GARY CAMPBELL

David Irvine-Halliday

Founder, Light Up the World

Nestled among silkwood and jacaranda trees in south-central Sri Lanka, three kilometres from the closest road, is the tiny village of Endagalaya. On this day, the 30-odd families that make up its citizenry are holding a community meeting in the neatly swept forecourt of the leader's mud-walled hut. The six chairs are a luxury; power and telephone lines are as foreign as snow here. Decorum and standard rules govern the meeting: minutes are read, motions are made, and new business is discussed. Topping the new business today is the fact that some "honourable" members have not been paying a recently imposed 25-rupee (35-cent) monthly fee.

Endagalaya collects the fee to maintain a revolutionary low-cost lighting system invented by David Irvine-Halliday, an electrical engineer from the University of Calgary. The system, which enables each household to have two lamps bright enough to read by, consumes less electricity than is needed to light a single conventional 100-watt light bulb. Affordable for those with annual incomes as low as $200 (U.S.), the system is powered with batteries that are recharged by a central solar panel and will be effective for about 20 years.

It was in 1997, while he was in Nepal helping to launch an electrical engineering program at the Tribhuvan University in Kathmandu, that Irvine-Halliday first thought of helping to bring light to rural communities in developing countries. "I had some spare time after my work finished, so I took a few days to trek the Annapurna circuit," the Scottish-born professor recalls. "Passing a village on the way back, I heard some children singing at a school,

so I poked my head in the window. It was so dark in there. How could they see? My whole life changed in a second, literally. For some reason, the idea of solid state lighting came instantly to mind.

"I came back to Canada to see if I could make white LED [light-emitting diode] light," says Irvine-Halliday. Tiny light bulbs that don't have a filament and therefore won't burn out, LEDs are the coloured lights that form, for example, the digital numbers on a clock radio or stove.

"I tried putting together and varying the intensity of diodes emitting the three primary colours to make white, but had no success generating a bright enough light," Irvine-Halliday explains. "Frustrated, I was browsing the Internet one day and discovered that a Japanese company had just perfected a technique." He called the company's representative and explained what he wanted to do. The company, Nichia, sent him a few dozen 0.1-watt white LEDs. When he saw how such a tiny light could illuminate a sheet of paper in the dark, he exclaimed, "Good Lord, a child could read by the light from a single diode."

Elated, Irvine-Halliday set out to build his first white LED system. The criteria were that it had to be self-powered and inexpensive – only 200,000 of Nepal's 3.4 million households have reliable power, and annual household incomes average less than $200 (U.S.). "Pico energy on a pico budget" became his motto. Readily rechargeable batteries proved the ideal power supply, and Irvine-Halliday devised simple rechargers that utilized pedal generators, hydro generators and solar panels. In 1999, he returned to Nepal with his wife, Jenny, and gave demonstrations of the system in several villages. With their amazing ruggedness and reliability, focused light beam and long life, the lights proved an immediate hit, and Light Up the World was born.

Irvine-Halliday says the cost of installing the system is now less than $40 (U.S.) per home. "The average family in Tibet spends that on candles every year," he explains.

"It's a quantum leap," says Lalith Senseviratne, an engineering consultant based in Colombo who assisted Irvine-Halliday in setting up the system and serves as a Sri Lankan-based liaison. "Households can buy a lighting system the way they finance a bicycle now – they're about the same price."

The ability to buy one's own system is of paramount importance. Self-financing has been a cornerstone of Light Up the World. "You can donate for a wee while, but you soon run out of money," Irvine-Halliday explains. "We use donations to light up the first few villages, get a good feel for the country and the people, and then go to the second step – establishing locally owned and operated companies." Irvine-Halliday personally founded and financed the first such power company, Pico Power Nepal. Nascent companies are also developing in Sri Lanka, India and Tibet.

The arrangement works well. "We provide the local companies with the technology, advice and parts, including low-cost diodes, for which we have negotiated a special deal with the manufacturer, Lumileds," says Irvine-Halliday. The local companies operate as a business but must follow the criteria established by Light Up the World, which ensures that local entrepreneurs don't overcharge. "Our control is through providing diodes," he says. "If any company is making more than a fair profit, we can cut off its supply."

Light Up the World also carries out research. "At the moment," says Irvine-Halliday, "we're working on developing wind-powered turbines, more efficient circuitry for the lamps and supercapacitors as a replacement for batteries. But," he emphasizes, "not all the ideas and improvements come from us. Our partners worldwide teach us more than a thing or two."

Irvine-Halliday continues to think of innovative ways to help the world. On a visit to Nepal last August, he asked villagers how long their conventional D-cell flashlight batteries lasted. "The average was two weeks, then they were thrown away," he says. "A back-of-the-envelope calculation told me that meant more than 300 million batteries a year were being thrown away in Nepal alone. And then there were the bulbs. It was a huge waste." So, as a pilot project, Irvine-Halliday donated a solar panel with a D-cell charger and six LED flashlights to a couple of families. Pico Power Nepal has now added LED flashlights to its line.

In Sri Lanka, a light supplied through Light Up the World enables a brother and sister to read after dark.

Irvine-Halliday's drive to better the lives of millions of people in the developing world has earned him several honours. At a ceremony in Tokyo late last year, he was given the prestigious Rolex Award for Enterprise, and following the award, both National Geographic and the Discovery Channel presented documentaries on the Canadian engineer's work. The result has been a flurry of inquiries from countries in Asia, South America and Africa. "There is hardly a country that hasn't approached us," says the University of Calgary professor. Today, more than 1,400 homes around the world have electrical light thanks to Irvine-Halliday. And it's only the beginning. – *Graham Chandler*

COURTESY OF DAVID IRVINE-HALLIDAY