Solar Household Energy, Inc.

Solar Cooking for Human Development and Environmental Relief

2018 Annual Report

Our mission:

Solar Household Energy (SHE) leverages the power of solar cooking to improve social, economic and environmental conditions in sun-rich areas around the world.

A light on our 2018 accomplishments

On the Ground: Empowering Local Solar Cooking Entrepreneurs

Research and Design: Enhancing Solar Cooking Technology and Testing

Education and Advocacy: Enlightening and Connecting people

Three Oaxacan solar cooking ambassadors (Flor, Bibiana, and Eva), selling solar cookers on commission for Lorena Harp's social enterprise, supported by SHE. Photo credit: Lorena Harp

He said, SHE said, You said…

Cover page: Top: Université de Notre Dame d'Haiti UDERS de Hinche "Science Day" participants, with representatives from the University, Solar Cookers International, Solar C³ITIES, Rose Bazile, Solavore, Public Private Alliance Foundation, and SHE. Photo credit: UDERS. Bottom left: Haines solar cooker social enterprise customers marvel at solar cooked dish during training. Photo credit: Lorena Harp. Bottom right: Teacher from The Gambia solar cooking food for his preschool kids. Photo credit: Heather Daniel, The New Hope Project

From the President

Dear friends,

Thanks to you, this past year, women and their families around the world are breathing cleaner air, saving money on fuel, engaging in productive activities as the sun cooks their food, and enjoying a greener environment. Some of them have become environmental leaders in their communities, such as Oaxacan rural women who are earning their living selling solar cookers; or University at Hinche, Haiti staff who are teaching the first University-level solar cooking course. Our projects this year have focused on empowering solar cooker social entrepreneurs in Mexico, Haiti, Kenya and Uganda, with ventures in The Gambia and Puerto Rico. But let us not forget the people from past projects in Chad, Senegal, Mali, El Salvador, Dominican Republic, and elsewhere, who are still benefitting from the high-quality, durable solar cookers they received over the course of SHE's 20-year history.

Last October, the UN Intergovernmental Panel on Climate Change (IPCC) released their landmark report concluding that **we only have 12 years to mitigate climate change catastrophe.** Carbon emissions would have to be reduced by 45% by 2030, and go down to zero by 2050, to stay below a 1.5 ^{0}C increase in global temperature. This would require a **fourfold-increase in carbon fuel costs**, at a minimum.[1] Already, LPG, liquefied petroleum gas, is unaffordable for the three billion people that still burn biomass or coal or their daily cooking and heating needs. Their only solution – our planet's only solution – is to turn to renewable energy technologies, including solar cookers. The ultimate cooking solution may be solar thermal devices with heat storage and/or electric hybridization capabilities. In the meantime, **SHE promotes simple, durable, safe solar cookers that are affordable to those who need them the most, whose distribution can quickly scale through market forces.**

2018 has been a year of many successes, and many challenges as well. With solutions springing from the close collaboration between solar cooks on the ground and SHE's multi-disciplinary team we have made remarkable progress. **With your continued support in 2019 we will ensure that our fledgling social micro-enterprises have the financial and technical support they need to become independent businesses, able to sustain themselves through solar cooker sales and promotion.**

Throughout the years, we at SHE have been honored to get to know people like you who wish to improve the quality of lives and the planet through solar cooking. We hope you will stay – or for new readers, become – actively involved in our solar cooking community, through reaching out to us, with your offers to volunteer, and through your financial contributions. If you are new to the world of solar cooking, we welcome you. If you are a veteran, thank you for your ongoing interest and support.

David Grossman
President of the Board
Solar Household Energy

Mexico: Scaling up Lorena Harp's Haines solar cooker enterprise

SHE first became engaged in promoting solar cooking in Mexico in 2003 after winning a "Development Marketplace" grant from the World Bank. Fifteen years later, 40,000 HotPot™ solar cookers have been disseminated worldwide, thanks to partnerships instigated by SHE. The HotPot, a "panel" design solar oven, was developed by SHE in collaboration with the Mexican Fund for the Conservation of Nature and the Florida Solar Energy Center in 1998. It is more economical than a parabolic oven, and cooks food in a way similar to a Crock-Pot.™

SHE is currently supporting Mexican solar cooking expert Lorena Harp in her dream to bring solar cooking to the rural women of Oaxaca State through a sustainable social enterprise. She is introducing an affordable but durable panel-style solar cooker called the Haines Solar Cooker (HSC). Prior to launch of the initiative, Lorena conducted local market research and optimized the HSC for local consumer preferences. She then trained three rural women to become "solar cooking ambassadors" to sell HSCs for 500 pesos (about $25 USD) on a commission basis (earning 200 pesos, about $10 USD) to members of their communities and provide follow-up support to maximize adoption of this alternative cooking model.

