INSIGHT

TECHNOLOGY PROFILE: SOLAR POWER AND THE ETHOS OF VOLUNTOURISM

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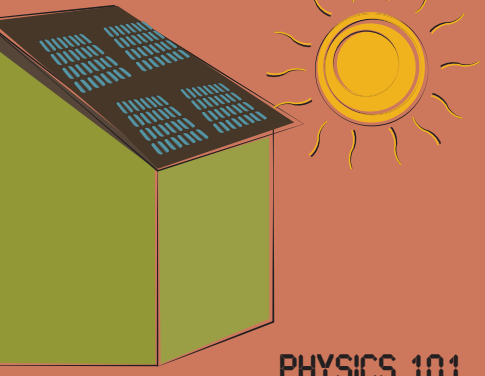
Every day, it seems, we're told that the dominance technology holds over our lives is crippling us. We cannot be without cell phones for more than a few minutes. We feel the need for constant connection to the Internet. Studies have suggested that individuals growing up with lifetime access to broadband Internet have trouble focusing on information for extended periods of time and cannot retain knowledge as well. We play video games instead of playing sports with friends. We pillage the globe for rare earth materials to make our cellphone and laptop batteries. It seems that every improvement technology offers is coupled with an equal but opposite detriment.

These advancements have certainly made life more convenient. They can empower individuals with knowledge. But these detractions raise the question: Are we creating any technologies that can help people's lives without the downside? In the case of solar photovoltaic power, GRID Alternatives, and Power to the People, the answer is yes.

Photo courtesy of GRID Alternatives



PHYSICS 101

In the simplest terms, a PV cell is made out of a semiconductive material (silicon being the most common in today's applications). When sunlight strikes its surface, a portion of the sun's energy is absorbed within the semiconductor. That energy, in the form of photons, knocks electrons loose from the silicon atoms, allowing the electrons to flow freely. The PV cells are designed to have one or more electric fields that force those freed electrons to flow in a certain direction; this action creates a current. If you put metal contacts on the top and bottom of the PV cell, you can then draw that current off for external use.

This scenario produces a direct current, but all Western electronics run on alternating current. So, the PV module requires an inverter to make that transition. Once it has inverted the power, there are two types of systems for utilizing that electricity — grid-tied and off-grid.

Grid-tied implies that the building in question is connected to a central electric grid through which utility providers transmit power. In that case, the electric meter on that building will track how much power the building consumes and subtracts the amount of power the PV module sends back into the grid. This dramatically reduces the resulting electric bill. And, if the building produces more power than it consumes, many states require the utility company to buy the power back from the building owner.

Off-grid means that the building is not connected to an electric grid. As such, there's nowhere to send the power being produced, and you can't utilize solar power when the sun isn't shining; so, you must couple the PV system with battery technology. Off-grid PV modules almost always send their power to a battery bank to store the electricity. Then, as the building requires power, it simply draws it from the batteries. This is especially prevalent in rural and/or impoverished areas.

WHY DOES SOLAR POWER MATTER TO VOLUNTOURISM?

Few would dismiss the need for medical care, education, safety, or financial security within a community, especially if the community lies at the lower end of the socioeconomic spectrum. What is one prerequisite those considerations have in common?

The need for electricity.

For people living in developed countries, the need for power may not come to mind when thinking of the developing world's largest problems. As something many of us take for granted, electricity is often overlooked as a vital step in modernizing and empowering impoverished communities.

If individuals live in a remote village with no power, they can't call an ambulance in case of medical emergencies. Hospitals and health centers cannot operate at night. Doctors cannot use modern instrumentation. Students cannot do homework at home unless by kerosene lamp; this is harmful to their eyes and their respiratory systems, and is a huge fire hazard. Individuals have no access to the information and freedom of the Internet. Many life-saving technologies, like water purification systems, often require power to operate. What good is having that technology if you can't power it?

