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Bright Lights

aplenty appear in this month's edition, among them Dr. Dave Irvine-Halliday, P.Eng., founder of Light Up The World

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Charity Keeps Spreading Light To the World's Darkest Corners

As Albertans illuminate the holiday season by stringing millions of sparkling lights around their homes, yards and offices, it's hard to imagine life without electricity. Places where children do their homework by the light of candles or kerosene lanterns. Where women give birth at night by the light of a flashlight — or with no light at all. But for an estimated 1.4 billion people in some of the world's poorest and most remote communities, that's the simple reality. And it's in many of those places you'll find that Light Up The World continues working to change lives

BY **CORINNE LUTTER**
Member & Internal Communications Coordinator

Since it was founded in 1997, a Calgary-based non-profit organization has been using innovative technology to bring sustainable energy to those living off the grid in some of the world's poorest and most remote locales. Thanks to Light Up The World (LUTW), solar systems are installed in far-flung homes, providing basic electricity for LED lights, radios and cell phones, and at the same time allowing the replacement of expensive, dangerous and inefficient energy sources like kerosene and candles. In recent years, larger solar projects have also been undertaken in health clinics, schools, community centres and even community fish farms.

To date, a small team of committed LUTW employees and volunteers has taken 31,000 solar-powered LED lighting systems to 767,000 people in 54 countries. One of the volunteers is Tim Schulhauser, P.Eng., MBA, a mechanical engineer from Calgary who joined LUTW's board of directors in 2011. He was interested in the organization's work both professionally and personally.

"It's just crazy to me that there are still more than a billion people in the world without access to electricity," says Mr. Schulhauser, who works in the solar energy industry. "Light Up The World is a hidden gem in Calgary. A lot of people don't know about it, but it's been here for a long time and has made a real impact on improving people's lives around the globe."

Mr. Schulhauser started out doing community presentations for LUTW, getting the word out about the organization's projects in countries like Guatemala, Costa Rica, Ecuador and Papua New Guinea. But it was during a trip to Peru last May that he really saw the light — quite literally — learning first-hand the impact that solar technology can have in remote communities.

He travelled to Nueva York, a small town of about 800 people located in the Amazon Basin. It's only route in is a river. Residents make a living by fishing, and through small-scale agriculture and temporary work in the nearby city of Iquitos. The only electricity in Nueva York is provided by diesel generators that run — most nights — for up to three hours. In 2011, a new education centre was built there, complete with a modern computer classroom. The only catch: the community couldn't afford the cost of fuel to run the school's generator, so the computer room sat empty.

Until May, that is.

That's when LUTW, which has a field office in Peru and two local staff members, helped coordinate the installation of a 1.1-kilowatt solar photovoltaic system on the school's roof — more than enough juice to power the computers and other small electronic devices in the building for six hours every day.

The project was funded in part by Mr. Schulhauser's solar design-build company, SkyFire Energy, which customized a six-panel system for the school based on the local solar radiation.

What makes this and all LUTW projects truly sustainable — aside from the use of solar energy — is the buy-in from the local communities, which are key partners in the projects.

Before any work begins, the community is consulted extensively about its energy needs, keeping in mind social and cultural considerations. And while projects

LIGHT IT UP
Solar technicians in Guatemala check a multimeter to see how much power a LED light is using, during a project of Light Up The World in 2012.
-photo courtesy Light Up The World

may be subsidized by donors, beneficiaries must also invest in the project. They either pay for the technology up front or over the course of several months. In Costa Rica, for example, most families pay for systems over six to 18 months. Payments usually work out to about the same as what they used to pay for kerosene or candles. In Peru, families often sell livestock — two sheep or two alpacas — to pay for the technology. Another approach, in the Solomon Islands, was a barter exchange — crops for solar systems.

"When people value something and feel a sense ownership, they are more likely to treat it with care," notes Tara Collins, LUTW's director of fund development. "For this reason, LUTW does not donate systems to families. Communities contribute financially and by supplying local materials for the installations. They also provide assistance to our technical teams by getting their hands dirty while installing solar systems, hosting project staff, and participating in community meetings related to projects."

