Energizing Development? Renewable energy technologies and social enterprise in rural India

A thesis submitted in partial satisfaction of the requirements for the degree Master of Arts in Geography

by

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2016
ABSTRACT OF THE THESIS

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Master of Arts in Geography

University of California, Los Angeles, 2016

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In India, there has been an outburst of social enterprises seeking to catalyze rural development and simultaneously address environmental concerns by spreading renewable energy technologies. This thesis compares two such organizations in order to answer two important questions: What effects do the shifts towards the social enterprise and renewable energy technologies have on the projects of development organizations in rural India? What are the implications of these changes on the poorest rural inhabitants? The thesis examines the shared assumptions of both organizations, tracing their origins in dominant development discourses and trends. Then, it explores the ways these assumptions manifest in the projects and development imaginings of each, revealing the gaps they create. An awareness of the limitations of these trends is necessary to avoid negative outcomes and direct development efforts to the poorest.
The thesis of Amanda Pearson is approved.

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2016
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1. Introduction

This thesis explores two organizations seeking to catalyze development in rural India with renewable energy technologies. Both organizations aspire to do so through social enterprise and nongovernmental organization (NGO) partnerships. One is a social enterprise, or business with a social mission. It seeks to bring electricity to rural areas through the sale of small-scale solar photovoltaic technologies. The second, a nonprofit, works to create affordable, bio-fuel based energy technologies designed specifically for rural people. At first glance these organizations are quite different in terms of their location, organizational type, and types of energy and technologies they provide. However, I argue that both operate with a shared set of assumptions that, while they manifest in each organization in different ways and to varying degrees, shape the type of projects and rural futures each organization pursues. These assumptions include naturalized, accepted, and taken for granted beliefs and decisions about what development needs and should look like. In this thesis, I focus on the similar ways each organization engages with rural people as a singular category—poor and different from urban people—and the types of renewable energy projects targeted at them. I also examine the beliefs that energy and technology are the missing links that will address poverty, and that social enterprise and market solutions are an effective way to achieve development.

These assumptions are influenced by a variety of powerful discourses, actors, and trends that help make up the development space in which both organizations operate. These include international development discourses and projects regarding poverty alleviation, renewable energy for environmental sustainability, climate change mitigation, and universal access to modern energy. It also involves shifts in the funding
environment that favor social enterprises as the model of choice to achieve development, and the coinciding rise in supportive organizations that foster social entrepreneurs and impact investing. And it includes trends in management schools and business strategies that target the world’s poor as the next market frontier.

While both organizations seek to create inclusive development for rural areas, these assumptions shape the type of projects they pursue and limit the scope of their work. If gone unchallenged, the limitations they impose may disproportionately disadvantage the poorest rural inhabitants. Using Anna Tsing’s (2005) concept of ‘gaps,’ I analyze how these assumptions provide a framework for development that works to naturalize certain decisions and projects while alternatives fall into zones of illegitimacy or invisibility. Either foreclosed as an option or completely omitted from consideration, they become unknowable, and therefore no longer possibilities.

The thesis begins with a brief discussion of research methods, followed by a comparison of each organization’s mission and work. The fourth section explores the similar assumptions made by both organizations, including descriptions of each and an analysis of their possible implications. This section is divided into four parts: the first and second examine assumptions related to the way each organization imagines and interacts with rural people. The third and fourth consider assumptions about the way rural development is pursued. The paper ends with measured hope. If the NGO and social enterprise staff members are aware of these assumptions and their implications, they can consciously shift projects and planning to work against them and avoid the negative consequences discussed below.
2. Methods

This project was inspired by two development trends that have been on the rise, particularly in the last decade. The first is the increasing focus on renewable energy technologies as the missing link and solution to both end rural poverty and mitigate climate change. The most notable proponent of this approach to development is the United Nations Development Program. Second is the shift towards privileging the business model and market solutions as effective development agents, particularly the rise in prominence and occurrence of social enterprises and attempts to engage with the world’s poor as potential new markets. In India, there has been an outburst of social enterprises seeking to catalyze rural development and simultaneously address environmental concerns by spreading renewable energy technologies. Such dramatic shifts in the development landscape necessitate several questions. I am particularly interested in asking: What affects do these shifts have on the projects of organizations working in rural India? What are the their implications for the poorest rural inhabitants? An awareness of these trends and their limitations is necessary in order to prevent negative outcomes and direct development efforts towards the poorest.

This thesis presents two cases for comparison, an NGO and a social enterprise working to spread renewable energy technologies in rural India. I selected these organizations because they are representative of the main approaches to spreading renewable energy access in rural India in terms of organization type, energy type, and ideological framework. However, as I discovered during research, the NGO had also developed a social enterprise to market its technologies. This surprising finding illustrates the pervasiveness of social enterprises. The comparison of these two organizational types allows us to trace both the influential discourses, actors, and trends that make up the current development space in India, particularly regarding renewable
energy, rural poverty alleviation, and climate change concerns. It also allows us to see how assumptions inherent in these discourses and trends manifest themselves in the projects of idealistic development organizations working in rural areas. Uncovering these also allows us to analyze how they shape development projects and possibilities as well as the implications they may have for development outcomes and the rural poor.

The names of each case study organization have been changed to pseudonyms. The first, Sun Power, is a social enterprise based in Kolkata that operates in the eastern states of West Bengal, Odisha, and Jharkhand. It works to spread solar electricity technologies to its constituents. The second, Scientists for Rural Technology (SRT), is a non-governmental organization based in Pune, Maharashtra. SRT operates many programs through its training center and throughout the state of Maharashtra in western India, but its technologies and work have spread across India and to many other countries. It develops technologies that utilize agricultural waste and other locally available biomass for fuel.

This thesis was inspired by research conducted over 10 weeks from June to September 2014. During this time, I met with many people and learned about as many organizations involved as I could in order to get a full picture of what is happening with renewable energy in India. I conducted interviews, attended conferences, toured organizations, and gathered publications and information about organizations working in the renewable energy sector in New Delhi, Rajasthan, Maharashtra, and West Bengal. I met with people from policy think tanks, science-based organizations, environmental and social activists, universities, NGOs, and social enterprises, including Sun Power and SRT. This fieldwork has strongly informed my analysis, although for issues of privacy I have opted to focus on print and media sources.
Therefore, my analysis utilizes print and media materials I gathered about Sun Power and SRT from June 2014 to May 2016. These include published materials available through web sites, brochures, educational and marketing films, and social media sites. Also examined were news articles and YouTube videos featuring information about each organization and interviews with founding members. Finally, I examined the websites of each organization’s partners, including investors and philanthropic funders, knowledge- and mentorship-sharing institutions, collaborating NGOs, social enterprises, spin-off organizations, government agencies, financial institutions, and university programs, which provided insights into the influences on each organization’s vision and work.

3. The Organizations: Sun Power and Scientists for Rural Technology

This section provides a comparison of two organizations, which I refer to as Sun Power and Scientists for Rural Technology (SRT). Both of these organizations seek to catalyze rural development using renewable energy technologies. Access to clean, modern energy services, which are usually analyzed in the two categories electricity and cooking fuel, is a problem across India. According to the International Energy Agency (IEA), an autonomous, intergovernmental organization that generates statistics on energy sectors, 237 million Indians, or about twenty percent of the population, lack electricity access. Many of these people live in rural areas, where the grid has not reached at all or is patchy. Many villages and hamlets across the country are located away from roads, in mountains or forests and other areas that are expensive and difficult to reach. People who do not have grid access rely on burning kerosene and diesel for their lighting and other energy needs, or they live without them. These fuels are expensive, often difficult to procure, and pose fire hazards. Organizations seeking to
spread solar photovoltaic technologies to rural areas claim the lack of grid power or other affordable energy sources is the main cause of stalled progress in the health, education, economic, and information sectors (“SE4All,” April 7, 2016; “Punam Energy Pvt Ltd,” April 7, 2016).

The IEA also estimates 841 million people, about 67 percent of the population, rely on burning biomass, such as cow manure, firewood, and agricultural waste for cooking fuel (“IEA,” April 7, 2016). Development organizations find this problematic for several reasons. According to the World Health Organization’s (WHO) 2012 data, traditional cook stoves that burn biomass generate indoor air pollution that causes 4.3 million premature deaths each year globally (“WHO,” April 7, 2016). WHO also states collecting these materials is time consuming, taking women and children away from school and other productive activities, and often puts pressure on local environments.

The two case organizations in this study formed in response to these widespread energy concerns of lack of electricity access and reliance on expensive fossil fuel and smoky biomass for cooking and energy needs. However, each offers a distinctive approach to the issue.

Sun Power defines itself as a social enterprise, or business with a social mission. Two brothers, whose previous experience is in management, economics and finance, founded the organization in 2009. Based in Kolkata, it operates on the eastern side of India in the lush, tropical, heavily forested states of West Bengal, Odisha, and Jharkhand. The Center for Science and the Environment (CSE), a research and policy advocacy organization operating in New Delhi, writes lack of electricity access is a “chronic” problem in these states; Less than half the population of Jharkhand and Odisha are connected to the grid, and just over half of West Bengal’s population is
connected (“CSE,” n.d.). Sun Power tries to increase electricity access in the rural areas of these states by selling solar photovoltaic technologies and ‘innovative solutions’ to rural energy needs. A physical challenge to their work is reaching people in swampy mangrove areas, a difficult but an important area to reach for global climate mitigation and biodiversity preservation efforts.

