IEEE smart village®

IEEE

PEOPLE HELPING PEOPLE

IEEE Smart Village 2019 Annual Report

IEEE SMART VILLAGE 2019

For ten years, IEEE Smart Village has been about people, volunteers with talent and desire, helping others, who have entrepreneurial spirit and drive. Our approach of empowering local resources with the knowledge and materials they need to be successful is proving to be a sustainable model with many of our entrepreneurs now expanding beyond their initial deployments. This global initative has had tremendous positive impact in the communities we have touched. This 2019 Annual Report is a small view into the thousands of activities that support this effort.

These accomplishment are possible because of the generous philanthropic investments of our individual and corporate donors, IEEE Societies and the IEEE Foundation. Thank you for your trust in the Smart Village team and belief in our vision.

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EXECUTIVE SUMMARY

The IEEE Smart Village initiative celebrated its tenth year in 2019. From humble beginnings that grew out of the IEEE Global Humanitarian Challenge and United Nations, ISV uses technology to better serve humankind. Our footprint has spanned across the globe directly impacting over 177,000 people with potential to serve more than 1.2 million people!

The three-pillars of Energy, Education and Entrepreneurship are the foundational concepts for our activities. Driven by this bottoms-up focus, we see the proof that energy poverty can be alleviated by local entrepreneurs working with other people in the community to improve all levels of education and providing others the opportunity to launch or expand their businesses.

We recognize that our efforts are synergistic with the work being done by the IEEE Foundation and IEEE societies. So, in 2020, to leverage the reach and power of the massive IEEE network, ISV will restructure its governance to draw upon the talent and expertise from all corners of IEEE. This will enable more input and expand support to more initiatives across broader technology areas. The current and proposed organizational structure are on the next two pages.

ISV has been blessed with wonderful volunteers, bright entrepreneurs, and support from so many Societies and people. Thank you for your continued support as we begin this new chapter!

OUR MISSION

IEEE Smart Village integrates sustainable electricity, education, and entrepreneurial solutions to help empower dissadvantaged communities