Ambassadors reached their pilot project goal for solar cooker sales in May 2018 by selling more than four dozen units. They surveyed their customers on a monthly basis in 2018 to assess the success not only of the solar cooker, but of the ambassador model for marketing solar cookers, training customers, and ensuring their long-term satisfaction. These findings have served to improve the social enterprise model, and provide more opportunities for ambassadors to thrive, both financially and as environmental leaders in their communities.

Oaxacan solar cooking ambassador Bibiana (2nd woman from right) with members of her community, welcoming visitors from Canada (back) and SHE Board member Margarita Battle (second from right in back). Bibiana has personally sold over 15 Haines solar cookers (right) on commission to members of her community.

These social enterprise customers in rural Oaxaca love to solar cook, both to supplement, and sometimes replace, their gas stove and oven (notice the solar cooker's location)! Photo credit: Lorena Harp for SHE

Lorena Harp, supported by SHE, is gearing up to sell 200 more solar cookers, manufacturing them locally. Thanks to Roger Haines' technical expertise and generous discounted materials for raw materials (metalized polyester foam and polycarbonate) and tools (e.g., eyelet and snap button stamping machines), Lorena Harp has set up shop and manufactured 50 more solar cookers, reducing costs and moving towards social enterprise independence. As sales increase, SHE's subsidies will decrease, allowing the social enterprise to gradually gain financial independence. Read more about it here, see photos of the manufacturing process here and the latest market demonstration here.

Lorena has also been promoting the project at top levels, presenting at the Mexican National Association for Solar Energy, the National network of Women in Renewable Energy and Energy Efficiency, and receiving recognition for her work in the Chamber of Deputies of Oaxaca on International Women's Day. Her work was featured in various news outlets, including an article in "El Universal," a major Mexican paper. Read more about it here.

Lorena Harp (right) and her work promoted through twitter by the Network of Women in Renewable Energies and Energy Efficiency. Photo credit: RED Mujeres EREE

Mexico: Aiding Oaxaca Earthquake Victims

In September 2017, Mexico was hit with the strongest earthquake in a century, at magnitude 8.2. Oaxaca state was devastated, with over 76 deaths and more than 11,000 homes damaged or destroyed (The Washington Post, 2017).

Solar cooked spicy shrimp, one of dozens of dishes solar cooked during training of Yoo Beñe's women's collective. Photo credit: Lorena Harp

In 2017, Lorena brought solar cookers to those who needed them the most, traveling to the earthquake disaster zones to carry out solar cooking workshops in Juchitán de Zaragoza and San Mateo del Mar. **In 2018, she carried out additional workshops** in these two towns, as well as in Ixhuatán. This past October, Lorena Harp traveled to Asunción Ixtaltepec to **donate over 45 Haines solar cookers** to the Yoo Beñe women's collective, a group of women who are reconstructing their homes from adobe they make themselves. The solar cookers were provided at heavily discounted rates by Roger Haines, a SHE Board member, and paid for by Oaxacan NGO Xquenda and Solar Household Energy. For more information, check out Lorena Harp's "Cocineros Solares" Facebook page.

Over 45 women of the Yoo Beñe women's collective (a group of women rebuilding their homes, destroyed by the 2017 earthquake, with home-made adobe) in Asunción Ixtaltepex, received Haines solar cookers, and training by Lorena Harp. Photo credit: Lorena Harp

Haiti: First University-level solar cooking course, and promotion by students

Three successful pilot projects proved adoption and high demand for parabolic solar stoves. SHE's efforts in Haiti started in 2011 thanks to a partnership with The Nature Conservancy (TNC) introducing 30 "Sun Oven" and 30 "Stove-Tec" cookers in Tilori, a small town on the Haiti-DR border. TNC then introduced 78 parabolic "Sun and Ice" solar stoves, upon SHE's recommendation, to satisfy Tilori residents' desires for fast cooking and frying of foods. With a high demand for more solar stoves, in 2015, SHE distributed 25 SolSource parabolic stoves in partnership with the Solar Electric Light Fund, a successful project whose evaluation showed "very high adoption" and "high impact" of the solar stoves according to UN standards. Read more about our projects in Tilori, and photos on Facebook.