Alternatively, Scientists for Rural Technology (SRT) was founded in 1996 as a non-governmental, nonprofit organization by a group of twenty scientists, technologists and social workers. Although this organization opens its technologies to people around the world, it works primarily in Maharashtra, a state on the western side of India. Although more than 80 percent of this state is electrified, many of its citizens located away from roads in the mountainous areas of the state have yet to be reached by the grid (“CSE,” n.d.). Likewise, the majority of rural inhabitants in the region use smoky, traditional cook stoves and many rely on expensive fossil fuels for energy needs. SRT formed as a research and development organization to address this concern by developing new technologies that are cleaner and rely on affordable local fuels and materials, as explained on its Department of Science and Technology website (“DST TARA SEED Division,” April 7, 2016).

The rest of this section provides details that differentiate each organization, including technologies, projects, mission, vision for rural development, and influential discourses and funding sources. However, as this discussion elucidates, these organizations are not as dissimilar as they may seem; the time and development space in which both operate provide a context and a number of influential forces that shapes the vision and work of each in very similar ways. It concludes with an examination of their most notable commonality—use of the social enterprise model.
3.1 Technology and Projects

Sun Power’s focus is on providing electricity to rural people who do not have access to grid power. Its stated vision is to provide energy solutions to underserved rural populations. They offer a range of solar products, provide reliable after-sales service, and help consumers with financing for solar systems, all to develop an ecosystem for sustainable rural development and empowerment. Sun Power offers a variety of individual, household, and community level products and systems, all of which use solar photovoltaic technology as their energy source.

Sun Power’s products and systems may be split into two categories. The first consists of devices from the market that Sun Power tests and selects for durability and reliability before selling in rural areas. Sun Power’s cheapest and most accessible products are the solar powered lamps and lanterns. These have built-in solar panels and batteries that can provide light that lasts from four to 36 hours. Some models also include mobile phone charging capability. Sun Power also offers a variety of household-scale solar systems. Customers can select the size of solar panels and batteries they need to support televisions and fans in addition to lights and mobile phones. Sun power sells appliances to be used with these systems, as well as inverters that allow connection to the grid where available. Finally, Sun Power offers two institution-scale technologies. The first, a rooftop water heater, is targeted towards schools and hospitals. The second is a solar powered street lamp, which is popular with village-level governments. These streetlights are particularly desirable in the Sundarban mangrove forests, where they provide safety from snakes and other predators (“Punam Energy Pvt Ltd,” April 7, 2016).
Sun Power also proudly offers its own innovations and energy “solutions.” Instead of simply selling devices, they use their information networks and own ideas to find and test innovative new ways of using technologies, collecting payment, and organizing ownership and use. One such solution is their micro-grid solar systems, which serve several households. These systems are owned and operated by rural entrepreneurs, and surrounding households pay them a fee for the electricity they use. Sun Power is experimenting with a remote monitoring system and prepaid payment plans. Sun Power states these give more control and flexibility in payments for the owner and users (“Punam Energy Pvt Ltd,” April 7, 2016). Another innovation is their solar irrigation pump, which connects the pump to solar panels instead of a diesel engine or unreliable grid power, allowing farmers another way to irrigate their crops. A third innovation is the solar computer centers, which provide computer and information access to rural areas. Sun Power also emphasizes after-sales service, and if a product or system stops functioning, the user may simply call Sun Power to have a technician come
to identify the problem and fix or replace parts as necessary (“Punam Energy Pvt Ltd,” April 7, 2016).

In addition to these products and innovations, Sun Power prioritizes developing relationships with banks and microfinance lenders. This is necessary in order to make its products available to rural areas where lenders view both the residents and solar technologies as risky investments. Over time, they have been able to build a rapport with several financial institutions and demonstrate solar technologies can be profitable (“Punam Energy Pvt Ltd,” April 7, 2016).

SRT projects and technologies differ in approach. This organization seeks to design technologies and make them available to improve the lives and economic potential of rural people. Low cost and availability of materials are design essentials in all of their projects. SRT’s activities to achieve this goal can be split into three parts: research and development, entrepreneur training, and marketing. The bulk of staff energy is spent on technology design and improvement, and the organization splits its research into the categories ‘bioenergy’ and ‘agri-horticulture.’ Bioenergy technologies seek to use locally available, non-food or fodder agricultural waste efficiently and safely. One of their main targets is improved cook stoves and cooking devices. Traditional biomass fuel stoves are inefficient and produce large amounts of indoor air pollution responsible for a high number of preventable deaths. SRT’s stove models are 25 percent more efficient, produce less smoke, and funnel smoke outside. They sell two pre-made metal stove models, but their most popular and innovative models are a variety of molds people can use to make the traditional mud, clay, or cement stoves. SRT designed these to accommodate local cooking customs, such as vessel shape, number of burners, cooking methods, and fuels used (“DST TARA SEED Division,” April 7, 2016).
SRT’s inspiration for several other cooking technologies arose from the dual concern of a lack of availability of quality cooking fuels and the overabundance of low quality agricultural waste. SRT has designed a series of technologies that may be used together to solve this problem. The first is a simple charring kiln and method that turns the light sticks and leaves remaining from cotton and cowpea crops into charcoal. Second is a process for turning powdery agricultural residue that remains after harvesting crops into a fuel by mixing it with cow dung. Rural users can then turn both the charcoal and the powder and cow dung mixture into briquettes using their choice of a variety of SRT-designed molds and briquetting machines. These briquettes may then be sold for use as cooking fuel. The final technology in this chain is the Sarai Cooking System, which uses these briquettes to efficiently cook for an entire family. It consists of three stacking containers that sit on top of a heating implement. This unit fits inside a
larger canister with a cover and a handle, making it portable. The three stacking containers each hold a separate food item, typically the rice, lentil, and vegetable combination of a typical Indian meal. The food cooks slowly, efficiently, and with little effort (“DST TARA SEED Division,” April 7, 2016).

Another important SRT innovation is the compact biogas system, also known as a ‘digester’ because it uses the bacteria found in cow dung to ‘digest’ kitchen scraps and produce biogas for cooking. The system is made out of two rain barrels, one inverted inside another, and some plumbing hardware that seals the system and routes food in and gas out. The inverted rain barrel rises as it catches the freshly produced gas, and lowers as the gas is burned. The gas filters right into LPG burning stoves and provides a clean and high quality cooking fuel. The digesters come in two sizes and typically provide about half of a household’s cooking fuel needs. SRT is currently experimenting with ways to use this type of biogas for electricity as well, both by connecting biogas plants to generators for backup power, and as a mini-grid fuel for villages too remote for grid connection (“DST TARA SEED Division,” April 7, 2016).
SRT’s second research area is agri-horticulture, and its researchers have designed several technologies and systems to provide farmers new income-generating activities. These include water collection techniques, solar food driers, raised beds and cheap greenhouse techniques that increase yields and reduce labor, and a tissue culture laboratory. All of these technologies are accomplished using strengthened bamboo, plastic sheeting, rainwater, pressure cookers, and jam jars. These technologies are designed to be as simple, cheap, and effective as possible. SRT’s ongoing task is to collect feedback about existing technologies and conduct further experiments to improve them (“DST TARA SEED Division,” April 7, 2016).

SRT also seeks to make its technologies available for use through both training and marketing activities. Trainings are conducted through an entrepreneur training center located in a rural town. Once people receive training, SRT allows them to reproduce the technologies at will, and encourages them to start businesses selling them to others. SRT has also created videos in Marathi, the main language of Maharashtra, and English that are used for marketing and instruction. These videos describe the uses, benefits, and specific design features of the featured technology. They also detail exactly what materials are needed in what quantities, and show the step-by-step process of assembly. These DVDs may be purchased for a nominal fee and are also available on YouTube. As with training participants, anyone is allowed to use the videos to produce the technologies at will (“DST TARA SEED Division,” April 7, 2016).

In conclusion, the differences in each organization include the type of renewable energy that is prioritized, the types of technologies selected, means of distribution preferred, and part of the distribution chain targeted. Whereas Sun Power works to spread solar technology that provides electricity, SRT’s technologies emphasize biomass
and alternative fuels. While Sun Power sells pre-made devices for profit, SRT emphasizes a strong do-it-yourself component, as many of its technologies are able to be made and fueled with locally available materials. And while Sun Power focuses its efforts on distribution, financing, and maintenance, SRT focuses on research and development of new technologies. These divergent projects arise in part from each organization’s distinct philosophy and influences.

3.2 Motivation and Influences

Each organization describes its motivation for founding and the cause and solution of rural poverty in quite different ways. However, a similar set of development and economic trends over the last thirty years have strongly influenced the work of both organizations. This section begins with a history of the shift in development focus on renewable energy as the missing link to solve environmental and poverty alleviation goals that provided the context for the formation of both organizations. It then examines the individual motivations and influences of each organization, including the influential ideologies and partnerships of each. While these differ for each organization, it becomes clear that particularly strong development shifts, including neoliberal restructuring and subsequent changes in development ideology and philanthropic and investment practices have created a development space that has had similar influences on how both organizations operate today.