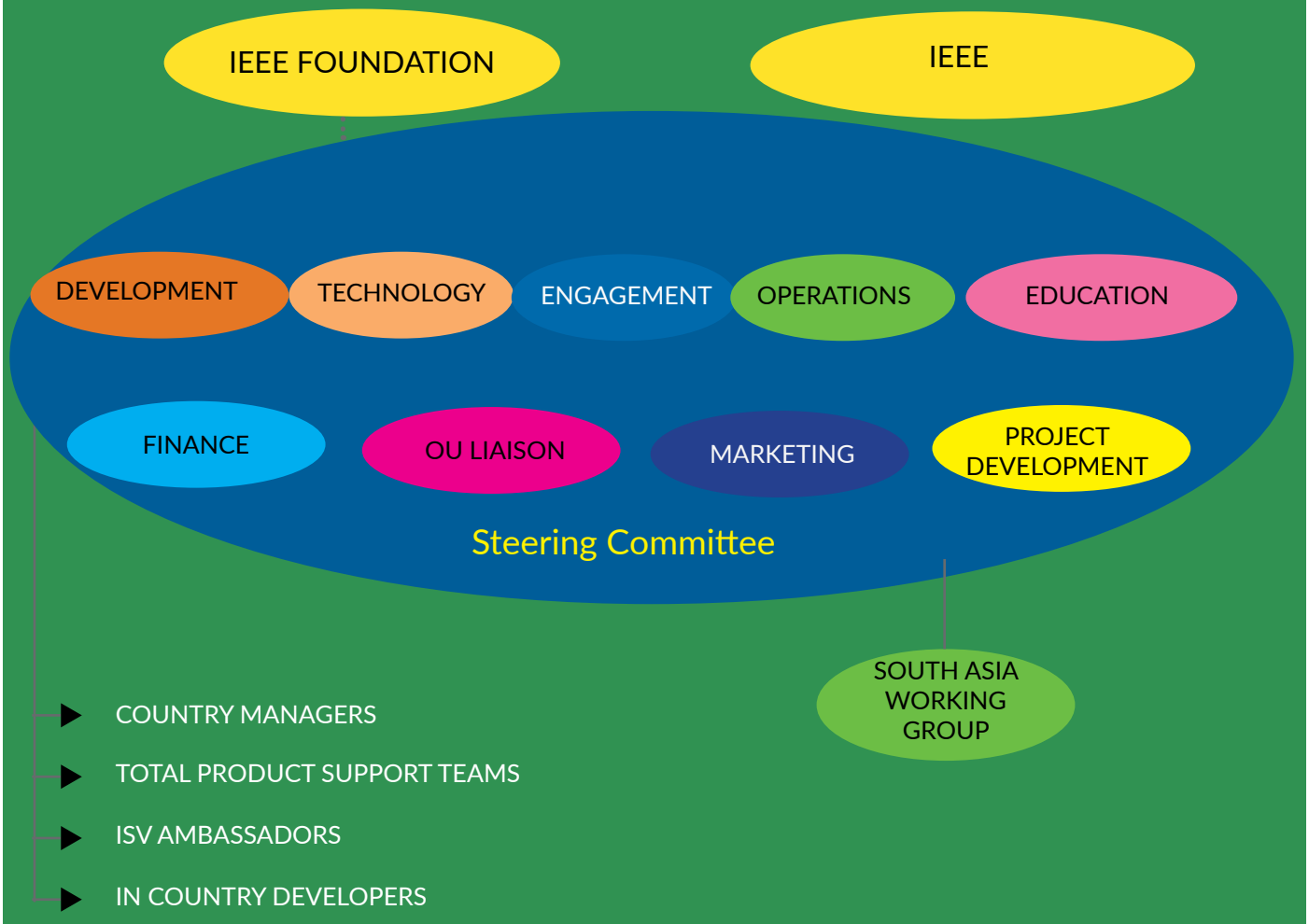
OUR VISION

A world where all people enjoy equal access to electricity and education to grow opportunities and leverage change for themselves and others.

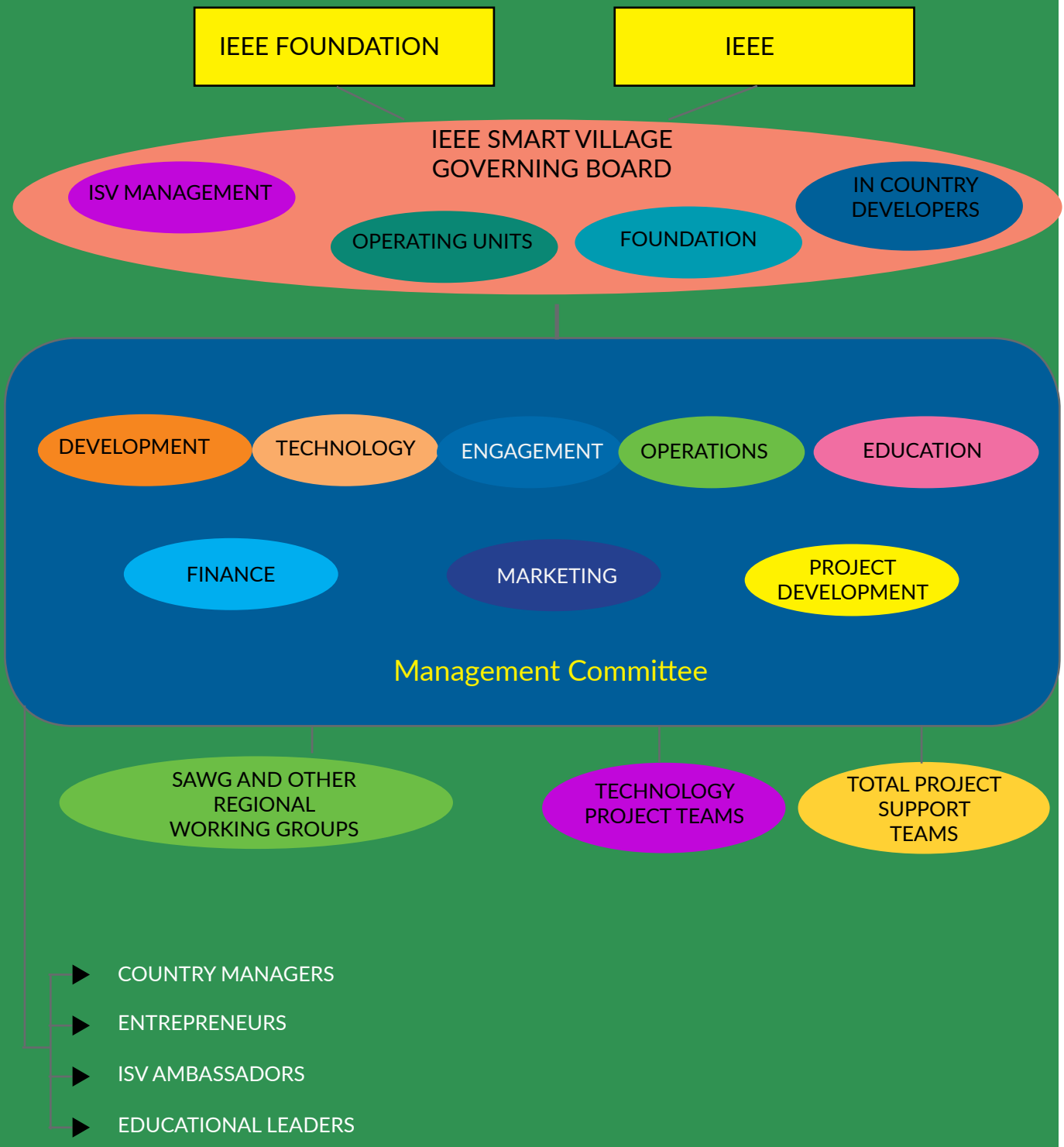
FOR MORE INFORMATION, VISIT OUR WEBSITE:

