the material that Dow had developed for Powerhouse's built-in roof base plate, system housing and the end caps that meet up with asphalt shingles.

"We looked at the inputs to what Dow had certified for this product, and with our supply chain we looked at how we could reduce material costs while meeting the specifications outlined by Dow and approved through UL," Tom Pilette, managing partner for General Polymers, said in a phone interview.

With a focus on performance at a lower cost, potential supply partners were evaluated in terms of their experience, location, capacity and commitment to the product.

"In this case, we did that with multiple partners because it's a compounded material," Pilette said of the base structure, which is a blend of glass, propylene and an olefinic component; thermal and UV stabilizers; and flame-resistant additives that meet or exceed UL requirements for residential uses.

Without altering the material, General Polymers officials said it worked with its supply partners to look at all cost drivers and reduce them.

"You're taking something that existed and improving it to the point that the program is much more marketable and feasible on the mass scale of production," Mike Kirtley, a co-founder of the business, said in a phone

interview. *"There were some hurdles. A good idea on the technical side doesn't always translate into a product that can be a profitable juncture in the real world. We helped them bring those costs down to make it very competitive and affordable."*

The other big change occurred with the partner in China and the photovoltaic laminate, which RGS says increases solar production at a lower manufacturing cost and will make the consumer price-competitive against the likes of CertainTeed, Suntegra and Tesla.

"The energy conversion and the cost of components are all going in the right direction to make this a value solution, which is why RGS Powerhouse 3.0 can now be considered for asphalt roof replacement customers," Pilette said.

RGS estimates that about 80 percent of U.S. homes have asphalt roofs and some 5 million need to be replaced every year.

Getting to market

CLC was about to manufacture solar shingle parts for Powerhouse 2.0 when the program was abruptly halted in August 2016, after Midland, Mich.-based Dow took ownership of Dow Corning Corp. In that process, the solar platform was re-evaluated and changed to a licensing business model.

"That put us in the driver's seat when RGS decided to pick up where they left off," CLC's Geist said. "We are very familiar with the design, molds, materials, assembly and overall requirements, so naturally we were poised to help them resurrect the supply chain and get things going again."

Geist thinks CLC offers two other advantages in making the product affordable.

"We have the ability not only to mold the parts in the Midwest, a great geographical location to service the solar roofing market on both sides of the country, but also to integrate all of the other components required for a successful installation into one package and deliver it directly to RGS customers," Geist said. "This reduces lead times and eliminates the need for additional transportation, warehousing and distribution costs."

While the partners prepare for the product launch, RGS Energy is trying to raise more money to commercialize the Powerhouse 3.0 system. In early April, the company entered agreements with institutional investors for up to a $10 million offering of convertible notes.

"We, of course, recognize it will take several years to enjoy a desirable share of the addressable market for Powerhouse; however, the more capital we have, the faster we can pursue market share," Lacey said.

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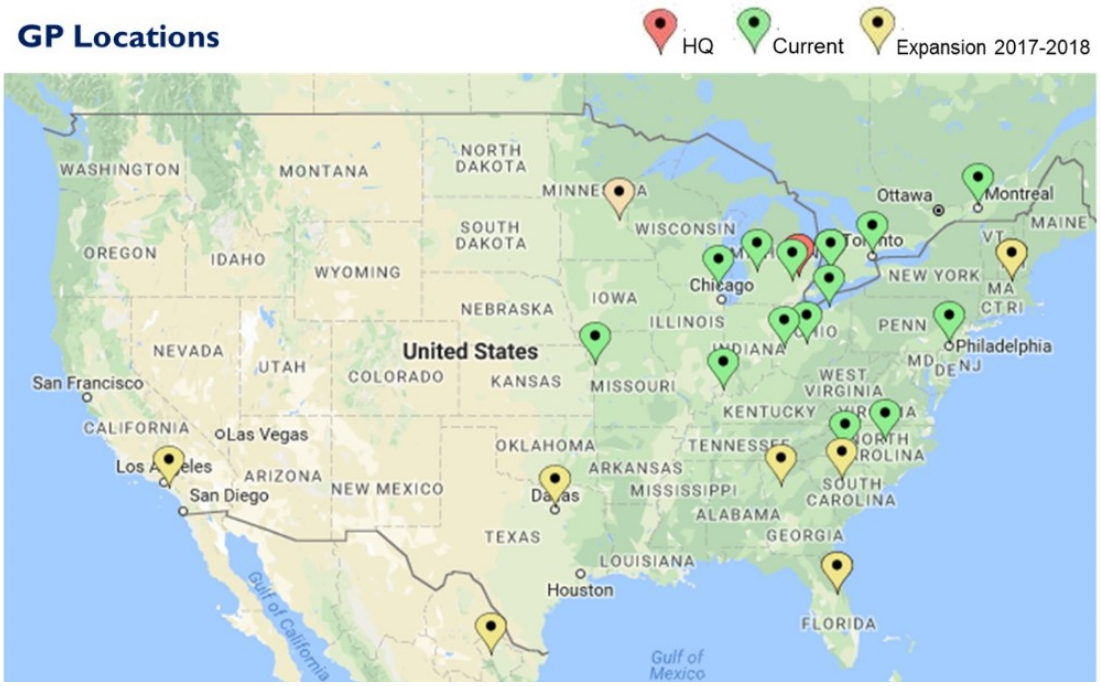

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