The United Nations Development Program (UNDP)’s Sustainable Energy for All initiative (SE4All) is a global project formed in 2011 to address climate change and energy access concerns. Their website states, “Without access to modern energy, it is not possible to achieve the Millennium Development Goals, the eight-pointed agenda adopted by the United Nations in 2000—whether reducing poverty, improving women’s
and children’s health, or broadening the reach of education” (“SE4All,” April 7, 2016).

This program particularly encourages the use of renewable energy technologies
delivered through decentralized means. This approach to achieving energy access and
global development goals has emerged from a confluence of ideas, actors, projects and
innovations in the last 25 years. Structural adjustment policies of the late 1980s and
early 1990s rendered building new energy infrastructure unviable (Cross 2013).

Jacobson (2007) notes that the 1992 UN Conference on Environment and Development
in Rio de Janeiro increased a focus on the importance of renewable energy, and by the
mid 1990s, international donor organizations, led by the World Bank and the
International Monetary Fund began to fund projects that would foster markets for these
technologies (Cross 2013; Jacobson 2007; Miller 2009). A quote from an article about
the successes and failures of minigrid solar systems by Acker & Kammen (1996) is
illustrative of the mood of environment and development actors at the time:

“The prospect of this future- over four billion people pursuing an energy guzzling
path akin to that of the so-called developed nations - is daunting. The potential
damage to the global environment and the depletion of natural resources is so
profound that environmentalists, resource economists, and many others are
rushing to advocate schemes that maximize the use of renewable energy
technologies in less developed countries (LDCs)” (81).

By the late 1990s, changes and advances in the solar photovoltaic industry made solar
technology cheaper and more efficient (Cross 2013). Although solar systems have
received the bulk of international investment, bioenergy projects shared some of the
limelight during this time. Models that had been designed and distributed in the 1980s
received criticism for bad design, and the health and environmental concerns of
traditional cookstoves were still pressing development problems (Agrawal, 2014; Ali &
Semwal, 2014). By the new millennium, these factors converged to create a very strong
foundation for seeking decentralized rural energy solutions using renewable energy technologies. These events provide the context for the founding of both Sun Power and SRT.

The original motivation for founding the social enterprise Sun Power can be summarized as combining concern about climate change with the lack of access India’s rural poor have to modern energy services. In an interview with journalist Prerna Raturi published in the magazine *Entrepreneur India*, one of Sun Power’s founders states, “The poorest spend the most on a utility such as power in these remote rural areas” (Raturi, 2015). This founder continues to explain his motivation for founding the organization by stating, “The entire movement, however, was a natural progression from a feeling of unease at how our over-dependence on fossil fuels is causing irreversible harm to the environment. That, and the faith in alternative energy sources” (Raturi, 2015). While this comment shows the centrality of environmental concerns, Sun Power’s website also emphasizes the desire to address rural poverty:

“Sun Power was spun off to address the significant gap in the rural energy situation. The failure of the grid to meet the energy expectations of the rural populace was clearly evident and attributable to the lack of development in these areas. People aspired for reliable energy beyond just lighting. Moreover, there was very poor after sales service provided for solar products and non-existent ecosystem for sustainable uptake of clean energy solutions. There was very little or nonexistent effort to address the needs of the large numbers of households at the bottom of pyramid.” (“Punam Energy Pvt Ltd,” April 7, 2016).

These quotations illustrate Sun Power’s work combines the environmental concerns of fossil fuel use with concerns for the lack of development in rural areas. They also show Sun Power identifies lack of access to electricity as the cause of ongoing rural poverty, and that the solution to both poverty and environmental concerns is to target rural people with renewable energy technologies. This particular balance of ideas and project
goals is directly linked to the discourse of the SE4All initiative. Two central declarations of SE4All are that energy access is central to achieving millennial development goals, and that rural people can leapfrog fossil fuel use for development by implementing renewable energy technologies. A direct link to this discourse is Sun Power’s partnership with the Indian nonprofit policy research organization The Energy and Resources Institute (TERI). TERI is SE4All’s capacity building hub, and is responsible for developing and spreading specialized training, education, and experiential resources to help organizations further SE4All’s mission (Punam Energy Pvt Ltd, April 7, 2016; “SE4All,” April 7, 2016).

In addition to direct influences from international development discourse, key philanthropies, investors, and management institutes also fund and influence social enterprises such as Sun Power. Sun Power receives funding, ‘knowledge partnership,’ and encouragement from several of these, including Unreasonable Institute, Halloran Philanthropies, ARTHA, and Indian Institute of Management-Ahmedabad’s Center for Innovation Incubation and Entrepreneurship (IIMA-CIIE). These organizations represent current trends in the development-funding atmosphere that have greatly influenced Sun Power’s work. Unreasonable Institute (UI), is a US-based for profit-non-profit conglomeration that works globally to, “Unite entrepreneurs with the potential to address major problems at scale...We then swarm them with hand-picked mentors, funders, and a global network to help grow their impact” (“UI,” April 7, 2016). UI seeks to be unreasonable in its goals for scale and impact, expecting each venture to impact one million lives. The for-profit section of this institute makes money from its entrepreneurial investments in social enterprises, while the nonprofit section receives funding from a large number of philanthropic and investment groups, including Bill &
Melinda Gates Foundation, Halloran Philanthropies, The Rockefeller Foundation, and BlueHaven Initiative, an investment group that seeks financial, social and environmental returns (“UI,” April 7, 2016).

American Refining Group CEO Harry Halloran founded Halloran Philanthropies in 2007. Halloran himself believes business is a driving force for social and economic change, and his foundation’s mission is to inspire, innovate and accelerate sustainable social interventions. The foundation operates globally, funding a mixture of nonprofit and for-profit organizations that, “Unleash the power of technology and innovation” (“Halloran Philanthropies,” April 7, 2016). This includes several organizations that foster social enterprises, including Village Capital and Unreasonable Institute (“Halloran Philanthropies,” April 7, 2016). ARTHA is a website and “online community” that seeks to connect Indian social entrepreneurs with investors seeking to fund high-impact ventures. The organization’s mission is to, “transform the face of investor/donor engagement with the vast, untapped markets at the base of the pyramid (“BoP”), otherwise known as the largest but poorest socio-economic group” (“ARTHA,” April 7, 2016). Its funding support comes from Switzerland-based investment advisory and impact investor Rianta Capital Zurich (ARTHA, April 7, 2016). IIM-A CIIE is the management school’s center that operates throughout India to bring about “disruptive change” through entrepreneurship. They seek this by, “Incubating, accelerating, mentoring, and funding innovative start-ups” (“IIM-A CIIE,” April 7, 2016).

These descriptions illustrate how these organizations blur the lines between philanthropy and for-profit investment, and for-profit and not-for-profit development work. The impact they have on Sun Power’s particular makeup is traceable through shared language. UI’s vision is mirrored in Sun Power’s mission, which is to impact one
million lives by 2017 and 10 million lives by 2023 (“Punam Energy Pvt Ltd,” April 7, 2016). The influence of all of these organizations may be seen in Sun Power’s own language on its website and about its projects, which emphasizes scale and impact, providing solutions and not just products, including incubating innovations, reaching BoP markets, and the power of technology and entrepreneurship for social and environmental change (“Punam Energy Pvt Ltd,” April 7, 2016).

The second organization, the NGO SRT, was founded thirteen years earlier than Sun Power with a distinctly different motivation and approach to rural poverty. SRT was a member of The Partnership for Clean Indoor Air (PCIA) during its operation from 2002-2012. This collaborative of almost 600 organizations globally worked to share information and expertise to reduce exposure to indoor air pollution in developing areas. The SRT webpage on this site situates its formation within the changes occurring in rural India following the structural adjustment programs of the mid-1980’s and early 1990’s. These programs favored tariff reductions, liberalization of exchange rates, and globalization, often at the expense of rural producers and artisans. SRT explains, “With the introduction of mechanization, automation, and mass production, goods produced by the organized industrial sector became so cheap that rural artisans could not compete with them. Destruction of the traditional rural enterprises led to pauperization of rural India” (“PCIA,” April 7, 2016). It continues to explain the increase in cost of fossil fuels, transport, and operation of modern industrial units provides a chance to revive rural and family owned enterprises that emphasize local sourcing and sales (“PCIA,” April 7, 2016).

This specific understanding of the causes of rural poverty in India shapes SRT’s work, as can be seen in its vision and mission statements. SRT’s main web page is
located on the Government of India’s Department of Science and Technology website.

Here, SRT states its vision is:

To serve as an instrument of rural development through application of scientific knowledge and technology. The primary objective of SRT is to develop, standardize, popularize & commercialise innovative rural technologies aimed at improving the quality of life and standard of living of the rural inhabitants of India (“DST TARA SEED Division,” April 7, 2016).

On the same site, SRT states its mission is to create, “Innovative appropriate rural technologies with special emphasis on making traditional rural businesses more profitable and also on generating novel employment opportunities in rural areas” (“DST TARA SEED Division,” April 7, 2016).

