

Using Microfinance to Ensure Sustainable Rural Livelihoods and Food Security While Mitigating Climate Change – PART II: CLIMATE CHANGE.

By

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Summary/Abstract

Three interlocking and indeed reinforcing crises facing the world’s poor, and to some degree all of humanity, call out for urgent action. Specifically, this paper is going to explore the issues of

- **energy poverty** – the lack of access to affordable, healthful, and productive electricity and cooking fuel among the poor,
- **climate change**, and
- the inability of many of today’s approaches to **microfinance** to (a) have a significant positive impact on poverty and (b) sustain the high levels of support amongst the media, policy-makers and the general public that are necessary to continue to grow and innovate.

A comprehensive response should involve wide application of a series of related solutions based on successful pilot efforts in countries as diverse as Bangladesh, India, Mongolia, Kenya, Argentina and elsewhere. This paper intends to address these three crises by examining known and potential solutions that could be applied by MFIs and energy companies, working alone or together, and summarizing lessons learned to date.

1.0 Energy Poverty: Draining the World of Productive Potential

1.1 Energy poverty is a significant barrier to the improvement of the socio-economic conditions, productive potential and health status of the poor. Practically speaking, the poor either (a) lack access to lighting and cooking fuel, or (b) have access to “solutions” that are expensive, dirty and the cause of massive illness and premature death. This situation is unacceptable and unnecessary.

1.2 I recall touring rural Bangladesh in 1992 with a physician and asking him what the most significant public health issue he saw for the kinds of people we were talking to. I was surprised when he said, “Indoor air pollution.” In fact, indoor air pollution from cooking using biomass in inefficient stoves without chimneys – which is the norm for much of the world’s poor – causes an estimated 1.4 million premature deaths every year, which is already more than the toll from malaria and tuberculosis combined. By 2030 it is projected to exceed the toll of HIV/AIDS. According to the U.S. Environmental Protection Agency (EPA), regularly inhaling the carcinogen emitted from biomass stoves ... is equivalent to smoking twenty packs of cigarettes a day.¹ These health risks are mostly felt by women and children due to the fact that they spend most of their days cooking, completing household chores and studying.

1.3 In addition to being harmful to humans and environment, kerosene and biomass fuels are often very costly. It has been estimated that global expenditure on kerosene alone is \$10-\$40 billion per year; to put this in context, total official international humanitarian aid is \$55 billion annually. The roughly 1.6 billion poor users of kerosene often spend 15% of their incomes on it.²

1.4 Use of kerosene, a dirty and dangerous fuel, releases 200 million tons of carbon dioxide, double the amount of emissions from all sources in the state of California. These startling facts have prompted several organizations to declare a “war on kerosene” as part of an effort to convert the world’s poor to cheaper and cleaner sources of lighting.

1.5 The out-of-pocket costs of using biomass for cooking are significant for poor households, but the opportunity costs are also substantial. Women in many societies spend a majority of their time gathering firewood for cooking over an inefficient stove while they could be doing something economically productive with their time. Deforestation is another related problem caused by current energy patterns.

1.6 Lack of access to reliable electricity leads to reduced academic achievement³ and economic activity amongst the poor due to the inability to study, trade and produce at night. Lack of reliable electricity also stymies the adoption of more efficient production and marketing processes by the poor, the formerly poor, and those who could employ the poor.

¹ Islam, Mahbul. “IMPACTS OF BIOMASS COOK STOVE USE ON AIR POLLUTION, GLOBAL WARMING, AND HUMAN HEALTH IN RURAL BANGLADESH.” EPA. 2002.

² For comparative purposes, this is about double the percentage that U.S. consumer pay for all their household energy requirements. According to US Department of Labor, the average US household spends roughly 7% of their income on energy needs (utilities, fuels, public services).

³ According to d.light, which cites information from Springer Science and Business Media, use of lanterns at least doubles the time children study at night.

1.7 Furthermore, low-income people pay an unacceptably high percentage of their incomes for the energy they *do* consume (often paying higher prices than wealthier people), and little of what they use is from clean or renewable sources. This resource drain on the limited budgets of the poor reduces consumption, investment and the surplus available for saving and/or spending on health care and education. A recent report by the SEEP Network frames the problem and opportunity well: “Existing energy expenditures by poor people on inefficient and low-quality energy sources are surprisingly high, both in terms of cost and time. Many poor people spend an inordinate amount of time foraging for traditional cooking fuels... Most estimates suggest that families in rural areas of developing countries spend on average \$10 per month on poor quality energy services.” This represents 20-25% of their household incomes, which, the report concludes, “underscores that ability of energy consumers, even if poor, to pay for modern energy services.” As we shall see, one the key constraints to turning this willingness to pay into using cleaner more efficient products is the ability to get financing for energy solutions, some of which have high upfront costs.