smartvillage.ieee.org

2019 GOVERNANCE STRUCTURE



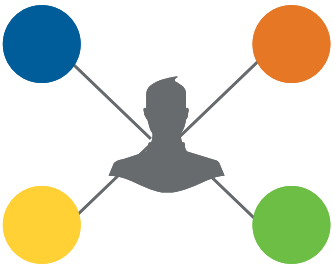
PROPOSED 2020 GOVERNANCE STRUCTURE



- COUNTRY MANAGERS
- ENTREPRENEURS
- ISV AMBASSADORS
- EDUCATIONAL LEADERS

OUR WORLD NETWORK

IEEE Smart Village now has a global network established to support entrepreneurs in 157 communities across five continents. Our In-country developers meet regularly via conference calls to network and discuss all aspects of project implementation from design to operations. The inter-personal relationships that are established help solve real-world problems and the leaders support each other, discussing and solving common issues.



An interactive version of the map is on the ISV website:

smartvillage.ieee.org

2019 New and Expanded Projects

During 2019, IEEE Smart Village funded new projects in the Galapogos Islands, the Darway Coast of Nigeria, and Rwanda. We expanded projects that were funded in prior years with educational grants in Uttar Pradesh, India and Maasai Mara, Kenya.

The expectation is that these seed-funded projects will become financially stable and expand beyond their initial deployments through internally generated cash flow as well as attracting venture capital investments drawn to their successfully launched projects. We have several entrepreneurs who have achieved this. For example, GVE Projects, Ltd. has now received multiple rounds of funding and is a leading provider of solar micro-grids in Nigeria.

GENERATING A HIGHER VALUE

Three Pillars Approach and Benefits

Billions of dollars have been poured into community development with, in some cases, little to show for it. This argument is stressed by several Nobel Economics and Peace Prize Laureates like Amartya Sen (India-Bangladesh), Wangari Muta Maathi (Kenya), President Ellen Johnson Sirleaf-(Liberia), and a community of sustainable development experts. Poverty has followed the trajectory of colonialist exploitation, slavery and genocide with repercussions lasting well over 400 years. The talented have had to escape the villages to become educated beyond a basic level, thereby exacerbating the problem. IEEE Smart Village aims to reverse this trend through its 3-pillars of Electrification, Education and Entrepreneurism, to slow or stop the brain-drain and resultant buildup of huge city slums as the only alternative for the already-disempowered.

By providing reliable power, villages can create jobs, educate their children, and expand their capacity for production. This generational change alters the future trajectory of the village.

Long term view of investments

The investments Smart Village makes in an entrepreneur go far beyond the traditional philanthropic handout. Each local proposal is vetted by a team of subject matter experts who have experience in running profitable solar micro-grids. Each funded proposal includes a business case that is examined with sound feedback on pitfalls others have experienced, reasonable growth expectations, and streneuous cash flow management objectives. The proposals all include expansion plans with a goal to scale to up to a million people impacted. To reach these long goals requires patience, modification of the plans for real conditions, and perserverance, sometimes in very harsh conditions. The payback is worth it, to see businesses thrive, communities changed, and people's lives move in a positive direction.

