

Solar-powered light bulb is one Denver inventor's brilliant idea

By Jason Blevins, *The Denver Post*

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Colorado native Stephen Katsaros wants his bulb to brighten up places without electricity. (Leah Millis, The Denver Post)

When he was 7, Stephen Katsaros took apart the box fan in his bedroom and reassembled it using a bigger, stronger motor.

"It sounded like a B-52, but I was cool," says the Denver inventor. "I was always breaking stuff open and never really fixing it."

Three decades later, the perpetual tinkerer snaps apart his latest invention: the world's first solar light bulb.

In his spartan Capitol Hill office, Katsaros explains how Nokero, the affordable, durable, sun-fueled light, can help the 1.6 billion people worldwide without electricity and wean them from burning dangerous kerosene lamps.

"You know how much money we could save on kerosene?" says James Marshall, a Liberian living in Parker who will soon be distributing Nokero bulbs in his homeland, where there is no network for electrical distribution.

"We are so in need of light. Most people use candlelight or kerosene," says Marshall, whose company, Africana SunPower, hopes to introduce solar power to West Africa. "This product takes us out of darkness. With light we could study, we could cook. It will change people's lives. And it's affordable."

Already Nokero bulbs are trickling into 33 countries, where tens of millions live without electricity. Bought in bulk, the bulbs cost about \$6 each. Retail, they run about \$15.

"We are running a very, very lean operation to keep retail costs low enough so the 1.2 billion people who live on \$2 a day can afford the light," Katsaros says. "So every penny matters."

At the China factory poised to make 600,000 to 1.2 million bulbs a month, the rain-proof lights are made with impact-resistant plastic and special computer chips to prolong battery life. Four solar panels charge the light, and they should last five years, providing up to four hours of light on a single charge.

A quarter of the world still burns fuel for light. Those burning lamps emit about 190 million tons of carbon dioxide into the atmosphere every year, the equivalent of emissions from 30 million cars or 1.3 million barrels of oil a day, according to an April report for the United Nations Framework Convention on Climate Change. Kerosene burners spend 5 percent of their yearly income on fuel that provides inefficient light while creating burn and fire risks and significant indoor air pollution.

"With a combination of new technologies and appropriate market-delivery solutions, this situation can be reversed to a profound degree," reads the U.N. report "From Carbon to Light."

Katsaros is sure his solar bulb can be part of the answer. The Nokero bulb was born in January as Katsaros, a Denver native and father of two, pondered his next invention.

Pathway of projects

His story includes dozens of new gizmos. At high school ski races while attending Vail Mountain School, Katsaros sold special tools for tuning skis. While studying mechanical engineering at Purdue University, he won awards for his strapped- to-the-ceiling bike-storage system. He developed the first risers for ski bindings, which lifted boots higher off the ski and increased carving leverage.

Westinghouse bought a track-lighting system he designed. He designed a fog-killing fan that fits in most goggles, called the Haber Eliminator.

He spent five years designing RevoPower, a motorized bike wheel that works on any bike and delivers 20 mph speeds and 200 miles per gallon.

Everything he's done, he says, led to the solar-powered light bulb.

"Everything just clicked with this project," he says, noting the rarity of moving an idea into reality and actual production in a matter of months.

As soon as he saw the first molds of the bulb coming out of the factory, Katsaros, 37, quit the legal firm where he worked as a patent agent and devoted himself full-time to Nokero.

His plan is to target countries such as India, Indonesia, Nigeria and Pakistan, where hundreds of millions rely on expensive, carbon-spewing gas lamps but income is high enough to afford a \$15 lamp. Demand is higher in places such as Ethiopia, but the population is too poor to afford the lamp, Katsaros says.

"This is not a charity," he says. "We are using capitalism as a method to improve people's lives."

Marketing strategies

That revenue-generating model is a pillar in the emerging field of social entrepreneurship, which focuses on social and environmental impacts while building a business model that can grow and sustain itself.

Giving away helpful products such as solar light bulbs or highly-efficient cookstoves — like those sold in India by Fort Collins-based Envirofit International — can bankrupt an enterprise as well as alienate those who receive the charity.

"Treating poor people as customers rather than charity cases offers several advantages," says Paul Hudnut, the co-founder of Envirofit, who teaches an entrepreneurship class at Colorado State University's School of Business.

Asking poor customers what they want and meeting that demand with a profitable plan that keeps the manufacturers, distributors and customers contented is a big component of social entrepreneurship, says Hudnut, who has sold tens of thousands of clean-burning cookstoves through more than 500 shops in India.

"We are selling and learning from people who buy it so we can improve it," Hudnut says. "We don't believe it's immoral to make money selling products to the poor. To grow, you have to make it work commercially."