Locals are given the practical skills necessary to install, maintain, troubleshoot and repair the systems, which can last for decades if properly cared for. Giving a community the tools to independently maintain a system is critical.

"We don't just go into the community, install the technology and leave," Mr. Schulhauser emphasizes. "It has to be sustainable, so education is a huge part of it, making sure there are local technicians who understand the systems, who can do maintenance or replacement."

In Nueva York, 12 local technicians actually installed the whole system after LUTW staff and volunteers spent a couple days training them in electrical and solar theory. "It was pretty much all new to them," Mr. Schulhauser says. "We would go through the theory and then do a practical example, and everyone seemed to pick it up very fast. They were very interested and asking questions all the time. Everyone was so eager to learn."

The consequences of not training local people in the use and maintenance of new technology were made apparent to Mr. Schulhauser on his trip. Another organization had previously installed two wells in Nueva York for clean drinking water, but residents didn't use them. "They walked by them on their way to get water from the river."

That's why follow-up visits are also an important part of LUTW's mandate. In Nueva York, for example, staff returned to the town in September to assess how the system was working and to do some follow-up training. A community forum was also held to discuss system use and local responsibilities for long-term maintenance.

"Installing a solar photovoltaic system in a village can take a few days, but laying the socio-economic foundation necessary to sustain the use of the technology can take many months, even years," says Ms. Collins. "The project process that LUTW follows has been refined over the years, building on lessons from successful and unsuccessful projects."

WHERE AND HOW IT BEGAN

It's a long way from the rainforests of Peru to the mountains of Nepal, where the initial spark for Light Up The World was ignited back in 1997.

Dave Irvine-Halliday, P.Eng., a retired electrical engineering professor with the University of Calgary's Schulich School of Engineering, was on sabbatical in Kathmandu, helping the local university develop an electrical engineering degree program, when his flight

home was delayed. A lifelong mountaineer, Dr. Irvine-Halliday ended up trekking for three weeks though the remote Annapurna mountain range. Most rural villagers there have little or no access to basic services like safe drinking water, sanitation — or electricity.

Along the way, people welcomed him into their tiny stone and mud homes for tea. The only lighting inside was from resin-soaked twigs or kerosene lamps, which gave off toxic fumes. At a local school, he saw children studying by flickering candlelight.

The images stuck in his mind.

He realized there was a great need for simple, inexpensive and rugged off-grid lighting. Having spent 20 years of his career in Scotland, Australia and Canada developing LED technology — among other research areas — he felt it might be a possible solution.

"While trekking in Nepal I received a gift — the idea that LEDs might be a feasible solution to bringing affordable lighting to the developing world," says Dr. Irvine-Halliday — or Dr. Dave, as the LUTW founder likes to be called. "After thinking about it over a few more days of trekking, I came to believe that this gift also came with a responsibility, and that was for me to see this idea through to its final conclusion."

Back in Canada, Dr. Irvine-Halliday set to work. At the time, LEDs were only used as indicator lights on things like stereos and VCRs. He spent two years — using his own money — trying to develop white light from coloured indicator LEDs, but he wasn't able to produce a light bright enough to be useful. A breakthrough came when he learned that a Japanese company, Nichia, had invented the white LED technology he sought.

He immediately ordered samples, and after they arrived came to a critical realization: a child could read with the light of a single, 0.1-watt LED.

Soon after Dr. Irvine-Halliday, with his wife, Jenny, and their son Gregor, travelled to Nepal with prototype LED lamps. The electricity for those first models was produced from pedal-powered generators. Thirty minutes or less of slow pedaling was enough to light six to eight homes for about five hours a night. After his house was lit for the first time, one villager exclaimed, "A foreigner has come and made Thulo Pokhara heaven!"

"There is one thing that will never change and it is the truly wonderful feeling you have when you see the look on the faces of a family that has just had its home lit for the first time, because you know that their lives have just changed for the better, forever, and it has also changed yours as well," says Dr. Irvine-Halliday.

Indeed, successful pilot projects in two Nepalese villages changed the direction of his own career and life, inspiring the Irvine-Halliday family to form Light Up The World, which was officially incorporated as a charity in 2002.