A Personal Story

Guddi & Najiya Khatoon

are sisters who live with their family in the village of Tirmasahun, in the Kushinagar District of Eastern Uttar Pradesh (UP), India. Guddi is 14 and Najiya is 11. Both sisters are exceptionally bright, and Guddi credits their mother who "always supports us, and allows us to study when we need to".

Guddi and Najiya have attended programs at Shakti Empowerment Solutions' (SES) charitable sister company, United for Hope ,for five years. Their family's commitment to education is highlighted by their unmatched attendance record. This does not mean however that they are not required to help out in the fields like many other children. Their entire family relies on the income derived from agricultural work, which means that while studying hard, they are also required to work hard.

At United for Hope, they now have access to a modern classroom, complete with desks, a projector and whiteboard, a library with hundreds of books in both Hindi and English, and, a modern computer suite, with fast Internet and Microsoft Office programs.

Another thing they greatly appreciate is the environment that the Community Center offers. "When I come here I feel safe, I feel confident as nobody is judging me," Guddi asserts. Najiya agrees and adds with a smile that "We can speak with the female teachers about all our worries, they listen to us, and that is very important."

So, what are the sisters plans for the future? Unsurprisingly, both have very high ambitions. Being the older sister, Guddi confidently begins "I want to be a doctor. There are so many diseases where we live, and I want to help people get rid of them." Najiya has similar aspirations of helping others, "I want to be a police officer because I want to change my country," she passionately states.

Thanks to the support from ISV, United for Hope has been able to help Guddi and Najiya flourish into truly inspiring young people. They are the reason why we work tirelessly and why we will continue in our endeavours to realize positive change here in rural India.

OUR GLOBAL IMPACT

Linkage to UN SDGs

In September 2015, the United Nations adopted 17 world goals to improve conditions across the planet. Ban Ki-Moon, United Nations Secretary General at the time said, "We don't have a plan B because there is no planet B." Amost all countries have adopted these goals and are contributing to the success in reaching these by the year 2030.

In all, there are 169 targets established with 232 measurements of progress for the 17 goals. IEEE Smart Village directly impacts 3 of the goals, #4, #7, and #9, and indirectly impacts almost all of the other goals.

For example, our solar micro-grids are the foundation for increased productivity in the community. This reliable power source allows shopkeepers to stay open for longer hours and provide services that otherwise would not be possible. This increased commerce has a positive effect on the poverty level (Goal #1) by enabling cash flow in the community. We provide power for irrigation pumps that increase vegetable production, even in the dry season, sometimes doubling the output of local food sources. (Goal #2) We provide much needed refrigeration for medical supplies, lighting for clinics, and medical tests. (Goal #3) Our educational initiatives are empowering for women, giving them the knowledge, skills, and opportunity to be self-sufficient business people. (Goal #5) The economic growth of the community is empowered as commercial ventures spring up in the areas around our micro-grids such as cellphone charging stations, barber shops, tool sharpening and repair shops, seamstresses and tailors. (Goal # 8) The clean energy that we are providing is a welcome change to the area versus the diesel generators or smoky fires that were prevalant before our ventures. (Goal #12)

One unsung story of Smart Village investments is the impact that we have on the global climate. With every solar panel that we deploy, there is less need for fossil fuel energy production. We also eliminate the costly construction of macro-grids with the deforestation that accompanies it, as well as eliminating the thousands of gallons of diesel fuel in their construction. We estimate that for each kilowatt of power that we produce, there is a corresponding offest of 250 kG of CO_2 offset.

ISV is working with The Maa Trust to jointly develop an impact evaluation tool based on the Acumen Lean Data Standard. Acumen measures social performance of investments with high quality at a fraction of the time and cost of other methods. The goal is a standard for all ISV projects to track impact trends at a very early stage. The monitoring and evaluation handbook produced will ensure that ISV entrepreneurs learn how to track their own impact, building capacity on the ground rather than relying on external consultants. The results are crucial to ISV seed fundraising and a projects' ability to attract investment capital.

Metrics

Systematically capturing meaningful, accurate metrics is a tenet of Smart Village. Each of our entrepreneurs submits quarterly reports detailing the status of construction, solar power produced in previously deployed projects, educational initatives' benefits, and jobs created in the community. These metrics are shared with existing and future sponsors as defacto evidence of the impact we are having across the world.