This past year, SHE has been laying the groundwork for an eventual launch of a Haitian renewable energy cooking social enterprise able to meet the high demand for parabolic solar stoves. Local manufacture, sales, training, repair and services for parabolic stoves would not only reduce distribution costs to make them more affordable to the average Haitian, it would also create a sense of pride and local ownership, and employment, all while improving health, increasing fuel savings, and helping the environment.

SHE led a consortium of ten organizations experienced in renewable energy cooking to develop a proposal for a renewable energy cooking social enterprise. SHE was invited by the Public Private Alliance Foundation (PPAF) to lead (and be a member of) a consortium of ten organizations joining forces to spread solar and biogas cooking in Haiti. Together, they developed a proposal for a project to launch a social enterprise to locally manufacture and sell proven solar cookers and biogas digesters and stoves, to be headquartered and managed by the University of Notre Dame of Haiti in Hinche (UNDH-H), with UNDH-H's Bioscience program students providing field work and research to achieve inclusive, human-centered design of these renewable energy cooking solutions and the social enterprise's operations. This "idea" (click here to read, and see pictures and videos) was posted on OPENIDEO's 2018 BridgeBuilder Challenge open application platform for a chance to win a share of $1 million, alongside 686 other "ideas." Unfortunately, our idea was not selected for funding, but this experience was the start of a beautiful partnership to bring truly renewable energy cooking solutions to Haiti for peace, prosperity and the planet. Read more about the idea that brought together the consortium.

SHE participated in Haitian University's "Science Day" promoting renewable energy cooking, donating SK14 solar cooker, and sponsoring Tilori leaders as guest speakers. On June 2, SHE participated in UNDH-H's "Science Day" to promote renewable energy cooking solutions, with over 200 people attending. SHE supported Tilori solar cooking project local leaders Idamane Supreme and Marc Breus, and field project manager Onel Joseph, to attend the Science day to demonstrate the use of E.G. Solar's SK14 parabolic solar cooker (donated to UNDH-H by SHE), as well as to meet with other consortium member representatives in person to discuss future collaboration. To read more about Science Day please click here. lease click here for the video. Please click here to see the pictures.

SHE, as part of a ten-member consortium, is developing and teaching the first solar cooking course at a Haitian University. This course aims to enable students to disseminate solar cooking practices and technology in nearby communities. Solar cooking classes began Saturday, October 20

for students at the University of Notre Dame of Haiti at Hinche (UNDH-H). Twenty-two biomedical and nursing degree students enrolled for this University-level elective course. The course will teach both theoretical and practical aspects of solar cooking, and feature many solar cooking expert guest speakers, thanks to video conferencing by representatives of the ten consortium members who developed the course textbook and syllabus, including Solar Cookers International, the Public Private Alliance Foundation, Konbit pou Developman Commune Kotes-de-Fer, and SHE. On top of learning the science and history of solar cooking, students will solar cook a variety of dishes on three different types of solar cookers during each class. They will also learn to make their own solar cookers, and create financial self-help groups in nearby communities to lay the ground for future solar cooker manufacturing and sales. See photos of the students in class and assembling the SK14 solar cooker.

Roger Haines donated two Haines SunUp solar cookers to the Haitian University, for educational purposes and to explore its potential for local manufacturing. Roger Haines, inventor of the Haines solar cooker and SHE Board member, sent two Haines SunUp solar cookers to University of Notre Dame of Haiti in Hinche, and one to the Public-Private Alliance Foundation. These will be used by the course students to solar cook meals during class time, and by the University's solar and biogas committee to explore its potential for local manufacturing and sales.

SHE is currently seeking funding partners to invest in the solar cooking course, to cover initial manufacturing and sales costs for the Haines SunUp solar cookers, and other efforts to help lay the groundwork for a renewable energy cooking social enterprise.

University of Notre Dame of Haiti at Hinche (UNDH-H) students learn to assemble an SK14 parabolic solar cooker, as part of the new solar cooking course made possible by a 10-member consortium including SHE. Photo credit: UNDH-H

Kenya: Eco-mandate gears up to sell Haines SunUp solar cookers

Last year, a Solar Cooker Festival for 500 schoolchildren was held at the vast Kakuma refugee community. Inexpensive, durable solar cookers called Haines-Copenhagen cookers were assembled in Kakuma by refugees from materials donated by Haines Solar Cookers.