This organization has a very Gandhian sentiment, as Gandhi’s own vision for India was village-centric development that featured strong, local industries. Gandhi’s influence is also present in the appropriate technology movement as popularized in India by Amulya Reddy. The term “Appropriate Technology” was coined in 1973 by economist Ernst Friedrich Schumacher, in a globally influential work titled Small is Beautiful: Economics as if people mattered. The book’s publication stimulated an outpouring of development writing that declared the transfer of modern industrial technology to poor, rural areas in developing countries inappropriate (Ghosh, 1984). The prodigious writings of Amulya Reddy, a scientist by training, popularized the appropriate technology movement in India from the 1970s until 2006. He hoped to change the energy sector, which he argues bypasses the poor and ignores sustainability. Reddy also believed science and technology should be used as a weapon for the poor and directed at development. Reddy wished to correct the bias of research and development towards urban people by developing technology specifically for rural people. In 1994, just two years before SRT was founded, he co-authored a book, The Technological
*Transformation of Rural India,* in which he argues the existence of poverty-stricken masses proves that the market alone does not work. Instead, he states the market should be harnessed to spread appropriate technology. These technologies must be risk-averse, resource efficient, low investment, and suited to local conditions. This work calls for an emphasis on research and development as well as distribution and training (Bhalla & Reddy, 1994). SRT’s name itself derives from this movement, but its mission also directly aligns with the principles laid down by its Indian proponents.

SRT also holds another influential partnership with the Government of India’s Department of Science and Technology (DST). This department founded SRT in 1996; it then became an independent NGO five years later. A specific DST program, Technological Advancement for Rural Areas (TARA), continues to provide funding and support for SRT’s work (“DST TARA SEED Division,” April 7, 2016). The program’s mission is to nurture organizations like SRT as science and technology incubators. TARA particularly encourages the development of technologies that target livelihood generation and social benefits (“DST TARA,” April 7, 2016). SRT’s own language and projects replicate the emphasis on rural people, science and technology, livelihoods, and sustainability found in DST program names and missions.

As the two descriptions above show, both Sun Power and SRT focus on rural development, the environment, and technology. However, their understanding of rural poverty and the best ways to seek development, as well as their sources of influence, are quite different. Sun Power identifies the lack of electricity as the central hindrance of development rather than consider the initial causes of poverty. SRT, however, defines itself in relationship to a specific understanding of history that sees the rise of mechanization and mass production, and the subsequent decline of rural industry as the
central cause of poverty. Whereas Sun Power’s work focuses on extending markets and after-sales service, SRT emphasizes research and development of locally specific technologies. These differences also stem from the very different partnerships and discourses that have influenced each. While Sun Power is influenced by the most current UN development discourse that emphasizes climate change, energy access, and renewable energy, SRT relies on an older, more Gandhian understanding of sustainable villages and the appropriate technology movement. And while Sun Power’s influential partnerships include many business and philanthropy leaders, SRT’s main funding and support comes from the national government’s Department of Science and Technology. The appropriate technology movement in India is led by scientists, as is SRT itself.

In spite of these differences, each organization is influenced by the dominant development paradigm they both operate in contemporaneously today. Anthropologists Erica Bornstein and Aradhana Sharma (2016) describe the effects of neoliberal restructuring on both project design and funding structures in an article about the changing atmosphere for NGO and social change work in India. These include emphasis on a, “Technocratic approach to development, turning political issues of poverty, inequality and rule into technical problems” (Bornstein & Sharma, 2016: 78) as well as a tendency to “[Explain] away inequality by invoking free markets and efficiency... translat[ing] insistently moral and messy questions...into formal, disaffected languages and goals (Bornstein & Sharma, 2016: 79). The effects of these emphases are visible throughout the projects and organizations described above.

Bornstein and Sharma continue to describe the legacy of neoliberal restructuring on the availability of funding for change-seeking organizations when they write of, “The globally expanding trend of CSR [corporate social responsibility], as well as social
enterprise and venture philanthropy (Hopgood 2008; Rajak 2011), which promotes business models and market-based strategies for development, poverty alleviation, and social welfare” (Bornstein & Sharma, 2016; 85). They argue this process can, “Redefine development in terms of capitalist aims and interests, extending the reach of the market” (Bornstein & Sharma, 2016; 85). While the influences of these shifts are easily visible in Sun Power’s projects, funders, and partners, SRT’s structure and work have also been impacted.

For example, SRT is not immune to the growing trend over the last decade in which an increasing number of development actors have turned to the social enterprise model to help fulfill their missions. In 2005, SRT began handing over most of its technology marketing to a social enterprise, Vatavaran Technologies, run by two of SRT’s founding members (“Samuchit,” April 7, 2016). This change is part of a trend that may be seen in the large number of philanthropists, investors, and institutes dedicated to supporting social enterprises described above. SRT’s own partner, PCIA, is funded by Winrock International, a self-defined “enterprise incubator” that helps social entrepreneurs share knowledge, network, find funding, and connect with strategic partners (“PCIA,” 2016). It seems significant that SRT’s social enterprise spin-off took place in 2005, three years after the knowledge-sharing collaborative formed in 2002. Section 3.3 explores in more detail the shifting development space and the growing trend of using the social enterprise model and market solutions to seek poverty alleviation.

3.3 Rise of Social Enterprises

Social enterprise as a development model has become prevalent in rural India, especially in the field of rural energy access. When Sun Power was spun off from a
climate change advocacy NGO in 2009, its founders chose to make the organization a social enterprise, believing this would be the best way to be successful and have a large impact. SRT, although an NGO, has handed over much of the marketing of its technologies to a for-profit business group called Vatavaran Technologies. Founded by two of the original SRT staff members, Vatavaran Technologies has expanded its range to include solar devices and includes urban people in its marketing strategies (“Samuchit,” April 7, 2016). This section explores the rise of social enterprises as a model for development organizations and speculates why this rise has occurred. As development anthropologist Jamie Cross (2013) states, the widespread adoption of individual solar technologies by development actors, “Reminds us how difficult it has become to imagine ways of fostering life, or expressing a concern for others, without fostering markets” (2013: 18).

In a comprehensive study commissioned by the Inter-American Development bank in 2007, social entrepreneur and consultant Kim Alter offers a history and detailed typology of this type of organization. She defines social enterprise as, “Any business venture created for a social purpose—mitigating/reducing a social problem or a market failure—and to generate social value while operating with the financial discipline, innovation and determination of a private sector business” (Alter, 2007: 18). Alter acknowledges many predecessors and parallel movements to social enterprises, including the agricultural cooperatives of the 1800s and the fair trade movement which formed in the 1940’s-1960s, but traces the roots of contemporary social enterprise to the 1960s. The first social enterprises she mentions are Minnesota Diversified Industries, founded in 1964 to provide employment for people with disabilities, and Pioneer Fellowship House, opened in 1963 to provide supportive residence for recovering
alcoholics. She argues social enterprises slowly gained a name for themselves in the 1980’s and 1990’s, and at the time of publication in 2007 she wrote, “The phenomenon of social enterprise is exploding” (Alter, 2007: 10).

Beyond sharing the basic characteristics in the definition above, Alter argues social enterprises may be differentiated in a number of ways. First they exist on a spectrum according to the degree to which they emphasize either their mission or their profit motives. Other factors include: the degree to which their social programs align with or are separate from their profit activities; the type of interaction the organization has with its target population, including whether that population works in or owns the organization or is external to it; type of organizational structure, such as whether the social enterprise is located within or partnered with a parent business or NGO or is a standalone organization; type of mission, including environment, education, health, or social welfare; and financial strategy, which includes sources of startup capital and methods of income generation (Alter, 2007).

Within the large range of possible social enterprise models, Sun Power and SRT are quite similar. In both cases, a social enterprise spun off from an NGO, and now operates in partnership with but as a separate entity from the parent organization. In both cases, the individual missions of the NGO and social enterprise are different but complementary to the shared vision for development. In both cases, the shared visions of the NGO-social enterprise partnerships involve environment and climate change concerns, renewable energy technologies, and an emphasis on rural development. In both cases, the financial strategy of the NGO is grants while the financial strategy of the social enterprise is selling technologies and installation services. However, Sun Power differs in that it also collects fees for electricity and system maintenance. Sun Power is
also more forthcoming than Vatavaran Technologies about its sources of startup funding, which includes grants and venture capital. Both sets of institutions seem to try to balance their profit and mission goals, although Alter acknowledges mission drift and shifting along the continuum is possible (Alter, 2007).