SDG # 7 Affordable and Clean Energy

"Ensure access to affordable, reliable, sustainable and modern energy for all."

Clean energy is the starting point for most ISV projects. Since the beginning of this initiative, we have deployed 3,266 solar panels generating 1882.6 kilowatts of power. We have 5,626 kilowatt hours of battery storage deployed. Our entrepreneurs have 47,106 customers with targeted, near-term expansion plans totalling 525,366 connections. We have projects in 15 countries across 5 continents.

SDG # 4 Quality Education

"Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all."

It is rare to find a philanthropic organization that takes a holistic approach to sustainable development. We realized early in our learning that power alone was not sufficient. Our educational initiatives have a total community approach. From providing K-12 curricula and intranet to local schools to sponsoring after-school computer and robotics classes, we've impacted more than 155,0000 students since 2009.

SDG # 9 Industry Infrastructure

"Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation."

Our job creation is a testament to the success of Smart Village. We have more than 550 villagers directly employed by ISV entrepreneurs. Our secondary job creation, where villagers are employed in barbershops, manufaturing, or other previously non-existent occupations is more than 1,505. ISV is having real impact at the local level.

2019 EVENTS

The Power Africa Conference allows the many ISV entrepreneurs a chance to meet face-to-face. During the 2019 Power Africa conference, they made a special presentation to Robin Podmore, honoring him for his more than ten years of service to IEEE Smart Village. The delegates all expressed their grateful appreciation for the mentoring and coaching that Robin has provided to each one. The plaque reads,

The Smart Village Community thanks Robin Podmore for a decade of extraordinary leadership and vision to end global energy poverty through your passion and hard work, you have created a unique global network of motivated energy entrepreneurs who are addressing tough challenges in energy-impoverished communities with electricity, education, and sustainable development"

Presented at the IEEE PES-IAS
Power Africa Conference,
Abudja, Nigeria
August 24, 2019
By the IEEE Smart Village Community at Large

Power Africa 2019

IEEE Smart Village co-locates a series of discussions each year at IEEE's annual Power Africa Conference. Two of IEEE larger societies, Power and Energy and the Industrial Applications join forces to coordinate an international forum on clean and affordable energy , focused on Africa's needs.

IEEE Smart Vilalge provide partial travel grants, making it possible for Smart Village's global energy entrepreneurs to participate in workshops and networking opportunities. This growing network of global IEEE Smart Village energy entrepreneurs have developed a special bond, having suffered through many of the same trials. Support funding increases the number of qualified entrepreneurs desiring to attend the conference.

PES General Meeting

The 2019 PES General Meeting was a large conference held in Atlanta, GA in August. This conference allows the ISV Smart Village team to meet emerging engineers in this rapidly changing environment. By hosting an information booth at events like this, ISV educates attendees on the ISV initiatives.

At the 2019 PES meeting, ISV launched a social media fundraising campaign called #bringthelight. The objective was for each local PES Chapter to raise awareness of ISV funding opportunities and to have a local team create social media awareness for their friends. This campaign engaged 12 teams and had 24 new voluneters for ISV.

Global Humanitarian Technology Conference

ISV is proud to annually participate in the IEEE Global Humanitarian Technology Conference, which highlights many of IEEE's humanitarian initiatives. In 2019, ISV leaders demonstrated its new Sun-Blazer IV technology initiative to the nearly 400 attendees. This innovative, modular platform combines ease of assembly from A-frame tubing to a portable charge controller capable of securely charging up to 16 Portable Battery Kits. It has both AC and DC output options.

FINANCIAL HIGHLIGHTS

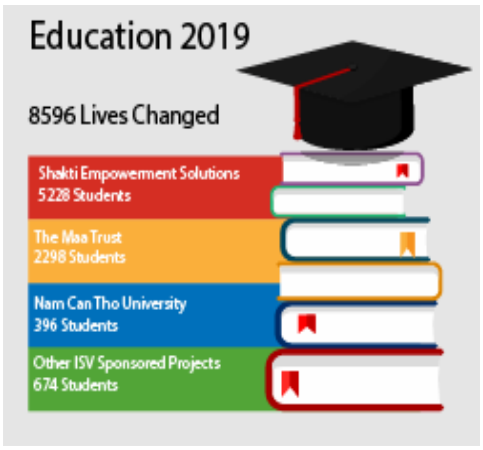
It is only through the generous donations of caring people that the impacts of ISV program are possible. We are thankful for two societies, PES and NPSS, who have been consistent supporters of ISV for many years. We are also thankful for the diligent work of the many volunteers who are personally giving, not only their own money but also of their time and talents in supporting Smart Village. For 2020, we have a goal to exceed $1M in new contributions. This will be critical to the continued pursuit of the long-term goal of impacting 50M people. In 2019, more than 50% of our investments went toward different types of educational initiatives in the communites we serve.