The increased efficiency of PV cells and the falling cost of panels could be a windfall for the developing world. No other technology offers the ability to generate power for isolated communities on the same scale. According to Engineers Without Borders, at the turn of the century, 70 percent of rural populations in developing nations lacked access to power. Small solar devices, such as rechargeable lamps, enable individuals and households to cook, work, and study at home without damaging their health or endangering their home. Larger-scale PV arrays can power hospitals, schools, and community centers without any of the harmful effects of pollution and climate change. But, despite these advantages, solar power systems require engineering expertise and considerable capital to design, purchase, ship, and install in remote areas.

Before delving into the ways voluntourists can help overcome those

Photos courtesy of (Left) Power to the People (Right) GRID Alternatives

obstacles, however, it's worthwhile to look back at the history of photovoltaic technology and explore how the different solar power systems work.

POWER OF THE FUTURE...AND OUR PAST

The shortcomings of fossil fuels are well known to anyone who values science and the health of the planet. Fossil fuels are limited; extracting them is a filthy and dangerous process for workers, the local ecosystem, and nearby residents; and they are the primary driving force behind pollution and climate change. The ability to power the conveniences of modern life comes at a staggering cost when using these dirty power sources. The sun, on the other hand, provides a colossal amount of usable energy that is clean, available, and free.

Utilizing the sun for power dates back to the 7th century B.C. At that time, sunlight was simply magnified or concentrated to make fires. Fast forward to the 1950s — solar photovoltaic (PV) modules emerged in the middle part of the decade at Bell Labs and eventually became indispensable to NASA's space program during the 1960s as a way to power satellites and space stations.

In the 1970s, PV systems were used to power many off-grid applications such as warning lights and horns for lighthouses, railroad crossings, etc. In the 1980s, PV systems had become sophisticated and efficient enough to provide power for residences and commercial buildings. Today, technical advances allow larger PV arrays to provide a small city's worth of electricity.

BOOTS ON THE GROUND

Power to the People and GRID Alternatives are two of the forerunners in the non-profit solar industry. GRID, founded in 2001, operates domestically whereas Power to the People, in business since 2008, focuses on Central America, specifically Nicaragua. And while they both install solar power systems as nonprofit corporations, they employ two distinct business models with a corresponding ethos for each.

Power to the People

Jenean Smith began her career in the solar industry in 2007 as a marketing communications manager for Mitsubishi Electric. But her desire to help people dated back much further, leading to her enrollment in the Peace Corps in 2001.

"After the Peace Corps ended, I realized you don't need a formal structure like that to keep helping people," said Smith. "It was a desire to continue helping people that were living in severe poverty on my own" that led her to found Power to the People.

Having a background in voluntourism and the solar industry, she started a renewable energy Meetup Group in Los Angeles, California. They attended conventions and tradeshows, but Smith began to feel that itch to work on projects firsthand. So, she floated the idea of traveling to Nicaragua, where she was stationed during her time with the Peace Corps, to install a PV system in a familiar village that lacked power. Five people demonstrated interest, and Power to the People had begun.

"We were not a 501(c)(3) at that time, but it was really just an experiment to see if we can even do that. And after that was successful, and we realized that this is really something

Photo courtesy of GRID Alternatives

we could do, we formed a 501(c)(3) and became a little more formal about how we did things."

Power to the People employs one staff member in the U.S. and two field project managers working in Nicaragua. The field project managers "travel around to potential sites, check them out, and meet the community members... Through visiting a lot of different potential communities, we select the ones we think are the best candidates for us to work in," Smith said.

Power to the People typically sends three trips a year to Nicaragua, but they have four planned for 2014. Each trip has anywhere from five to12 individuals, and participating requires neither solar nor Spanish language experience. Most of the voluntourists are in their late 20s to early 40s, but Power to the People has had participants ranging from teenagers to people in their 60s. The trips last for eight days and cost around $1,600.

Of those eight days, four are reserved for travel and cultural immersion while the other four are dedicated to installing the solar systems. "When you're on the trip, you can contribute to the solar installation as much or as little as you want," Smith said. "Some people just want to travel and take pictures, whereas others really want to get involved with the solar aspect of it."