Click on link to view on YouTube. 500 children in Kakuma refugee camp learn to cook in Haines-Copenhagen solar cookers. Video credit: NTV Kenya

A 2016 study by World Food Program (WFP) engineer Godfrey Mawira, showed that solar cooking was the second-most preferred method of cooking in Kakuma, even though very few solar cookers were available. **Godfrey Mawira, the main project implementer on the ground, is the CEO and Founder of Eco-mandate, Ltd, a solar cookers seller,** renewable energy promoter and research firm based in East Africa.

In 2018, local manufacturing of Haines solar cookers, and thus sales, were put on hold as Roger Haines perfected his design of the Haines solar cooker, resulting in the Haines "SunUp" solar cooker. The Haines SunUp is made from the same raw materials (reflective metalized polyester foam, and transparent polycarbonate sheets) as the original Haines solar cooker, but it is 40% more powerful, and easier to assemble and use.

In 2019, Eco-mandate will manufacture and sell Haines SunUp solar cookers from the same raw materials that were used to make the 500 Haines Copenhaguen solar cookers for last year's Festival. Materials for hundreds more solar cookers are in a warehouse in Nairobi.

SHE is looking for funding to help kick-start Ecomandate's enterprise to sell Haines SunUp solar cookers, **and to learn lessons from the Kakuma Festival distribution** of 500 Haines-Copenhaguen solar cookers to schoolchildren.

Uganda: Go Green sells SunUp solar cookers; Refugee project planned

In 2016, SHE board member Roger Haines spearheaded a project to distribute 500 Haines solar cookers to low-income families in Gulu and Atiak in northern Uganda, in partnership with the Rotary Club of Gulu, and with funding from San Diego Rotary Club, with the Alliance for African Assistance (AAA) in Gulu implementing the project on the ground. This free distribution of solar cookers succeeded in creating a demand for Haines solar cookers.

In 2017, AAA, supported by SHE and other partners, started making, marketing, selling and training people on using Haines Solar Cookers, naming the project "Go Green! Cook with no smoke, no sweat!" Over forty Haines solar cookers were sold in 2017.

In 2018, local manufacturing of Haines solar cookers, and thus sales, were put on hold as Roger Haines perfected his design of the Haines solar cooker, resulting in the Haines SunUp solar cooker. This new solar cooker is made from the same raw materials (reflective metalized polyester foam, and transparent polycarbonate sheets) as the original Haines solar cooker, but it is 40% more powerful, and easier to assemble and use. **Manufacturing of Haines SunUp solar cookers commenced a few months ago, with 10 solar cookers sold so far thanks to "Table Banking Groups," financial self-help village groups.**

As the region bordering Uganda and South Sudan, the current insurgency in South Sudan has made **northern Uganda home to over 180,000 refugees**, all of whom need a reliable source of energy for preparing their daily meals.

Demonstration of the Haines SunUp solar cooker near Palabek refugee camp in Uganda. Photo credit: Roger Haines

Roger Haines is also planning a pilot project near Palabek refugee camp distributing 33 Haines SunUp solar cookers. Unfortunately, the discovery of a 30% tax on NGOs operating in this camp made this project financially unfeasible. But a work-around has been found: SunUp solar cookers will be sold in Ogili, the nearest center (less than 1 km) to Palabek Refugee settlement camp, with training slots reserved for refugees. The San Diego Rotary Clubs fund the project, the Alliance for African Assistance in Gulu manages manufacturing and sales of solar cookers, the African Refugee Education Project funds and manages the refugee aspect of the project, Solar Connect Association based in Gulu will provide training, and SHE will carry out project evaluation.

Chad: SHE fundraising for Haines solar cookers for women in Gaga camp.

In 2011, Solar Household Energy partnered with UNHCR and its then local implementing agency, Africare, to launch a pilot project introducing 50 HotPot solar cookers in Gaga refugee camp. Based on the results of that initial effort, Africare quadrupled the scale of the project. **Long-term success of the project was confirmed in evaluations by the Lutheran World Federation in 2014 and SHE in 2016,** showing, among other findings, that 62% used the HotPot with high frequency compared to other cookstoves, and all HotPots were in good condition.