A few key concepts and thinkers have influenced the shift towards support for market-based development, including social enterprises. Notable among these is C.K. Prahalad’s work about the “Bottom of the Pyramid.” Prahalad coined this phrase with Stuart Hart in a popular *Strategy+Business* article in 2002 (Prahalad & Hart, 2002). He elaborated the concept in his key book entitled, *The Fortune at the Bottom of the Pyramid*. In this work, Prahalad declares that businesses can, “Do well by doing good” (2004: 26), and that they may do so by targeting the four billion people who live on less than two dollars per day. These are the people located at the bottom of a global population pyramid he discusses in the beginning of the book (Prahalad 2004: 28). He argues corporate social responsibility is not enough, and the people at the bottom of the pyramid (BOPs) need to be central to the business focus. He also contends creating markets for BOPs can be profitable if businesses shift their thinking and approaches. Anthropologist Julia Elyachar (2012) explains another central part of the BOP approach is the idea that corporations should not wait for the right physical infrastructure, development agencies, or the state. Instead, they should redesign products to work in current conditions and, “Meet the design challenge of poverty” (2012: 114). Prahalad’s emphasis on making entrepreneurs of the poor is challenged by Roy (2010). She severely critiques the assumption that, “The poor have assets and the poor are assets” (Roy 2010: 64). Nonetheless, Prahalad’s book and its concepts quickly became very popular and it has had an oversized influence in business and development discourses.
Around the same time, a 2006 article in *The Economist* introduced the term ‘philanthrocapitalism’ to describe a shift in thinking among prominent investors who wanted to shift foundations and philanthropy toward a model of giving that operates with more of a business mindset. In this model, donors expect measurable results and do not limit themselves to nonprofit ventures but also seek to support social entrepreneurs (“The Birth of Philanthrocapitalism,” 2006). Bill Gates is the most prominent proponent of philanthrocapitalism, which he also calls creative capitalism. In a video interview with *TIME* magazine, Gates argues that if businesses, which currently do not serve the poor, can shift their focus to do so, they will create change, “Far faster than relying on government alone” (TIME, 2008). Combined, these shifts in development, business, and philanthropy thinking influence the development space in which organizations like Sun Power and SRT operate. This includes the foundations, investors, and business and management schools that partner with both organizations, as well as a consensus among Indian organizations working for energy access. Cross notes, “Two decades ago, it was difficult to imagine a solution to the challenges of improving access to electricity beyond the extension of large-scale national energy grids. Today, however, a consensus has emerged around a market-based approach to energy access” (Cross 2013: 6).

In addition to international discourses and trends in philanthropy, social entrepreneurs and NGO workers themselves have pointed to many other reasons for the strong preference for the social enterprise model. Cross (2013) writes about one social entrepreneur whose start-up develops and sells the d.Light solar lamp products, which both Sun Power and Vatavaran Technologies happen to sell. The entrepreneur explains several reasons for the popularity of the social enterprise model. First, he argues their
products are affordable for people in emerging markets without subsidies or charity, and that they pay for themselves in only three months. Likewise, his business is not dependent on grants or government subsidies but is able to make a profit from its good work. Finally, he claims that instead of the 100 years an NGO would take to achieve this objective, they could make a difference in five or ten, a substantial decrease in the perceived temporal scale of development work over nonprofit models (Cross, 2013: 8-9). The entrepreneur’s comments illustrate how alluring and effective this model of development seems to many development workers.

Sun Power’s own rhetoric illustrates a similar fervor for the social enterprise model and offers more reasons for its popularity. The organization’s mission and vision, as well as those of its influential partners, emphasize achieving large scale of impact. This can be compared to NGO work, whose impact is often deeper but much more geographically limited. Having a large spatial impact and reaching large numbers of people feels and looks more satisfying and successful for social enterprise employees and proponents. An article in The Guardian featuring Sun Power is also informative. The article quotes the organizations’ CEO stating, “As a social enterprise, we have a triple bottom line impact—increasing access to clean energy, using available sustainable energy to address the social problems that restrict development, and through our own profitability” (“theguardian,” 2015, September 10). The article continues to state that Sun Power reached profitability in three years and is expected to continue its 100 percent per year growth for the next five years (“theguardian,” 2015, September 15).

1 d.light is a California-based social enterprise that sells affordable, durable solar-powered lamps and lanterns to BOP markets globally. It began as a project for a Stanford graduate class, “Entrepreneurial Design for Extreme Affordability.” This course, which is rooted in C.K. Prahalad’s business theories, has “incubated” several ventures (Cross, 2013). d.Light products are sold by both Sun Power and Vatavaran Technologies.
This shows how attractive these organizations must be to many professionals interested in having a positive impact and working in a growing, successful, well-paying organization.

The examples above detail why many development workers are enamored with the social enterprise model; the challenges SRT faces as an NGO illustrate a few reasons why NGO employees may shift parts of their work to the social enterprise model. A primary concern is lack of funding. This impacts the ability to conduct research and pay researchers living wages. For example, in the organization’s early years, one researcher worked as a teacher to earn money and did research on the side to pursue the goals of the organization (Joshi, 2013). The lack of funds also keeps SRT from being able to fully market its technologies. This is the main reason SRT handed over its marketing and sales for the cook stoves and biogas technologies to a social enterprise (“Partnership for Clean Indoor Air,” April 7, 2016).

Both Sun Power and SRT rely on the social enterprise model to achieve their mission. These organizations have been on the rise, a shift in development that takes its influence from prominent discourses about the bottom of the pyramid and philanthrocapitalism. The business model is attractive for many professionals as it suggests larger economies of scale, impact, and success, while also ostensibly addressing poverty concerns. Roy (2010) engages this shift and its implications for development by asking, “Can poverty be transformed into poverty capital, a frontier of accumulation, speculation, and profit? If so, will poverty capital serve the interests of the poor?” (Roy 2010: 23). The next section engages this question through an examination of the shared assumptions Sun Power and SRT’s projects operate within.

**4. Assumptions and Gaps**
Although created in different times and with different motivations, Sun Power and SRT currently operate contemporaneously. The legacy of neoliberal restructuring on the ideologies and practices of investors and philanthropists, mentorship organizations, and international development organizations powerfully shape the current development space towards their particular development agendas and beliefs. The influence of this process is traceable in the projects of both organizations. This section identifies and analyzes the set of powerful development assumptions that have manifested in the projects described above, and explores the limitations and possible implications of operating through the framework they provide. If unchallenged, these implications may work to limit the positive impacts the idealistic workers in both organizations seek for their constituents.

Anna Tsing’s (2005) concept of “gaps” aids the analysis of these implications. She defines “gaps” as, “Conceptual spaces and real places into which powerful demarcations do not travel well” (175). They, “Occur where metro projects do not reach so far or so deep as to change everything according to their plans,” and leave, “Persistently uninteresting, invisible, and sometimes illegitimate zones” (2005: 196, 172). Tsing develops this concept through her ethnographic work among the Meratus Dayaks, a group of people living in the central Meratus Mountains in Indonesia. She explains these people are commonly regarded by surrounding regions as a “weedy” and backwards group development has missed. However, closer examination reveals the Meratus lifestyle includes a complex and highly sustainable relationship with their forest environment that does not fit cleanly within common dichotomies, including, “Human livelihood versus nature conservation, productive farms versus forest reserves, and settled culture versus the wild” (Tsing, 2005: 175). In contrast, Tsing describes the
variety of outside actors that seek to classify and use the forests of this region, including
government agencies, environmental NGOs, loggers, and plantation operators.
Although each has very different motivations and goals and they often work at cross
purposes, each of these actors make similar assumptions regarding these dichotomies of
nature versus society that blind them to alternative ways of seeing and engaging with the
forest and its inhabitants. The Meratus Dayaks, whose way of life does not fit into these
categories, fall into the gaps of these various development projects. Since these actors
and their projects do not “see” the Meratus lifestyle or land use strategies, they do not
recognize or utilize the Meratus land use rights or innovative conservation strategies to
the detriment of social and environmental goals. Similarly, this section explores how the
development assumptions operating through Sun Power and SRT’s projects shape what
types of rural futures and development these organizations imagine and pursue, and
what possibilities fall into the gaps.

This discussion is split into four sections. 4.1 discusses assumptions about rural
people that view them as different from their urban counterparts. 4.2 examines the way
rural residents are framed as “Bottom of the Pyramid” people (BOPs). 4.3 considers a
set of assumptions about the primacy of renewable energy technologies for development.
4.4 examines the final set of assumptions that privilege the social enterprise and market
solutions. Each section offers a brief description of the assumptions and how they
operate within each organization. This is followed by an examination of the gaps each
assumption creates and their possible impacts, asking what types of development they
allow or render invisible and whether this will serve the poorest. Throughout the
discussion, it becomes clear that the poorest people, and various measures that could be
taken to serve their needs, fall into the gaps.
4.1 Rural People are Treated Differently

The first shared assumption is that rural people are different from their urban counterparts. This can be seen first in the way that rural people are targeted with different types of technology than urban people. Instead of having a program that connects rural areas with LPG stoves and LPG as a cleanly burning fuel, which would also address rural development and health, and perhaps subsidizing this fuel for those who cannot afford it, SRT has designed more “appropriate” bioenergy stoves that are more labor intensive and put pressure on local environments. This is commendable in that it is a sustainable, affordable, and easy way to have a more immediate and reliable effect. However, this scheme treats rural people as if they should have a different, less “modern” development than urban people have.