"LUTW started off as a family project whose original goal was for children, especially girls, to have light to study and read with, since education is everything," says Dr. Irvine-Halliday. "Once we began to appreciate the truly profound, positive impact that LED lighting was having on the developing world, we set our sights on helping to bring the gift of light to millions of homes around the world."

Education, of course, isn't the only benefit of the solar LED lights.

"Lighting does more than light up a room and allow a child to read; it illuminates a path out of poverty and so much more," says Dr. Irvine-Halliday.

When people are no longer exposed to the danger of accidental fire and the harmful fumes of their kerosene lamps, health risks are greatly reduced. And once the solar systems are paid off, homeowners no longer have to spend a high portion of their monthly incomes — in some cases 30 to 40 per cent — on inefficient lighting. Families have more disposable income to spend on other priorities such as school fees, health care or starting a small business. Lives are transformed.

For the Irvine-Hallidays, that's all they'd hoped for.

"Jenny and I only conceived and gave birth to LUTW. It's the many passionate, talented and committed people who have given their time so selflessly this past decade and more who are the real heroes," says Dr. Irvine-Halliday. "Like parents who see their child

PHOTO BOMBED

Tim Schulhauser, P.Eng., left, along with LUTW colleague Jacob Fountain, get solar training equipment ready for class by making sure batteries are charged — via solar panels, of course. The rooster's name is not known.

-photo courtesy Light Up The World

SIDEBAR

RENEWABLE ENERGY ECONOMICS

Macario Matias Jeronimo and his wife, Santo Ramirez Mendoza, live in Guatemala with their five children. Before purchasing a solar lighting system from Light Up The World, they spent 90 quetzals a month — about $12 Canadian — to light their home with kerosene and charge their cell phone. Their investment in solar power will save them on energy costs and provide the family with a renewable, non-toxic source of power. Two of their children, who used to walk to a nearby street light each night to do their homework, can now study at home.

SHEDDING SOME LIGHT ON LOGISTICS

It took about three months for the solar energy system designed by SkyFire Energy to arrive in Nueva York in the Amazon Basin. Much of the equipment was ordered from the United States and shipped via freighter from Florida to South America, through the Panama Canal and south to Lima, Peru. From there it was combined with other equipment in Lima and sent on another freighter to a port city on the Amazon River, where it travelled by boat to Iquitos, the largest city in the world accessible only by water. From Iquitos, the equipment travelled a short distance by road to another small town, where it was loaded on a small boat and sent up river about 100 kilometres to Nueva York.

ONE FAMILY AT A TIME
Macario Matias Jeronimo, his wife, Santo Ramirez Mendoza, and three of their children stand outside their home in Guatemala. The family had a five-watt solar system installed in their home, saving them on energy costs and allowing the children to study at night.
-photo courtesy Light Up The World

go off into the great big world and do well, you have to feel more than a wee bit proud of them."

Today, the Irvine-Hallidays remain committed to LUTW's mission as volunteers and advocates, and they've also begun a new venture in India. It's a social enterprise company called Visionary Lighting & Energy India, and it designs, develops and manufactures cost-effective renewable energy lighting systems for the developing world. *See related story, next page.*

PUTTING THINGS INTO PERSPECTIVE

For Tim Schulhauser, the opportunity to support LUTW, both as a board member and on the ground in Peru, has been immensely fulfilling and eye-opening.

"It's rewarding giving back. We're so lucky here and we take so many things for granted. When I was in Peru, it just gave me such great perspective on my own life and reminded me how lucky I am. It reminded me why I'm volunteering my time on the board," he says.

LUTW is always looking to engage people in upcoming projects. Volunteers are currently being recruited to help with solar home installations in Peru and project evaluations in Costa Rica. Training is provided for both projects, which will be undertaken in May.

Employers can also get involved. Some companies and APEGA permit holders like ConocoPhillips and, through its energy4everyone Foundation, Enbridge, have provided financial support to LUTW. They also encourage staff to get involved as volunteers.

"APEGA members can make a direct and significant impact on people living in remote and underserved communities by supporting our work and coming out to volunteer on a project," says Tara Collins.