In 2018, SHE is ready to deploy the Haines SunUp solar cooker. Thanks to field tests of the Haines solar cooker around the world which led to improvements in its design, SHE has garnered sufficient evidence to justify deploying the improved Haines SunUp solar cooker as a good alternative to the HotPot. The Haines SunUp is exceptionally powerful, more so than the HotPot or other box cookers, yet very affordable, with the capacity of being locally made, and used with local pots. **SHE and its project partners, UNHCR and LWF, are currently looking for funding to scale up the solar cooking project in the Gaga refugee camp with Haines SunUp cookers**.

On April 1st, SHE launched a 60-Day Fundraising Campaign: Make Cooking a Joy for Women in the Gaga Refugee Camp**.**

Check out our campaign video at* http://www.she-inc.org/?p=2684*. Photo credit: Patrick Fourrier for SHE

The Lutheran Alliance for Faith, Science and Technology published an article on SHE's solar cooking project in Gaga refugee camp entitled "Solar Cookers in Africa supported by Lutheran World Federation and other partners," highlighting the HotPot solar cooker's long-term adoption by refugees in the camp, with all HotPots being in good condition and regularly used after more than five years.

Solar cookers for The Gambia and Puerto Rico

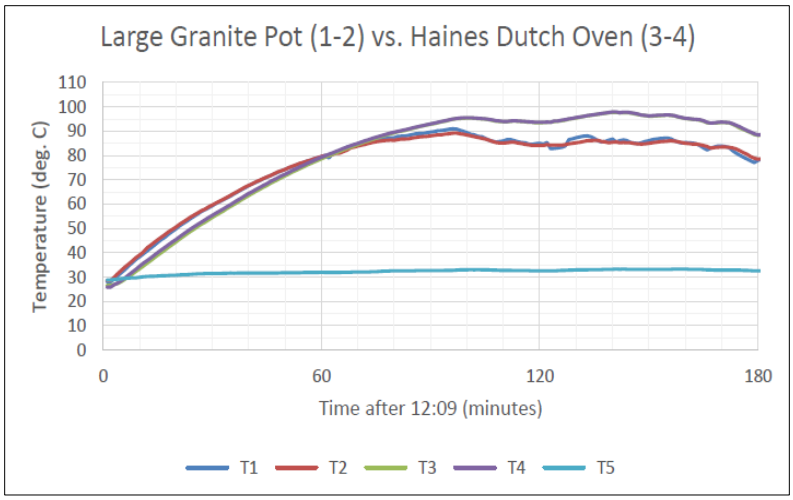
SHE provided 12 solar cookers and basic training for Puerto Rico disaster recovery, and 2 discounted solar cookers to The New Hope Project in The Gambia. Heather Daniel, founder of The New Hope Project, then trained her Gambian partners. Her project manager, who is responsible for cooking food for a preschool funded by The New Hope project, now solar cooks to save on time, gas and charcoal. Funding is needed to bring more solar cookers for the preschoolers' families.

Research and Design: Enhancing Solar Cooking Technology and Testing

SHE's ongoing R&D efforts represent a fundamental element of our strategy to disseminate solar cooking technology to those who need it the most. Long-time board member Paul Arveson, a retired engineer, leads SHE's R&D efforts, including conducting his own research, contributing to others' research projects, and participating in setting international standards.

Optimizing standards' measurements accuracy and solar cooker efficiency

Paul's findings, from teasing apart the multitude of factors affecting solar cooker performance, such as cooking pot properties, to improving testing methodologies in terms of accuracy and cost, documented in a series of technical reports (TRs), available on the SHE website's "Research" tab, are summarized below.



Measuring the performance of solar cookers with different pots (excerpt from technical report 35). Credit: Paul Arveson

- TR-35**: Compilation of Solar Cooker Heating Experiments, Summer 2017:** This report includes plots that summarize the "raw" data obtained from solar cooker heating experiments in 2017. Each of these experiments was intended to answer a particular question. All experiments were controlled by the use of two to four temperature measurements, so that the comparison would help to identify causes of variations.

- TR-36 **Standard Power Test Report – Haines Model 2.0 Solar Cooker:** This is a measurement of the heating power of the Haines Model 2.0 Solar Cooker conducted using the ISO standard protocol for power measurements.

- Computer Code **for cooker power calculations:** This is a listing of the Python code used for automating the processing of data collected by data loggers as described in TR-09.1. The data loggers generate Excel files which are then read and processed by this program.