Likewise, solar energy technologies like those Sun Power sells bring services to rural areas that improve current energy conditions but do not make them equal to what is available to grid-connected urban people. This disparity may be seen in comparing Sun Power’s energy systems, which are limited by the generation and storage capacity of their panels and batteries with grid connected urban standards of energy provision. The solar lanterns, which are the least cost prohibitive, provide an average of four hours of light per full charge. The household-scale systems are designed to provide four hours of light and the use of one fan and one television. Sun Power’s microgrids, which distribute the energy to a community of households, also offer a limited amount of energy to consumers (“Punam Energy Pvt Ltd,” April 7, 2016). In an article for Yale Environment 360, a publication of Yale’s school of Forestry and Environmental Studies, Fred Pearce discusses the energy challenges of microgrids, which produce a finite amount of energy for a group of households. He describes how individuals in a
community of microgrid users are often limited in the amount of electricity and types of devices they are allowed to use so the community does not run out of electricity. These often provide modest lighting and fan use, but cannot support a large number of televisions or additional appliances (Pearce, 2016, January 14). In contrast, grid-connected urban households do not receive limitations on the amount of electricity or type of devices they use, apart from power outages and load shedding. While living in an apartment in Delhi during Summer 2014, I enjoyed unlimited use of electricity for four light bulbs, a ceiling fan, a smart phone, a computer, a small medical device, a refrigerator, and an air conditioning unit. I used all of these liberally, and compared to my neighbors and friends whose houses I visited, this level of consumption is common among middle class residents of the city. Rural people operating their own systems have to make many more decisions about how to use their limited power. Grid-connected urban people do not need to make the same choices, such as whether to use a light bulb for studying or the television for entertainment, let alone whether they could use a refrigerator, computer, or air conditioner.

Rural people are also expected to develop with different types of power supply infrastructure, energy types, and management systems than urban areas. While urban people are highly connected to the grid and fuel markets, SRT and Sun Power both target rural people with individually purchased, owned, and maintained systems of energy provision. While the government has spent a great deal of money providing power to urban people who do not have to take out loans or build their own energy systems, rural people in these projects are expected to bear a greater share of effort and expense to get inferior energy services.
A third point is the difference in quality of life expectations for rural versus urban people in these projects. While many urban people enjoy long periods of unlimited energy supply each day, with grid connection and LPG stoves, rural people are targeted with experimental, expensive renewable energy technologies targeted at individual consumers. SRT’s projects imagine a rural future where local people have thriving industries but remain close to the earth, living sustainable lives that are not too energy intensive. Sun Power’s projects imagine that small-scale, privately purchased devices with limited power are enough. Both of these projects supply technologies that are better than what rural people currently have access to, but not as good as urban standards for energy.

A fourth part of this assumption is that rural people are a good target for sustainability and climate change initiatives. The UNDP’s SE4All program, which is one of Sun Power’s influential partners, states on its website that renewable energy can be leveraged to help rural people “leapfrog” a fossil fuel based economy by developing directly with renewable energy technologies (“SE4All,” April 7, 2016). Likewise, the appropriate technology movement targets rural people for different types of technology than urban areas receive. A large focus of these technologies is providing sustainable energy sources.

Many rural people themselves notice the disparity in energy provision between rural and urban residents and do not approve. While researching cases of mini-grid installations, it is not uncommon to hear of people who refuse to become part of community-scale solar projects, citing the expectation that the government should supply the infrastructure and bear the burden of maintenance. The grid is rarely very far away from un-electrified villages, and when the grid comes, people tend to abandon
solar projects for the cheaper, government-subsidized power (Wood, 2016, January 18). An article in the news magazine India Today reports an entire village in Bihar protested after Greenpeace installed a solar-powered micro-grid in their village. Villagers held signs demanding “real” government-supplied grid power, and not “fake” solar power (Jha, 2014, August 6). Additionally, in an interview published on YouTube by Anil Agarwal, one of the founders of Vatavaran Technologies states when they market cooking technologies with a “rural” label people will not buy them. If they market the same product as “cooking technologies” without a rural label, people will buy them. She also notes that once technologies become popular in urban areas, rural people start to demand them (Agrawal, 2014). These examples show many rural people are acutely aware of the services they are entitled to as well as the disparity of conditions in rural and urban areas. Their aspirations do not necessarily align with those of the appropriate technology movement, the United Nations Sustainable Energy for All program, or the social enterprises and nonprofit organizations seeking to bring them sustainability and renewable energy.

Programs that target rural people for sustainability and with lower energy consumption targets also occlude critical discussions about the contributions of urban versus rural people to climate change and the proper targets for mitigation efforts while subtly creating a disparity in development standards. Bazilian and Pielke argue the “ambition gap,” or setting low targets for rural energy consumption both avoids difficult discussions about the overconsumption of urban elites while indirectly managing the risk of fully developing rural areas (Bazilian & Pielke, 2013). Similarly, sociologist Amita Baviskar (2005) critiques the attitude generally held by the urban middle class, which seeks distant environmental causes to champion without questioning their own
consumption patterns and contributions to environmental problems. This seems to be at play in the projects of these organizations. Sun Power’s rhetoric directly states the organization targets rural populations with renewable energy technologies in order to address climate change concerns. Although less explicit in the work of SRT, this organization also misses these important considerations by focusing on providing rural populations with sustainable technologies designed to provide a different, lower-energy lifestyle than urban people experience. Rural peoples’ lives are already sustainable, if difficult. They are minor consumers of fossil fuels, whereas the lifestyles and consumption patterns of urban elites seem to be the real culprit for environmental concerns. It may be argued they should be the targets of appropriate technology and renewable energy initiatives.

4.2 Rural People are BOPs

Both projects also imagine and engage with rural people as people at the “bottom of the pyramid.” This term, coined by C.K. Prahalad (2004), refers to the four billion people globally who live on less than two dollars per day. Each organization has been reached and influenced by this discourse, but to varying degrees. While SRT staff members occasionally make reference to BOP rhetoric when describing their constituency, the term does not appear in its official definition, mission, or vision (“DST TARA SEED Division,” April 7, 2016). The BOP framework is central to Sun Power’s work and self-definition. The “About Us” section of it’s website states the organization was initially founded in response to the, “Very little or nonexistent effort to address the needs of the large numbers of households at the bottom of the pyramid” (“Punam Energy Pvt Ltd,” April 7, 2016). Sun Power founders also use this rhetoric in describing its work in interviews (“theguardian,” 2015, September 10), and its partner
organizations also centrally engage with this conceptualization of rural people (“ARTHA,” April 7, 2016; “IIM-A CIIE,” April 7, 2016; “SE4All,” April 7, 2016).

The BOP framework limits an organization’s ability to see and engage with difference among people in rural areas. Engaging with the rural populace through the BOP lens defines them in very simple market terms in which as much as 60 percent of the population is conflated into a single category. However, numerous studies indicate there is quite a bit of difference within the bottom 60 percent of society, including economic, social and political power, and gender, caste, and religious disparities (Jayadev et al, 2007; O’Reilly & Dhanju, 2010; Karim, 2011; Responsible BOP, 2012). These differences are not considered in this view. Instead, the rural is reduced to a simple equation in which:

reaching a rural life = reaching a bottom of the pyramid life = achieving development

This overly simplistic understanding of rural life renders actual differences invisible. This invisibility will likely stand in the way of attempts to create change and work to maintain the hierarchies that already exist in project areas. It is possible that these organizations will be able to strain against the limits of this framework. For example, Sun Power has several projects that use grants and NGO partnerships to provide handheld lights and streetlights in extremely poor communities. However, these are not the focus of their projects, and variations in wealth and status within their target population is not explicitly addressed in their mission or project materials.

Two more concerns arise from engaging with rural people through the BOP framework. The first is that it defines them as poor. This seems to make it easier to
justify extending experimental, lower quality technologies to them. Since these technologies are an improvement over their current state, many people readily accept them and it may seem that they should be happy to do so. However, this view makes it difficult to raise questions of equity between rural and urban people and whether people who are not poor would accept these technologies. Second, this framework defines rural people as market actors, which implies they need to be supplied with market solutions in order to develop. This blocks other, non-market possibilities from being seen and explored.

A publication from Prayas, a Maharashtra-based organization that researches and advocates for policy changes regarding renewable energy proposes an alternative. It argues the fossil fuels we have left should be used to develop rural areas, while climate change initiatives and lifestyle changes should be made in elite urban communities, where consumption is the highest and development has already blessed people with good lives. It asks, what better use could we think of for our resources? (Gambhir, Dixit, Toro, & Singh, 2012). However, as sections 4.3 and 4.4 illustrate, assumptions about how to develop rural areas shift these organizations’ focus towards individually purchased, easily scaled, renewable energy technologies designed for rural areas. Development projects operating with these assumptions render such alternatives invisible or illegitimate, with the consequences falling to the poorest rural inhabitants.