2.0 Climate Change: A Threat to the All, Especially the Poor

2.1 The second crisis we will explore is climate change. A strong scientific consensus exists that emissions of carbon dioxide and other gases, mainly from human activity, is slowly warming the planet and changing the climate in other respects, most of which are negative. This process is projected to lead to climate change that will be characterized by rising sea levels (and the wholesale destruction of many coastal areas and some island nations), more intense storms, and loss of biodiversity. Warming will affect the productivity agriculture and fisheries, often for the worse.

2.2 The bulk of responsibility for this trend should be laid squarely on the industrialized world whose societies emit much more greenhouse gases than developing countries, and which has been slow to respond by adopting cleaner energy use for production, consumption, lighting, cooking and agriculture or by enforcing emissions levels and other legislation that would directly address the problem. However, the developing world is increasingly contributing to the problem as growing numbers of people adopt lifestyles (and consumption patterns) comparable to middle-class living standards in the industrialized world. Oftentimes, those lifestyles are reliant on inefficient technologies that emit more greenhouse gases than necessary (which is often the case as those technologies are usually the most widely available and/or appear to be the least expensive).

2.3 Even if the industrialized world rolls back its contribution to global warming, that achievement could be negated by the increasing emissions from developing nations. It is also important to note that in many respects, the world’s poor will suffer the most from climate

change, as it will disrupt their housing, businesses, employment opportunities, ability to purchase food, agriculture, and in the most extreme cases, their very survival. Efforts to help microfinance clients, and poor people generally, prepare to mitigate climate change have been piecemeal to non-existent.

3.0 Microfinance: The Urgent Need for Reinvention

3.1 The third crisis that this paper will address relates to a kind of “mid-life crisis” being faced by the social innovation known as microfinance. The successes of self-help through microfinance are well known. Many research studies, which have been summarized and analyzed in Professor Kathleen Odell’s paper “Measuring the Impact of Microfinance: Taking Another Look”, have confirmed that it can be a powerful tool to reduce poverty when provided in an effective manner. Furthermore, unlike many social innovations that remained trapped in “pilot” status, microfinance has leveraged philanthropic, socially motivated and, increasingly, commercial capital to scale up to the point where more than 150 million families are participating and benefitting. While some countries have failed to keep pace – indeed, a disproportionate number of clients are in two countries, India and Bangladesh – and while the quality of services varies widely, this is nonetheless a significant achievement. However, the push to rapidly scale microfinance while also maintaining profitability (at the level of the microfinance organization) has created its own set of problems that are described below – problems that, if left unaddressed, could result in a contraction of the number of people served and compromise the potential of microfinance to address other social problems, such as energy poverty and climate change.

3.2 What has gone wrong, and why? Fundamentally, in the drive to achieve scale and profitability, many microfinance institutions became less client-centric, lost touch with their original social mission to combat poverty, and/or failed to anticipate and prevent an inevitable backlash amongst the media and populist politicians as it (a) became a more visible part of the financial sector and national poverty reduction strategies and (b) faced growing competition. These failures have led to widespread (though by no means universal) issues among MFIs:

- offering poorly designed, overpriced products (primarily credit)
- delivering those products by undertrained staff who are responding to financial incentives that are not consistent with client benefit,
- ineffective or nonexistent measures to prevent over-indebtedness

- realizing high levels of profitability due largely to temporary oligopolistic market dynamics (which has become especially controversial where interest rates are considered to be high and where efficiency gains and profitability have not led to reductions in interest rates) , and
- losing the support of the media, policy-makers, politicians and the general public.

3.3 In extreme cases, some clients have been abused by MFIs' field staff trying to recover loans that were not productively invested in an increasingly competitive environment. A few MFIs became so profitable that they were able to conduct public offerings that (among other outcomes) enriched already-wealthy people and organizations without adequate consideration of the repercussions in the court of public opinion.

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3.4 In a variety of ways these three crises reinforce each other, especially insofar as each of them has negative repercussions for the poor and organizations that they belong to or are otherwise served by. Fortunately, there are a series of solutions to these issues that are already proven or are quickly coming into existence, and they likewise reinforce each other to a large degree.