Advancing international solar cooker field testing standards

In 2018, SHE's Research Director Paul Arveson participated in the International Standards Organization's (ISO) development of cookstove field testing standard, ISO 19869, as well as the release to the public of the clean cookstove lab testing standard, ISO-19867-1, which he had worked on in 2017. As a member of the ISO's US subcommittee for the development of clean cookstove standards, and sitting on multiple working groups, Paul led the efforts on drafting cookstove safety standards, and contributed towards drafting cookstove efficiency, durability, and usability standards. **Both standards refer to the ASAE S.580.1 standard protocol for power measurements of solar cookers.** The scope of both standards includes solar cookers, as well as biomass and (in some cases) liquid and gas fueled cookstoves. Ensuring solar cookers were kept in the drafts required careful vigilance. **Having the solar cooker power protocol included in an international standard will provide a fair and scientific basis for comparing power for all household-scale solar cooker types**. SHE and Solar Cookers International (SCI) have developed instruments and software that can be used to measure solar cookers in accordance with the protocol. We hope that these efforts over the past five years to establish standards for solar cookers will add credibility to the whole industry.

Sparking new collaborations

SHE partnered with Messiah College's "Collaboratory" team to develop a "solar simulator," for testing solar cookers indoors. Messiah's engineers created the simulator with a 1000 Watt airplane landing lightbulb and a large frame Fresnel lens to obtain parallel rays (simulating the Sun's) provided by SHE. They are also designing a prototype solar cooker to be used in Rwanda, comparing its performance with those of the Haines and HotPot solar cookers, donated by SHE.

SHE is working with the "Montgomery County Makers" to design a rotator for testing solar cookers. It is micro-controlled from a computer via wifi to rotate at certain rates thanks to "Arduino" software.

Solar simulator at Messiah College for testing solar cookers indoors. Photo Credit: Messiah College

Searching for the perfect solar cooking pot

Panel solar cookers work best with a black pot with a tight-fitting, transparent lid. A handle-free pot can be held up by a polycarbonate sleeve, allowing reflection to its bottom. The ideal pot would be 5 quarts, and durable enough to withstand heat from fires and rough scrubbing without deforming, or chipping of paint or non-stick surface. SHE has been making progress in its search for a pot & lid set that meets all these conditions for use in Mexico for under $15.

Education and Advocacy: Enlightening and Connecting people

SHE's co-founder and Board member Louise Meyer continues to spread the joy of solar cooking to children and other audiences. Here are a few of the activities she and other SHE team members undertook this year, all on a volunteer basis:

Enlightening young minds in the DC area

- **Four solar cooking demonstrations in two schools in underserved communities in the DC area, in partnership with Kid Power, Inc.** (Jefferson Academy Southwest, and Salle-Bakus Middle School NE). Louise taught both the science of solar cookers, and the need for them in developing countries, to classes from elementary all the way to high school.

Josh Singer, Community Garden Specialist at the DC Department of Parks and Recreation, demonstrates the SolSource parabolic solar cooker and Sun Oven at Lederer Youth Garden for Earth Day celebration, in partnership with SHE. Photo credit: Louise Meyer for SHE

- **Earth Day celebration at Lederer Youth Garden, in partnership with the DC Department of Parks and Recreation (DCDPR).** Louise Meyer and Josh Singer, Community Garden Specialist at the DCDPR, demonstrated solar cooking, popping popcorn in the SolSource parabolic solar cooker, and baking a cake in the Sun Oven.

Growing food for solar cooking

- **Two-week long solar cooking demonstrations at San Diego Agricultural Fair.** SHE Board members Louise Meyer and Roger Haines, SHE Advisor Pat McArdle, and solar cooking expert Sharon Claussen took turns demonstrating solar cookers three times a day over two weeks, reaching thousands.

- **Promotion at Rooting DC, an all-day urban gardening forum** hosting over 60 green businesses and non-profits in the region. Louise used the opportunity to promote solar cooking and explore partnership potential with dozens of participants, leading to the Earth Day celebration at Lederer Youth Garden (see above).

Connecting for international development

Therese Alougon. Camerounian politician, received training in box and panel solar cooking. Photo credit: Louise Meyer for SHE

- **Therese Alougon, a woman running for mayor of her town in Cameroon, received training in box oven and HotPot solar cooking**. Louise Meyer and intern Nazario Saintlouis carried out the training during Therese's visit to DC. Therese hopes to leverage the Mayoral position to promote solar cooking for women in her town and throughout Cameroun.