Educational Investments in 2019

Agri-business Training in Uganda

Honey production in Kenya

SunBlazer manufacturing in Cameroon



Vocational Training in Nigeria

Computer programming in Cameroon

Expanded computer literacy, hygiene and women's empowerment training in India

2019 Expenditures

Our program expenditures generally fall into three broad categories: New Projects, Educational Initiatives, and Expansion Projects. In 2019, we invested more than $600K USD in the three pillars of ISV: Energy, Education, and Entrepreneurship.

New Solar Power

Education

Expansion

FINANCIAL DETAILS

The tables below reflect the historical contributions and expenditures of the program. In 2019, we experienced more than a 50% reduction in contributions compared to 2018. This resulted in a significant reduction in new entrepreneurial start-ups.

Contributions ($000's)	2016	2017	2018	2019
Donations to the IEEE Foundation	437.0	1192.2	1368.3	638.0
IEEE Power and Energy Society	435.0	_	534.4	67.6
IEEE Nuclear Plasma Science Society	120.0	412.0	-	165.0
Other IEEE Operating Units	84.0	45.0	-	50.0
Total	1076.0	1710.6	1902.7	920.6
Percent Change YOY	-	58%	11%	**-51%**

REC Group Makes Significant In-Kind Donation

REC Group, a global leader in the manufacture of solar photovoltaic panels, was introduced to Smart Village's approach to supporting the world's energy-impoverished population. Their CEO, Steve O'Neil, was intrigued by ISV's seed funding of carefully selected in-country entrepreneurs who will deliver electricity, education and jobs to their communities. Steve knew immediately that this approach matched REC's commitment to provide off-grid communities with renewable energy.

After careful considering how their investment could serve as a catalyst to meet the needs of the energy impoverished, REC Group focused its support on one of ISV's most successful entrepreneur's - Shakti Empowerment Solutions Pvt Ltd (SES) . Leveraging REC Group's in-kind donation of sixty-six 330W REC Twin Peak 2S 72-Cell Bifacial PV panels, SES will be able to generate solar energy to implement a sustainable agro-tourism business in the village of Manoli of the Sonipat District, Haryana, India. Tara McCartney, CEO of SES says "All social enterprises need reliable power to run effectively. The gift of these solar panels will go a long way in helping us power our job creating 'Tourist Farm'. We thank REC Group for believing in us and helping us create dignified, prosperous communities in rural India."

Expenditures ($000's)	2016	2017	2018	2019
Program Management	191.1	173.4	189.5	201.7
Strategic Communication	211.3	207.3	97.0	34.8
Committee Travel	190.0	153.3	57.3	59.7
In-Community Deployment	401.0	953.1	1,007.0	569.9
Conferences	-	-	51.8	32.2
Education	83.3	82.9	500.0	30.1
Total	1,076.7	1,569.9	1,902.7	932.8
Percent Change YOY		45%	21%	**-51%**

PROJECT HIGHLIGHTS FROM 2019

Expanded project details can be found at our web page: smartvillage.ieee.org/our-projects

The success of Smart Village is due to the many project leaders that have invested their lives into these remote parts of the world. These entrepreneurs come from all walks of life, from aspiring Engineering students to college professors. They all have a common belief: that sustainable change comes from local ownership and accountability.

The paragraphs below provide real-world insight into the day-to-day operation of many of the projects that ISV has in progress. The entrepreneurs face personal and business challenges working in some of the harshest environments on the planet. ISV volunteers are exposed to their trials and provide encouragement and advice through our Total Projects Support Teams. Though the relationships are mostly built through email, conference calls, and video links, they are nonetheless bridges among empathetic individuals from diverse cultures, and countries.

Africa Development Promise- Nigeria

Womens' co-op training has been expanding with more co-ops forming and product diversification. ADP has recovered from a large-scale theft of newly purchased IT and vocational training equipment. The loss was fully insured, and ADP is currently acquiring new computers and equipment.