Both are fine with Power to the People; they simply want to help as many people as possible. Sometimes, those in need of help aren't Nicaraguan, though.

"The people we're helping in Nicaragua are not the only people in need. I would say we, the travelers, are also people in need, and we benefit a tremendous amount from traveling," said Smith. "Experiencing life in another culture and seeing how people are truly living in poverty helps us have a little bit of perspective.

"I'm not interested in having an organization where people just pay money to have professionals install the systems, because a large part of the benefit of doing these projects is the cross-cultural exchange."

Voluntourists stay with host families while in Nicaragua, and Smith wouldn't have it any other way. "That, to me, is so key. It helps the community members feel more invested in the project so they are more willing to maintain the systems afterward." Furthermore, groups like Power to the People "organize opportunities that you would never be able to have on your own. If you just went as a backpacker, you'd never be able to have that four-day stay in a community. That's so enriching, and it's so worth it to learn about how other people are living."

Because the villages in which they work are completely off-grid, Power to the People specializes in installing battery-based PV systems — which means those systems are more expensive and more complex.

"We train the communities quite a bit to maintain their own systems after we install them," said Smith. But through that cross-cultural exchange, Power to the People engenders a sense of responsibility within those communities to ensure that they maintain their systems properly.

Overall, the ethos of Power to the People falls directly in line with the voluntourism movement. "I think it's really great when people choose to

do voluntourism vacations, because it's always a lot of fun to vacation and relax, but I think that when you help other people at the same time, your vacation is so much more fulfilling."

GRID Alternatives

Founded by Erica Mackie and Tim Sears in 2001, GRID Alternatives focuses on providing solar power to low-income families in the U.S. Both Mackie and Sears were employed by for-profit solar companies, whose target audience was, by definition, middle- and upper-class homeowners who could afford the cost of the systems. But, they both saw a need and an opportunity to service lower-income households.

In describing their motivations, Bret Carr, volunteer and training coordinator for GRID, said, "lower class people that could use solar probably more than anybody else [were] being left out of the equation. So they thought, 'hey, how can we get these people access to solar?', so they fundraised and sponsored a couple of installs that went fairly well. People were into it, so they started pursuing it more aggressively."

Now, GRID boasts eight regional offices — seven in California and one in Colorado (they're opening a ninth in New Jersey sometime in 2014) — with 11,000 active volunteers and 130 full-time staff members.

Unlike typical voluntourism opportunities, in which the byproduct of your effort is travel, GRID Alternatives takes a different angle: "We basically do job placement for volunteers because we're not only a nonprofit solar contractor, we're also work force development," Carr said. "There's not a lot of spots for people to get hands-on experience installing solar, so we try to utilize that aspect of the organization to connect people who are looking for jobs in solar to be experienced and learn to do actual jobs."

GRID utilizes a mostly volunteer workforce on the actual installs, and people are clamoring for the opportunity to donate their time. "In the other organizations that I worked for, you have to find the volunteers — they don't just come to you," said Carr. "But here, they literally just come to us. And we actually have a problem where we have more volunteers than we can actually take on."

This focus on acquiring marketable job skills in lieu of travel produces a different motivator for volunteer involvement.

When he was a volunteer coordinator with the United Way and Ashoka, Carr believed the main reason people were volunteering was because they wanted to help the community. Whereas with GRID, "rarely do I find someone who is really interested in helping low income communities access solar. I think all of [the volunteers] are happy that that's an aspect to it. Nobody is against that, but it's not the main reason people volunteer. For the most part, it's all about getting experience with solar."

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> *Founder of Power to the People*

Carr believes that people "will come and volunteer as long as there's something in it for them." And even though this flies in the face of voluntourism's general culture, who is to say that this is not a better involvement model? Business is booming for GRID Alternatives.

SASH

GRID focuses its efforts almost exclusively on the Single-family Affordable Solar Homes (SASH) incentive program within California. SASH provides fully subsidized solar systems to qualifying homeowners that fall within the service territories of Pacific Gas and Electric, Southern California Edison, and San Diego Gas and Electric. GRID is the program manager for the entire state and handles the process from application through to collection.