- **Cultivating relationships with international solar cooking NGOs**, particularly Bolivia Inti Sud-Soleil, and ADES with projects in Madagascar.

- **Participation in the "Women in Energy" Network**. Louise participates in, and has hosted, a non-formal group of professional women in energy, aka "WonderWomen."

- **Solar cooking exhibit at "Sharing to Accelerate Research – Transformative Innovation for Emergency Support" (STAR-TIDES) at George Mason University.** SCI and SHE volunteers, including Afzal Syed and SHE team members, showcased over seven solar cookers, reaching hundreds. The Executive Director, Sophie Lyman, gave a 25-minute presentation on solar cooking projects worldwide that was attended by experts in innovative development programs with civilian and military applications.

- **Participation at Haitian Embassy dinner and conversation with Haitian Ambassador.** Board member Janet Murphy and intern Nazario Saintlouis enjoyed a delicious, authentic Haitian food at the embassy, as well as a conversation with the Ambassador about SHE's projects in Haiti.

- **Meetings at DC international development events**, hosted by Sustainable Energy for All, the Brookings Institution, Solar Sisters, the Global Foundation for Democracy and Development, etc…

What lies ahead for SHE

2018 has been a year of many successes, particularly for Mexico's social enterprise and Haiti's University solar cooking course, but it has also been a year of many challenges. With your support, we managed to surmount most of these, thanks to SHE's multi-disciplinary team working hand in hand with solar cooks on the ground: from enterprise customers, to University students, to field project managers. For example, when rural women in Mexico heard false rumors that solar cooked food causes cancer, local solar cooking ambassadors found culturally appropriate answers to assuage fears (solar hot water roof heaters, common in the area, don't cause cancer), while SHE Research Director wrote up scientific arguments for those who needed more proof. Challenges that remain to be solved in Mexico include finding durable, affordable pots suitable for the Haines solar cooker, and reducing training and marketing costs while improving upon them, to become more financially sustainable.

In 2019, we will continue improving our solar cooker social enterprise methods in developing countries, applying lessons learned from Mexico to enterprises in Kenya and Uganda and others still in their infancy. One important project we hope to undertake, given funding or expert volunteer hands, is the **production of instructional and marketing videos** for Haines solar cookers, for Mexico and for the world. Topics would range from basic solar cooking science, to culinary tips and tricks, to commercials. These videos could be used by field project managers to become solar cooking experts without the need for costly international travel. And in these days of ubiquitous smartphones and worldwide connectivity, videos spread through social media could help reinforce initial hands-on training and reach new audiences.

Another promising educational project is the University of Notre Dame of Haiti's Solar Cooking Course, already underway. This course is harnessing the intelligence of bright young students to catalyze the dissemination of renewable energy technologies in Haiti. The student committee on biogas and solar cooking is leading the way, with discussions on locally manufacturing and selling solar cookers, and building a renewable energy social enterprise.

In terms of research and development, SHE's Research Director will maintain his participation in the development of clean cookstove standards with the International Standards Organization, ensuring the inclusion of solar cooker standards. **SHE will also continue research initiatives into solar cooker and testing technologies,** on its own and with partners**.** Not only do these efforts aim to make solar cookers (including their pots) affordable for all, but they aim to make the *testing* of solar cookers affordable, to encourage solar cooker innovation and optimization, even on limited budgets in developing countries.

Solar cooking education and advocacy remain vital to our mission. Solar cooking is for everyone! School children, urban gardeners, professionals in renewable energy, emergency and disaster mitigation, international development, to name a few – all are dazzled by the power of solar cooking, and all can help promote it, if not for their own emergency preparedness purposes, then for those already living in desperate conditions around the world. **Thanks to your support, people are learning about the science and need for solar cooking, receiving training to pass on in developing countries, and starting new partnerships to spread solar cooking. To partner with us, contact us at info@she-inc.org.**

Our People

SHE is a small but productive organization with far-reaching impact, thanks to the combined experience, knowledge and passion of its team members and dedicated volunteers.