It's about making a change, one light emitting diode at a time.

"We're not going to get light to one billion people tomorrow, but it's one step at a time and one family at a time," says Mr. Schulhauser.

SURFABLES

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Rookie Businessman Sets Up Shop in India To Forward His Vision Of a Better-Lit World

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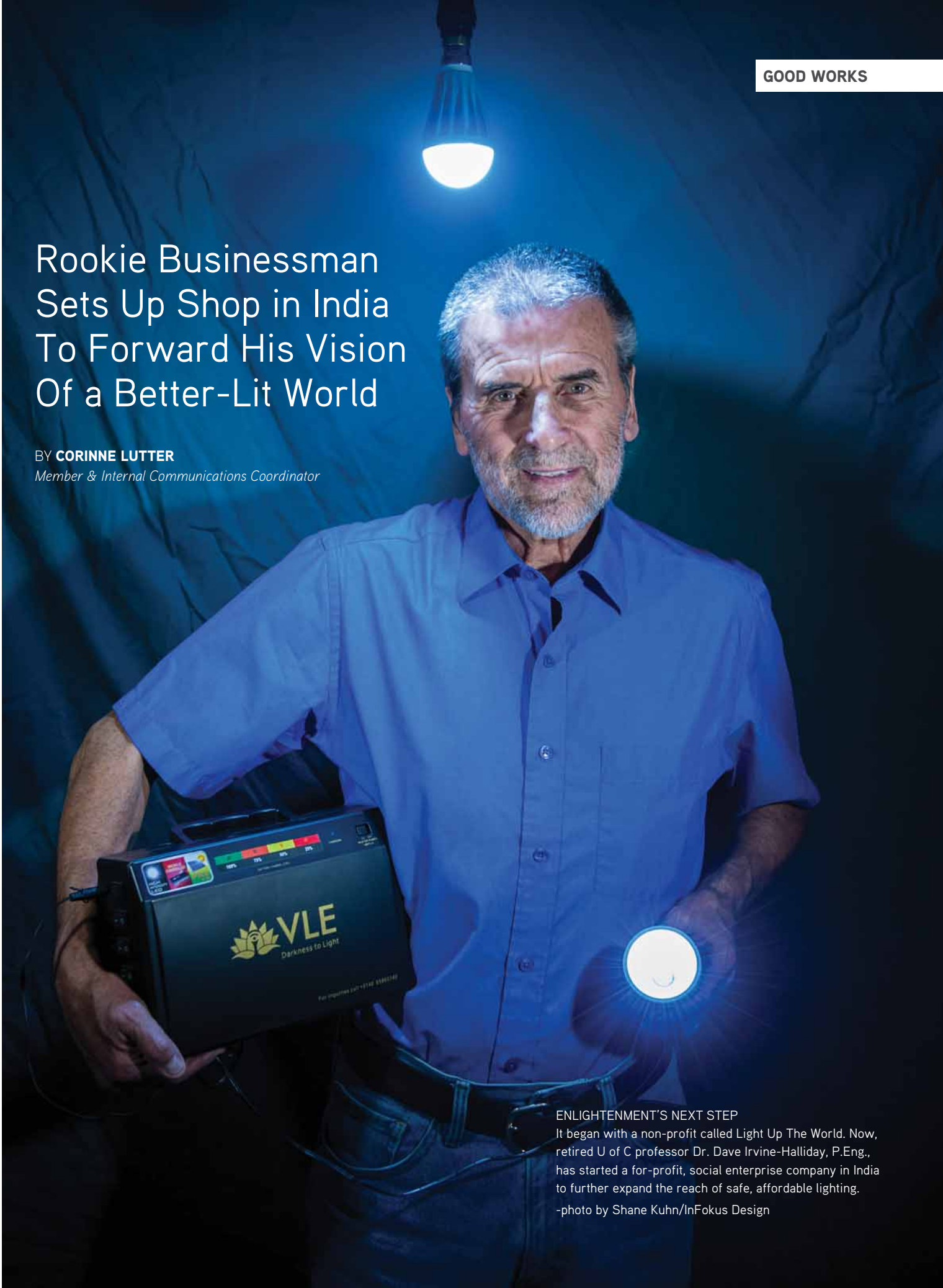