4.3 Renewable Energy Technologies as the Solution to Development

The third set of assumptions these organizations share is that energy is central to and necessary for development, that development may be catalyzed, and that technologies aimed at providing renewable energy can be just such a development catalyst. The first part of this assumption group is the necessity of energy for
development. The influence of the global shifts discussed in section 3.2, including neoliberal restructuring, World Bank and IMF programs, international conferences, and developments in renewable energy technologies and markets, is clear in both SRT’s and Sun Power’s projects. SRT was founded in 1996, around the time that international discourses began connecting sustainability, energy, and development concerns in a substantial way. Bioenergy is one of two focus areas for SRT projects, and more than half of this organization’s technologies focus on energy. This includes all of the cook stove models, the charcoal makers, and biogas digesters. SRT’s mission is to use these energy-providing technologies to improve the lives and economic potential of rural people. Sun Power’s emphasis is even more explicit. Not only is the organization partner with both UNDP and TERI, the SE4All capacity-building hub, but also its stated vision is to, “Provide complete energy solutions, that will create an ecosystem for both sustainable development and rural empowerment” (ONergy & SwitchON, n.d.). This implies that energy has the power to change the rural ecosystem towards sustainability and empowerment in a way other development focuses have not been able to do.

The second assumption in this set is that development needs a catalyst, and can be catalyzed by renewable energy technologies. Both organizations seek to be catalysts for change. Sun Power’s website mentions using its technologies to develop an ecosystem for sustainable development and rural empowerment (“Punam Energy Pvt Ltd,” 2016). SRT’s mission statement claims the organization seeks to develop appropriate technologies in order to be an instrument of development in rural areas (“DST TARA SEED Division,” 2016). In both cases, the assumption of serving as a catalyst implies that development can be spurred into action. That something is missing which, if addressed, can change the whole ‘ecosystem’ of rural India. The catalyst of
choice is technology, and specifically sustainable technology that solves energy problems. Sun Power seeks to catalyze rural development through solar photovoltaic technologies and delivery solutions. SRT designs appropriate technologies that utilize sustainable, local energy sources to develop rural areas.

Perhaps it is true that energy is necessary for other development goals and rural integration to be achieved, and perhaps these technologies can make a difference in the lives of rural people. Reliable access to energy and efficient technologies can provide many things, including more leisure and rest time, connection to urban centers and markets, longer days for working and studying, a relief on environmental pressures, and health benefits. These technologies are affordable and relatively easy to distribute to remote places, bringing immediate change to areas that have been waiting decades for connection to modern energy services.

However, the focus on energy as central to development and as a ‘solution’ is problematic in what it excludes from consideration. In *Encountering Development*, anthropologist Arturo Escobar (1995) details the history and processes of international development discourse and practice. In particular, he traces the way these processes work to define poverty as a lack of development. This understanding implies that in order to address poverty, one must simply address what the poor lack. Escobar explores this connection through attempts to address hunger by addressing the lack of food. Today, it has also become popular to address rural poverty by addressing a lack of energy. Focusing on material lack is problematic because it is apolitical and erases concerns around power and politics that underlie the conditions of rural poverty. Emphasizing a lack of energy in rural areas occludes concerns for how these conditions came to be this way in the first place. It shifts the focus of development projects away
from addressing the power relations and political forces that brought about conditions of poverty and development disparity.

Anthropologist James Ferguson (1994) writes about the ‘anti-politics machine.’ This refers to the way development makes political decisions regarding resource allocation seem like technical solutions to technical problems. In this way, projects that focus on energy and technology as poverty solutions seem like a natural and obvious response to rural lack, and political questions are lost from view. By operating through the assumption that rural poverty may be fixed by addressing a lack of energy technology, Sun Power and SRT fail to see the political nature of their choices, and fail to address these true causes of poverty. This process works to create a space of development in which only certain things can be said and even imagined (Escobar, 1995: 39), and they do nothing to acknowledge the structural violence that keeps poverty from being addressed.

Similarly, Anthropologist Akhil Gupta (2012) draws attention to the structural violence of the state in India. He writes that although the state has many poverty-alleviation programs and the poor are largely active members of the democracy, millions of unnecessary deaths occur in the country as a result of what he calls structural violence. He argues that corruption and bureaucratic practices create an arbitrariness of outcomes that is then treated with indifference. If poor and rural Indians are to have the quality of life to which they are entitled, long-term steps are necessary. These must include holding the government accountable for its commitments and responsibilities to its citizens and work that address the structural problems that allow for such uneven outcomes and indifference. However, such political concerns are occluded from view by the naturalization of technical solutions and energy provision.
4.4 Social Enterprise and Market Solutions

This section examines a set of four related assumptions both organizations make regarding the best way to seek development. Both organizations seek to catalyze development and spread their technologies, at least in part, through the social business model and the logics and assumptions that come with it. These include a tendency to seek individual solutions to development goals, commoditizing the development process, and emphasizing scale and the ability to scale up the distribution of their products, in order to scale up their impact and profits.

The first assumption of this set is that social enterprises are an effective way to achieve development goals. Social enterprises are businesses with a strong social mission. Both Sun Power and SRT have turned to the business model to market their technologies and services, while continuing in some capacity to rely on the NGO model. Sun Power, a social enterprise from the beginning, is a spin-off organization from an advocacy organization that seeks to support sustainable livelihoods (“SwitchON,” April 7, 2016). Sun Power continues to collaborate with this organization, particularly for support with capacity and awareness building efforts like rural entrepreneur and bank manager trainings (“Punam Energy Pvt Ltd,” April 7, 2016). SRT, an NGO itself, acknowledges its limitations, both in terms of funding and as an organization run by scientists. They have little funding, staff time or expertise for marketing technologies. Therefore, they have handed over the majority of marketing and sales of their bioenergy technologies to a social enterprise. This shift towards the business model may have implications for what types of projects are most marketable and therefore which have the most reach and impact.
This leads us to the second and third assumptions; that development is best pursued through individual means, and that energy and its provision is best delivered as a commodity. Sun Power’s technologies are targeted to individuals, like solar lamps for cooking and studying, or household solar panels to support lights, mobile phones, televisions, and fans. Only a few projects are targeted to small groups in the form of micro-grids and irrigation pumps. These are more difficult to set up, require a lot more community organization, and still target very small groups of houses or farmers in close proximity to the system. SRT’s technologies target almost exclusively individual entrepreneurs, farmers, or households. In both cases, the technologies must be purchased, or at least the supplies must be procured and constructed by the consumer. In the case of both organizations, the target consumer for these goods is rural, bottom of the pyramid people.

The final assumption in this set is that scaling up energy provision is necessary to catalyze rural development. This takes form in both organizations as small scale, scalable technologies. Sun Power and Vatavaran Technologies are businesses that sustain their work through profits, and this necessity is well served by targeting individual commodities that are easy to sell in large numbers with a minimal amount of organization. For example, Sun Power’s mission is to impact one million lives by 2017. This is much easier to do when selling solar lanterns than when setting up mini-grids. In addition to profit motives, the regular emphasis on daunting poverty statistics in influential discourses also helps explain the importance these organizations give to scale. For example, C.K. Prahalad’s bottom of the pyramid consists of four billion people who lack proper market access, and the UNDP’s Sustainable Energy for All initiative works to assist the over one billion people who lack access to modern energy services (Prahalad,
The size of these numbers seems to create an urgency and necessity to reach scale in order to have a ‘real’ impact on the Millennium Development Goals. The imperatives of large impact and sustaining work through profits, as well as the emphasis on a certain type of individual, commoditized technology delivered en mass in rural areas shape what is possible for rural futures.

Several concerns about the future of rural development arise from this set of assumptions. The first is that the emphasis on individual commodities as the primary deliverer of development will shift development away from the poorest in favor of those who already have some purchasing power. Kate Meagher argues the ‘pyramid’ of social stratification is not a pyramid at all, but a Christmas tree shape with the trunk representing the world’s poorest. She argues that while development traditionally focuses on this section of the population, attempts to develop the ‘bottom of the pyramid’ through market-based strategies shifts the attention of development away from this group, in favor of those with some resources (Responsible BOP, 2012). Studies conducted in Zanzibar and Kenya suggest micro-scale energy projects disproportionately reach the rural middle class (Dean 2010; Jacobson, 2007).

Returning to Tsing’s concepts of gaps, the emphasis on the ability of market-based strategies’ to serve the poor renders this segment of the population unknowable and invisible to large-scale development efforts. This works to foreclose other types of development projects that would address equity concerns and ensure universal access to energy.