SHE Co-founder, Board member, and volunteer Director of Education Louise Meyer has been carrying out solar cooking education in Washington, DC for decades, and she was honored in 2017 as a winner of the "Leaders in Energy" Leadership Award. SHE's Board member and volunteer Director of Research Paul Arveson has been advancing solar cooking standards though his participation in International Standards Organization forums and carrying out research to optimize solar cookers and their testing. Board member Roger Haines, on top of inventing promising new solar cookers, has been investing his own time and funds to bring solar cooking to refugees and low-income villagers in Kenya and Uganda. Board member Margarita Battle, a Mexico native, has been invaluable in SHE's project to launch a social enterprise in Oaxaca, Mexico. Board member Cora Shaw led SHE's project in Gaga refugee camp, Chad, and assists in efforts to scale it up. Solar Household Energy's Board of Directors is led by David Grossman, Director of Global Programs for the International City/County Management Association.

This year, we welcomed two new Board members: long-time SHE volunteer and Green TV producer Janet Murphy in DC, and Jonathan Changus, with the Center for Sustainable Energy in Sacramento, California. We are fortunate to have these smart, experienced people on our team!

SHE's ongoing operations are carried out by a small team. As SHE's Executive Director, Sophie Brock Lyman's responsibilities include leading our strategic development, project design and analysis, and partnership development. Richard Stolz, with SHE since 2002 but currently SHE's Chief Operating Officer, works closely with Sophie, and oversees SHE's financial administration. John Nash provides SHE IT support and guidance. Lynn Patton is SHE's bookkeeper.

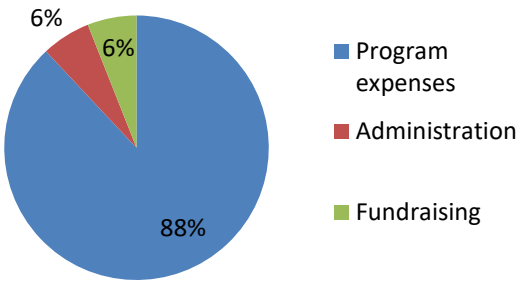
We also had three temporary people assisting us this year. Heljye Mounkala, with expertise in project management and resource mobilization, spent a few months with us as Associate Director. We were also joined this summer by two volunteer interns from The Fund For American Studies: Olivia Alland and Nazario Saintlouis. We were honored to host Heljye, Olivia and Nazario, all of whom were committed to the cause, having had first-hand experiences with the negative impacts of dirty cookstoves, in Ivory Coast, Tanzania, and Haiti.

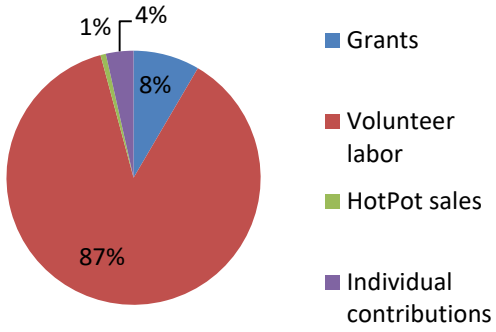
Volunteers are vital to the work of Solar Household Energy. Esperanza Sanz keeps the organization active on social media, particularly Facebook. Afzal, Zainab, and Samina Syed helped with solar cooking demos.

All of SHE's Board members and its other volunteers have been paramount to fulfilling SHE's mission, dedicating their time, efforts and personal funds to ensure the highest standards and results, for human development and environmental relief. We are deeply grateful for their service.

Committed to accountability and transparency

Solar Household Energy is a 501(c)(3) non-profit corporation and public charity. We are committed to accountability and transparency, and are GuideStar Gold certified. We will be happy to send you our 990 tax return upon request.





Although volunteers play a vital role in our ongoing ability to carry out our mission, we also require funds to conduct projects and manage operations. We welcome and encourage all financial support, large and small. Please consider making a tax deductible contribution to SHE via Network for Good or by mail to: 5 Lochness Ct., Rockville, MD 20850-2950, attn: Richard Stolz. We also encourage inquiries about our finances and operations. All of our board members and staff can be reached via email to: inquiries@she-inc.org

Thank you for your interest and support for Solar Household Energy.

Solar Household Energy is a 501(c)3 non-profit. Please like us on Facebook, join our Washington, DC area solar cooking meetup group, follow us on Twitter @SolarHouseholdEnergy, and check out our website: www.solarhouseholdenergy.org

References

1. Watts, Jonathan. “We have 12 years to limit climate change catastrophe, warns UN.” The Guardian. Oct 8, 2018. Web. 12 Dec. 2018