ENLIGHTENMENT'S NEXT STEP
It began with a non-profit called Light Up The World. Now, retired U of C professor Dr. Dave Irvine-Halliday, P.Eng., has started a for-profit, social enterprise company in India to further expand the reach of safe, affordable lighting.
-photo by Shane Kuhn/InFokus Design

A retired electrical engineering professor, Dr. Dave Irvine-Halliday, P.Eng., never expected to become a rookie businessman at the age of 67. But there he was, starting up a social enterprise company halfway around the world in Hyderabad, India. He also never imagined corporate espionage would be one of the hurdles he would have to overcome to make his dream a reality.

In 2006, Dr. Irvine-Halliday and his wife, Jenny, had a vision — to develop a more reliable, efficient, brighter and affordable LED lighting system for Light Up The World, the Calgary-based non-profit charity they had formed years earlier with the goal of bringing sustainable energy to the developing world.

So the Calgary couple set about building a for-profit social enterprise company — Visionary Lighting & Energy, or VLE for short. Three years later Dr. Irvine-Halliday was journeying east to set up a design and manufacturing facility in India, where more than 400 million people don't have access to electricity.

"If I was going to design an LED lighting system for the developing world, then it just made so much sense to move to India to be physically immersed in that environment, so that I would be an insider looking out, instead of an outsider looking in — and hopefully our products would be exactly what the people truly needed," explains Dr. Irvine-Halliday.

It also helped that he has many talented friends living in India, who support his ideals and were happy to partner with him on product development, and with navigating the country's complex business environment.

"Establishing a company in India can be daunting in many ways, with the many levels of bureaucracy and the excessive time it can take to get even simple things done. It is also an unfortunate fact of life that corruption is relatively widespread, so one must always be on the lookout for it," he says. "However, it is so much easier when you have local people on your team who know what to do and what not to do."

It also made sense to move to a for-profit market model, in order to bring lighting to the maximum number of homes, in the least time and at the lowest possible cost.

"The number of potential customers is so great — astronomical, in fact," says Dr. Irvine-Halliday. "One quarter of humanity is presently without electric lighting, so there's still a great deal of work to be done."

Dr. Irvine-Halliday taught electrical engineering at the University of Calgary for 28 years before retiring in 2011 to focus on VLE. For the past five years, he's spent about two-thirds of his time living in India, getting VLE off the ground. While the company's vision is similar to Light Up The World — to provide safe, healthy, affordable and appropriate lighting to people living off grid — its approach is very different. As a for-profit organization, it must make a fair profit to be sustainable, pay its bills and continue developing new products. But the focus still remains one key concept: people first.

"Our definition of a social enterprise is one that focuses more on how one's products are going to positively impact society over the long term, rather than focusing on maximizing profit every quarter," explains Dr. Irvine-Halliday. "We are essentially a bottom-up company whose role is to provide services to the Base of the Pyramid — the world's poorest people — and we believe that this is how we can have the greatest positive societal impact."

LIGHT TALK
Dr. Dave Irvine-Halliday, P.Eng., left, with the help of business partner and translator Sridhar Ponugupati, talks to villagers in Pairwara, in the state of Madhya Pradesh, India, about VLE's Freedom lighting systems.
-photo courtesy Dr. Dave Irvine-Halliday, P.Eng.

DESIGNS AND DAGGERS

One of the first products VLE has developed is the patent-pending Freedom Lantern, which the company expects to introduce in early 2014. A highly efficient, solar LED lantern, it is designed to work equally well both vertically and horizontally. It has a variety of beam patterns, it is waterproof, it floats and it even charges mobile phones. As far as the company is aware, there's nothing else like it on the market. The goal is to sell it for around $40.

"The Freedom name is important since it has many positive connotations, including freedom from poverty, freedom to be educated and freedom from the dark," says Dr. Irvine-Halliday.

VLE has also developed two different types of Freedom Light Systems, which are affordable solar lighting systems designed to light both large and small spaces. One system has been designed for the global market. The other was designed for the Government of India, and its users can apply for subsidies and loans to help pay for the technology.