A second concern arising from the market-based emphasis of these projects is the business model favors projects and technologies that make a profit, possibly to the detriment of social commitments. Cross and Street (2009) write of Unilever’s efforts to
market soap as a social good. The company argues by selling individual sachets of soap and conducting workshops about hygiene, they are able to make a profit while also helping to develop rural areas and combat disease. However, Cross and Street illustrate the ways that, although this project is ostensibly helping development by increasing knowledge about germs, providing entrepreneur opportunities, and making desirable commodities accessible to the bottom of the pyramid, the project is doing more ‘good’ for the company’s bottom line than for rural Indians. By encouraging hand washing alongside advertisements for their soap products, they argue that they are doing more to create new desires and norms for consumption than for social benefit. Cross and Street quote a line from the ‘Health in Your Hands’ partnership market research that states, “The more evolved the market, the more species of soap product will be found in a consumer’s household” (2009: 7). As these soap products become the norm, they pave the way for more products to clean other ‘dirty’ body parts and household objects. Cross and Street (2009), along with Meagher (2012), argue that traditional soaps and soap markets already exist, even if germ knowledge is not common. Projects that focus on selling soap as a social good that will combat disease ignore the larger problem of lack of clean and safe water. But projects of a political nature would not serve Unilever’s bottom line and are foregone in favor of the single use soap sachet. Sun Power and SRT’s partner Vatavaran Technologies are not multinational corporations, and both have a much larger emphasis on their social mission to act as development agents. However, concerns for profitability impose limits visible in the solutions and products each sells. Both organizations seek to sell technologies rather than provide access to LPG markets, grid power, or subsidies for energy infrastructure. The decision to operate within this frame, and the imperative to sell products, could make certain technology
and strategy choices seem more visible, legitimate, and self-sustaining. This could in turn block from consideration alternatives that may not serve profit and impact targets but do more to ensure the poorest have energy access. Vatavaran Technologies’s recently expanded line includes small solar lamp devices. These products, while profitable and much easier to sell than biogas digesters, may be losing the do-it-yourself, accessible flair of SRT’s projects while allowing the business to maintain profits and an apolitical focus. While neither organization seems as flagrantly profit-motivated as Unilever, scale and the profit-making imperative shape each organization’s projects and marketing in ways that could shift the focus away from the needs of the poorest.

A third concern is the focus on delivering energy and its provision as an individual commodity places the financial and organizational burden of getting energized on rural people. Although the Government of India’s Electricity Act of 2003 requires the government to provide electricity access to all areas of the country, including villages and hamlets, and although the federal government offers subsidies for clean cook stoves, these projects have not been very successful or timely in their provision (Agrawal, 2014; Ali & Semwal, 2014). Instead of addressing these shortcomings, Sun Power and SRT have both sought to bypass them by selling small-scale energy solutions. Unlike their middle class urban counterparts who receive energy access through government-provided and maintained infrastructure, rural consumers must purchase, organize, and maintain the energy-generating technologies themselves. These technologies achieve the quick results Bill Gates extolled, at least for those who are able to procure them, but at what cost?

Cross (2013) argues the power of social goods like solar lamps, “Lies less in [their] capacity to convert sunlight into electric light at low cost and more in its capacity
to depoliticize the failure of governments to sustain life by providing essential goods and services (18). In a similar tone, Andrew Szasz coins the term ‘inverted quarantine’ to describe the process through which people try to buy certain products to protect themselves from dangerous people and toxic chemicals in their environment. After he convincingly illustrates that this approach will not protect people from harm, he warns, “Consumers believe these products will protect them, which creates a kind of political ‘anesthesia’ that severely reduces their willingness to participate in collective political action to generate real change” (2009). Likewise, a heavy focus on individual solutions to development may act as an anesthetic by bringing electricity to a large number of individuals, creating a gap in which political solutions like challenging ineffective structures are not visible. Instead, rural people are expected to take out loans to provide these services for themselves. These loans are often sought from microfinance institutions that have interest rates of up to 50 percent, and frequently have harsh default conditions that disproportionately affect women (Karim, 2011). It is possible encouraging people at the bottom of the pyramid to take out loans for energy provision systems leads to exacerbated poverty conditions. Theft of solar technologies is common, especially panels, and this cost burden is left to the individual. Likewise, the purchasers may not be able to afford maintenance and repairs, leaving them with debts and nonfunctioning devices they should not have had to purchase themselves.

A final concern for this set of assumptions is small-scale initiatives that have a large reach but relatively small impact on rural lives get a lot of attention, to the detriment of larger, more difficult, but more transformative projects. Sun Power does have several projects that benefit small groups of farmers or households. However, these are its largest projects, and most of its work involves individual and household
scale technologies. SRT likewise is not dreaming up larger, community scale projects, but continues to focus on individual households or entrepreneurs. For example, its incinerator technology is designed to serve individual establishments. This allows the heat from the burning garbage to be utilized for hot water, but it does not address larger community-scale concerns about trash disposal and hazardous waste management. While this project is solving waste and energy problems for a school or restaurant, it does not help tackle the problem of what to do with the toxic ashes created from incinerating plastics that surely has an effect on the workers and the community in which these things are discarded. Focusing on such a small-scale project shifts attention away from larger initiatives like a community-scale waste program that may be better suited for the community as a whole.

5. Conclusion

The shift towards using a business model for development raises many questions about its viability, as well as the future of development efforts. In this thesis I sought to examine this shift through a comparison of two organizations using the social enterprise model to catalyze rural development. I did so in order to answer two important questions: What effects do the shifts towards the social enterprise and renewable energy technologies have on the projects of development organizations in rural India? What are the implications of these changes on the poorest rural inhabitants? To do so, I examined the shared assumptions of Sun Power and SRT, tracing their origins in dominant development discourses and trends and the ways the assumptions manifest in the projects and development imaginings of each organization. This process allowed me to make visible the gaps these assumptions create. I argued an awareness of the
limitations of these trends is necessary to avoid negative outcomes and direct development efforts to the poorest.

Section 3 compared the projects, motivations, and influences of each organization. It highlighted a variety of differences between the two. Whereas Sun Power works to spread solar technology for electricity access, SRT emphasizes biomass and alternative fuels. While Sun Power sells premade devices, SRT emphasizes making technologies and fueling them with locally available materials. And, while Sun Power focuses its efforts on distribution, financing, and maintenance, SRT focuses on research and development of new technologies. The two organizations also identify different causes of rural poverty; Sun Power emphasizes the lack of electricity as the central hindrance of development, while SRT explains poverty with the history of neoliberalism and subsequent declines in rural industry. These differences stem in part from the different partnerships and discourses that have influenced each during their formation. While Sun Power is influenced by the most current UN development discourse that emphasizes climate change, energy access, and renewable energy, SRT relies on an older, more Gandhian understanding of sustainable villages and the appropriate technology movement. And while Sun Power’s influential partnerships include many business and philanthropy leaders, SRT’s main funding and support comes from the national government’s Department of Science and Technology.

However, these organizations are not as dissimilar as they may seem. Through the comparison of each organization’s influences and motivations it became clear that particularly strong development shifts, including neoliberal restructuring and subsequent changes in development ideology and philanthropic and investment practices have created a development space that has had similar influences on how both
organizations operate today. These changes resulted in both organizations adopting the social enterprise model. The assumptions inherent in these development discourses may be traced through the work each organization does using this model. While these assumptions appear more explicitly in the rhetoric of Sun Power, section four illustrated they ways they also appear in the work of SRT and its social enterprise partner Vatavaran Technologies.

Section four examined the ways these assumptions have manifested in each organization and the gaps generated by operating through such a framework. 4.1 looked at the assumption that rural people are different from their urban counterparts. It illustrated how the projects of both organizations target rural people with different types of technology and energy infrastructures that require more effort and expense and provide inferior energy services to that available to grid-connected urban people. Projects operating within this assumption also target rural people with different quality of life and development expectations than urban people experience. Several considerations fall into the gaps of this lens. These include equity in quality of life expectations, development targets, and costs incurred for receiving energy services between rural and urban areas. It also includes what rural people want for themselves and considerations of urban elites’ contributions to climate change.

Section 4.2 explored the assumption that rural people are BOPs, a framework that assigns 60 percent of the population to a single category of poor market actors. This frame obscures the differences among rural people that have both contributed to current development conditions and will shape future possibilities. This category also forecloses non-market solutions to poverty and development.
Section 4.3 discussed the assumptions that energy is necessary for development and that development can be catalyzed with renewable energy technologies. This depoliticized understanding of poverty renders invisible the power relations and political conditions that brought it about, as well as the political actions that would challenge current power imbalances.

Section 4.4 examines a set of four assumptions: that social enterprises are an effective way to achieve development goals, development is best pursued through individual means, that energy is best provided as a commodity, and that scaling up energy provision is necessary to catalyze rural development. Operating in this framework has the possibility of shifting development towards those with some purchasing power, relegating the poorest people into the gaps of this view. It also opens the possibility for the social enterprises to more successfully market and spread technologies that are profitable to the detriment of projects and technologies that may be more socially beneficial but are expensive or difficult to implement. Finally, these assumptions encourage projects that place the burden of getting energized on poor rural individuals, obscuring the commitment and responsibility of the government to provide electricity services to all citizens.

Hope

Tsing (2005) writes instead of being mesmerized by the coherence and size of global circulations, “It is time to turn attention, instead, to discontinuity and awkward connection, as this proves key to emergent sources of fear and hope. There is hope that the dominant development discourses are not as hegemonic as they may seem.” Kathleen O’Brien’s (2007) ethnographic study in a rural Indian NGO offers a hopeful perspective. She shows how people working within dominant development discourses
and projects are able to create openings in the dialogue and use their spheres of influence to shift the direction and emphasis of projects that ostensibly subscribe to and act upon dominant ideas. Likewise, Roy (2010) writes of centralities and multiplicities in development arenas. This understanding recognizes development ideas operate in a messy realm where ideas converge but also diverge in a large range of actions and interpretations that make up a specific discourse. Applying this reasoning to the two organizations discussed in this thesis offers hope. Staff members, if made aware of these assumptions and their gaps, can actively work against their possible negative implications to ensure their projects serve the poorest rural inhabitants.
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