In an unassuming industrial park on the outskirts of Charlotte, a paradigm shift is taking place behind high walls of corrugated steel. Manufacturing firm Livingston & Haven is finding ways to make solar power more portable — and more widely usable — than ever before. The firm’s new off-grid solar products include a solar battery charger with soft, foldable panels that can power a laptop computer for eight hours; a solar-powered water purifier suitable for use in disaster relief settings; and a trailer-mounted solar array that can power villages of up to 100 people in the developing world.

For a company that didn’t sell a single solar-powered product only two years ago, those are some big changes. Many U.S. manufacturers have been forced to diversify and revamp their business models since the economic downturn of 2008. And L&H is no exception.

“What was profitable before the Great Recession isn’t profitable anymore,” says Phil Mintz, associate director of NC State’s Industrial Extension Service or IES.

“We still import a lot of mass-produced commodities, and American companies can’t make a profit selling those products, so growth in manufacturing is mainly taking place among niche products — things that aren’t so easy to mass-produce,” Mintz says. “Our buying habits have changed. We don’t want the thing that’s mass-produced and unsophisticated. Now we want things that are innovative, that tie into how we feel and who we are.”

Researchers at L&H’s Genesis Group responded to the new economic landscape by trying to find ways to commercialize a portable solar design brought to them by an inventor. However, they soon learned that they were more comfortable running an established business than developing new products. No one had ever taught them how to innovate.

That’s where IES lent a timely hand. The organization provides coaching and training in knowledge areas including process optimization and industrial engineering for manufacturers and other firms across North Carolina. IES helps companies reduce costs, improve efficiency and increase profits, and its work has borne impressive fruit. Since 2000, the organization has helped companies create or save 14,500 jobs in North Carolina, and the total economic impact of its work is pegged at $2.3 billion across the state.

In June 2012, IES conducted a three-day Innovation Engineering Institute. Members of the Genesis Group attended the conference, hoping to learn more about how to innovate. They got more than they bargained for.

“Right after the first break on the first day, the Genesis guys all sat down together with coffee and said, ‘We’ve been doing everything wrong,’” recalls Will Wood, an engineer with L&H.

“Going to that Innovation Engineering conference was like suddenly seeing someone with a flashlight when you’ve been wandering around in the dark,” says Shane Marshall, L&H’s general manager of research and business models since the economic downturn of 2008. And L&H is no exception.
development. “We used to always struggle with managing innovation. How do you innovate? It turns out that there is a process for it. You can put the greatest minds together in a group and ask them to innovate, but if they don’t have a good process, it won’t work.”

After the conference, the Genesis Group began participating in the Innovation Engineering program in January 2013. Over the year, the group received weekly coaching visits from Kevin Grayson, manager of business growth and innovation services for IES. At each visit, Grayson sat with the group and helped them move through the five main steps of the Innovation Engineering process: brainstorming ideas, defining each idea, discovering obstacles to the idea, developing a physical prototype and delivering a product to the customer.

The first three steps of the Innovation Engineering process are recorded on a special yellow card that has predefined blanks for the components of each step.

“The yellow card itself is actually the cheapest form of prototype there is,” Marshall says. “You look at all the objections to an idea, and either you defeat the objections or they defeat you. An idea is not an idea if you can’t fill out that card. The cards decrease risk and increase speed. We always say, ‘Fail fast, fail cheap.’”

Wood agrees. “One of the great things about innovation engineering is how marketing-focused it is. When you start making stuff, right away you also have to think about how you pitch it, how you sell it. Marketing is a part of design.”

L&H currently has four products in its GoSol Power line, with online distributors using sales channels including Amazon and eBay Stores. The GoSol products generate massive interest at trade shows and conferences. The firm currently is negotiating with a government agency regarding sales of the trailer-mounted solar array.

Ideas in the hopper for future GoSol products include microgrid appliances that would provide stand-alone, off-grid solar power to an isolated community or small town.

“It’s only 20 years, most developing countries won’t supply all their power through a single large grid. They’ll have several microgrids,” Wood says. “Solar would be perfect for that. We could sell thousands of those.”

It’s safe to say the future looks bright for L&H and its GoSol product line. As they continue to innovate, they’ll keep using the innovation engineering principles they learned from IES to help them thrive in the new manufacturing economy of today.

“It’s innovation engineering is really helpful for companies that don’t want to get stuck making commodities that can only compete on price,” Grayson says. “Instead of racing to the bottom, innovation engineering allows you to succeed by starting a new product, creating a new curve. That’s the future of manufacturing.”

IES receives a portion of its annual funding in the form of a grant administered through the North Carolina Manufacturing Extension Partnership, the state affiliate of a federal program that provides resources to support profitable growth for smaller manufacturers.