Also in the works is a UV-LED water treatment system, and a solar-pumping and drip feeding irrigation system, which would allow families to increase the amount and quality of food they can grow.

Dr. Irvine-Halliday says VLE lighting systems are being sold not only in India, but in the Caribbean, South America, Australia and Africa. The company has been building relationships with major distribution companies in India, which recently started selling products through their national networks.

"After our first year it became obvious that we were designing not only for Light Up The World, if they wished to purchase our products, but also for the entire developing world market," he says.

Unfortunately, VLE's early success resulted in a case of corporate espionage by one of the company's own staff members. Earlier this year, the employee stole the Freedom Lantern design, and designs for other new technology in development — then set up two separate companies to sell them.

"What was so disappointing was that he knew VLE is a young company, which has spent years perfecting our product designs, and any copies of our unique designs could have been fatal to VLE's future," says Dr. Irvine-Halliday. "What was probably even more of a dagger in the heart was the fact that I really liked this young fellow and had talked with him at great length over a year and a half, and I honestly thought he understood and bought into VLE's philosophy of doing well by doing good."

Fortunately, the theft was discovered before any major damage was done. He no longer works at VLE, but the company decided to give the young man a second chance and did not press charges against him.

RISING FROM THE POVERTY TRAP

Dealing with corporate espionage certainly didn't put a damper on Dr. Ivine-Halliday's determination to deliver cost-effective lighting to those without. "We truly do plan on illuminating the lives of millions of families and helping to create thousands of jobs," he says. The manufacturing of VLE products will create a number of jobs, but the primary source of job creation will be in the sales and marketing of the products throughout the world.

One of VLE's most important goals is to help the poor get a hand on the first rung of the economic ladder so they can start pulling themselves out of the poverty trap. They can do this by moving from inefficient, dangerous and expensive lighting sources — kerosene, candles or wood — to LED lighting.

VLE and its distribution system partners make this possible by joining forces with micro-credit organizations and rural banks, which enable people to purchase the lighting systems. When the owners are done paying for the systems, usually in 12 to 36 months, the money they used to spend on kerosene and other fuel can be used for things like schooling, better housing, improved diet, medicine or starting up a business.

VLE calls these customers "lightpreneurs." Sustainable lighting is their business and they, in effect, make a profit by saving money on fuel costs.

"Even though their income may be essentially fixed, initially at least, their disposable income effectively increases due to the savings. Therefore, in reality we believe that we have created a true increase in real wealth," says Dr. Irvine-Halliday.

MEMBER HELP SOUGHT

So far, VLE has been financially independent, funded by the Irvine-Halliday family and other supporters. In the future, the company may seek angel investors to optimize growth in order to reach its goals faster. That's where APEGA members may be able to provide assistance.

"Given the vast business knowledge of APEGA members, we would certainly appreciate receiving practical advice regarding the pros and cons of bringing such investors onboard with VLE, keeping in mind that we do not wish to give the company away or find ourselves having to put profit before people," says Dr. Irvine-Halliday.

At 71 years old, he hopes in the near future to start staying closer to home — Calgary — to enjoy more time with Jenny, his wife of 46 years. But that doesn't mean he'll be stepping away from VLE. It just means he'll only be living abroad four months a year instead of eight.

"VLE is a dream and was never just a project. It has become our life and we plan never to retire from it," he says. "It seems to me that all of us have a sort of sacred duty to use whatever talents we have been fortunate enough to receive, to make the world a better place. No man is an island, right?"

That conviction stems back to his youth, growing up in Scotland and studying engineering at Abertay and Aberdeen universities. "Since I was a student, and one from a so-called lower-class Scottish family, I have always believed that the over-developed world should make more of an effort to share its new knowledge with the developing world," says Dr. Irvine-Halliday.

Unfortunately, sharing doesn't always come easily or quickly.

"I do, however, retain my glass half-full attitude and believe that the world, in general, will ultimately become enlightened and see that it is only holistic, people-centered solutions that will make the world a better place for all its citizens," he says.

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