Beyond Chacay Foundation - Galapogos

A series of community training sessions were delivered by Villanova University to increase digital skills of teachers and facilitate the use of the community intranet installed earlier in the year. This system serves half a dozen schools.

Community Energy - Malawi

Through their commercial arm, Waste & Energy Technologies, CEM just commissioned an 80kW solar mini-grid in the village of Sitolo. This provides critical life-changing energy in a country where only 11% of the population of 17.5 million have access to power.

Community Transformation Centers - Papua New Guinea

The political unrest in PNG and the untimely death of Dr. Larry Hull has paused the project in PNG. Unused funds were returned to the ISV treasury. This project is pending further action.

Global Himalayan Expedition - India

GHE led 6 expeditions to villages in the Himalayan Mountains where responsible travelers provided electricity to these remote communities using solar power. Six more treks are planned for 2020. GHE has been recognized for its global eco-tourism efforts

Green Village Electricity - Nigeria

GVE signed a tripartite agreement with Abuja Electricity Distribution Company and Wuse Market Traders Association for the development of a 1MW interconnected mini-grid system in Wuse Market FCT – Abuja. Major funding from a consortium of government, equity and loans has propelled GVE operating 18 mini-grids with half a megawatt of combined generation capacity serving the needs of nearly 300 businesses and 5,000 households

Darway Coast - Nigeria

IEEE Smart Village has joined the U.S. Africa Development Foundation and ALL-ON to fund two solar powered micro-grids in the Etchie region of Nigeria. Henry Ureh, CEO, has secured funding from multiple sources to start the projects.

The Maa Trust - Kenya

Brick production has increased and construction of the new IT hub is nearing completion. Design of the power system for the training center has been completed, with installation anticipated in 2020. Jude Numfor, REI-C, is assisting with the design and installation. The first set of training camps for teachers and students are scheduled.

1000 Hills Honey Enterprise - Rwanda

Cyiza Augustin has begun a systematic business plan for commercial honey production. A market survey, price analysis, and best practices collection is underway.

Nam Can Tho University - Vietnam

Bending Bamboo has recently partnered with Vietnam's largest provider of renewable energy in the country. Schools will be able to access a collaborative platform for community-based learning. The support from ISV has been leveraged over 100% by a US semiconductor company whose Vietnamese workforce will also access materials and classes designed and offered by this project.

Trinity Business Solutions - Namibia

The Puros village community solar water pump, after 5 years of continuous operation, was provisioned with new batteries and pump maintenance which re-engerizes the local school and community center. Now, with the addition of streetlights, the village has fresh water and a vibrant evening life.

Reliable Energy Innovators - Cameroon

The digital education platform developed by REI-C is now running with a pilot deployed in the city of Yaoundé. Deployment in the village of Sabongari has been delayed by ongoing violence by Separatist fighters. Jude Numfor has developed the production prototype for SunBlazer IVs to be manufactured in Cameroon.

Seva-Bharati - India

Work at Seva-Bharati has been delayed by a lapse in the organization's FCRA certification. A partner NGO has agreed to accept the remaining tranche funds to their FCRA accounts on SBI's behalf. Preparations for classrooms and curricula delivery continues.

Shaybis Nigeria Limited - Nigeria

SNL produced the first SunBlazer IV manufactured outside the USAThe first group of students completed the training program in a new technical center with practical electrical engineering curricula. The project is now conducting outreach to increase enrollment and awareness of the program. This is the first AutoCAD training center in the region.

Shakti Empowerment Solutions- India

SES was the beneficiary of a donation by REC (See Page 10) which significantly increased their capacity. The community education through the United for Hope program increased enrollment for after-school programs and women's empowerment sessions. Development of vocational training and business basics curricula is ongoing. A co-ed program for menstrual health education was launched, raising awareness in the community.

Torchbearers Foundation / Igniting Africa - Cameroon

The solar and computer training centers have been completed. An agricultural training center is currently under construction. Students in the work-study program have been installing microgrids and home electrification systems for village customers. A dormitory has been added for students in the hands-on learning programs.

Youth in the Darway Coast of Nigeria are learning new job skills.

SHOW YOUR SUPPORT

Your help is needed to continue more great work in 2020! IEEE Smart Village relies on the generosity of supporters like you, who contribute to a dedicated fund, administered by IEEE Foundation. Contributions can be made via: Smart Village Donation.
Questions? Send an email to donate@ieee.org or call 732.562.3915.

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