"We put up the money for the system, and we help [the homeowners] with the application," Carr said. "We actually submit the paperwork for them… they don't have to work with the state." Once their application has been submitted and approved, GRID installs the system and collects the subsidy.

"We get a lot of funding from the State of California," Carr said.

By helping so many families access solar power, GRID has also received the lion's share of SASH subsidies. In 2011, the most recent tax year publicly available, GRID raked in $18,597,598 in revenue from SASH alone. Contributions and grants, including in-kind donations of equipment — like solar panels and inverters — added another $2,426,035. According to the SASH website, the 3,024 previous installations, combined with the 567 projects awaiting installation or under review, equal $67 million in incentive money.

Carr confirmed that this type of support allows GRID to employ lobbyists to help enact and/or preserve beneficial policies within the California legislature. SASH was originally set to expire in 2015, but has since been extended to 2021. This will allow for even more volunteer training, more economic empowerment for low-income homeowners, and more jobs — both within GRID as well as with sub-contractors. But, should we second-guess these more corporate tactics as betraying the spirit of voluntourism, or should we simply concern ourselves with the total amount of good accomplished, regardless of methods or motives?

ENDS, MEANS AND IN-BETWEENS

Power to the People toes the voluntourism line and enriches lives by doing so. But, it has been able to send only a little over 100 voluntourists to Nicaragua over the last six years. That's an impressive accomplishment in and of itself. But on the flip side, by using a more business-minded approach to voluntourism, GRID Alternatives maintains an active volunteer corps of 11,000 individuals that have installed over 3,000 systems. Even though it's easier to do a weekend installation project within a couple hours' drive rather than fly to

Photos courtesy of Power to the People

Nicaragua, that's still a large disparity.

What does that say about whether voluntourists actually care about helping others? Does the corporate nature of GRID and its volunteers tarnish the results of their efforts? At what point do motivations matter? Or, should the ends simply justify the means?

Carr, coming from a background within more traditional volunteer organizations, voiced similar apprehension: "The main reason people get involved is for getting experience with solar, which makes us really unique and puts us in an interesting spot. I'm not sure how I feel about it."

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> *GRID Training Coordinator*

On the one hand, you are straying from the altruistic volunteering model. You could almost classify GRID's volunteer corps as unpaid interns simply putting in the prerequisite time to earn a job in a burgeoning industry. Does that really matter, though? The volunteers are ostensibly improving their career opportunities while, at the same time, enriching and empowering the lives of low-income Americans. Who are we to judge the motives of the volunteers so long as the end is good?

GRID seems to have tapped into a basic human characteristic and leveraged it to accomplish something positive — people generally act in self-interest. It's difficult to get people to sacrifice their time, effort, or money for something from which they expect no tangible return. But, if you can pair a self-interested act with a desirable social, economic, or environmental output, then you can leverage a self-serving action into a greater good.

In the end, each organization could learn something from the other. GRID could work harder to engender a sense of service and altruism among its volunteer corps — put a face on who you're helping and augment your recruitment messaging to highlight project results as opposed to individual marketability.

Likewise, Power to the People could look into expanding its operations and scope by marketing its trips as being more than just altruism, but also giving individuals marketable skills in the renewable energy industry. People would still be working with Power to the People to improve lives, but Power to the People could recruit more voluntourists and do more good overall.

There can be little doubt as to the opportunity solar power presents for improving, empowering, and enriching lives. Capital costs are still high, and it requires field expertise to execute, but few technological advancements hold as much promise as solar photovoltaic systems. As can be seen via Power to the People and GRID Alternatives, though, there are numerous paths to adoption and implementation.

In the same way that technology brings both positive and negative effects, so too are there organizations implementing these solutions in different ways. We must figure out how to harness the opportunities technology present without having to endure any equal but opposite side effects. Likewise, there should be a middle ground between the corporate ethos of GRID Alternatives and the purely voluntouristic ethos of Power to the People. By finding that path and treading it, an organization would be able to help the most people and do so for the right reasons.