4.0 Emerging Solutions

4.1 In combating energy poverty, there are existing (and rapidly improving) technologies that could allow the poor to consume more electricity and cooking fuel while reducing their collective environmental footprint and, in particular, their contributions to climate change. These products include solar home systems, micro-utilities⁴ based on renewable and/or clean energy, biogas plants (which create organic fertilizer as a byproduct), improved cooking stoves, solar lanterns, easy-to-install insulation to improve household heat retention, and solar charging solutions for cell phones. In many cases, the cost of adopting and using these technologies is comparable to, or even less than, the dirty, inefficient and unhealthful technologies used by the poor today. Adoption of these solutions by microfinance clients (whether for business or residential use) could allow them to invest more in the productive capabilities of their businesses and family members. Reduced health expenditures would free up additional resources. Furthermore, producing, selling, installing and repairing these solutions could in fact be a robust

⁴ Micro-utilities are shared access production and distribution models for energy, such as a family or company installing sufficient solar or biogas power generation equipment to not only serve their own needs, but other families and/or businesses nearby.

income-generating activity for thousands if not millions of the world's poor, including microfinance clients and their family members. Fundamentally, there is a problem of marketing, financing and distribution – though one that has been solved in a growing number of countries. In one case it has been solved on an unprecedented scale, by the Bangladeshi organization Grameen Shakti.

4.2 There are some enticing opportunities for generating social and financial profit, helping the poor, empowering microfinance and slowing climate change if MFIs were to invest in offering such solutions on a much larger basis. For instance, there is a massive market opportunity represented by the fact that an estimated one-third of global microfinance clients are dependent on kerosene for lighting, spending about \$1 billion per year on this inefficient, unsafe, dirty and unhealthy source of lighting that contributes to global warming through significant emissions. Solar lanterns, which can be sold either by MFIs or by the entrepreneurs that MFIs finance, can reduce these emissions to zero while saving poor families at least \$20 per year for every traditional lantern they replace with solar lantern.

4.3 Climate change will require massive and urgent reengineering of industrial, agricultural, and consumption patterns in industrialized countries that is beyond the scope of this paper. However, the world's poor and the microfinance institutions that serve them can contribute significantly to reducing if not preventing widespread climate change, and successfully adapting to it, to the extent it does occur. In particular, rapid adoption of clean energy technologies can slow the contribution of the world's poor to global warming – a process that MFIs or comparable entities (such as rural energy providers using techniques borrowed from microfinance) can go a long way to facilitate through education, promotion and financing.

4.4 According to Nicola Armacost, the founder of Arc Finance and one of the world's leading authorities on energy lending, it is important to identify the relative benefits to clients and impact on climate change of various technologies in setting priorities. From a climate change perspective, biogas systems and biomass digesters have the highest potential for carbon dioxide emission savings (4-5 tons saved per system, per year), followed by improved wood stoves (4 tons), improved charcoal stoves (0.5 tons), and solar home systems, lanterns and battery chargers (0.1-0.7 tons). All except biogas systems/biomass digesters and larger SHSs are currently affordable by the poor. This suggests in particular that there is a tremendous opportunity to market improved wood stoves on a global basis. Oftentimes, affordable solutions such as solar lanterns can be a first step up the clean energy ladder, which begins a gradual climb from very inefficient energy services to more efficient energy services, while simultaneously improving the productivity of the household.

4.5 In addition, as Professor Asif Dowla argues in his path-breaking paper, "Climate Change and Microfinance," MFIs can help ensure that millions of the world's poor are less negatively impacted than they would otherwise be. The most effective strategies will be to recast some of

their lending for business, agriculture and housing, and in particular through the provision of micro-insurance, so that these products are responsive to expected climate change. Dowla persuasively argues that investments now that anticipate climate change will likely pay significant dividends in the future for MFIs and their clients.

4.6 Furthermore, a few MFIs have gone beyond end-user finance for clean and renewable energy solutions that often cost \$150-\$1,000, a strategy that has an uneven track record to date, and gear up to promote and lend to a wave of “energy entrepreneurs” as part of their small and medium enterprise (SME) portfolios. This approach may have even greater potential to spread these technologies and create sustainable revenue streams for the MFIs along with the entrepreneurs, while also addressing the need and opportunity to facilitate higher value added livelihood opportunities for microfinance clients. Indeed, providing finance to energy microentrepreneurs in the range of \$50-\$500 to enable them to market lighting products, mainly 1-10W solar lamps that retail for \$10-\$150, has shown to have tremendous potential but only on a small scale to date. Another approach used by some MFIs is to bundle clean or renewable energy solutions as part of larger loans to establish or expand micro, small and medium enterprises or are part of community infrastructure loans⁵ or housing loans⁶.

4.7 These efforts have begun modestly. To date, only 500,000 microfinance clients have received loans for energy solutions, barely 0.3% of global microfinance clients, despite massive need and opportunity, and growing demand. In places like India, where many of the MFIs have stripped down their offerings to the bare essentials – i.e., only providing working capital loans maturing in one year – making energy loans and providing access to quality energy products through partnerships with energy companies is a powerful way for an MFI to distinguish itself in an increasingly crowded marketplace. Furthermore, the opportunity for MFIs to finance the acquisition of clean, efficient and/or renewable energy by the poor represents an opportunity to significantly increase their loan portfolios while ending for productive and/or expense-savings purposes. The supply-demand market gap for energy is estimated to be \$195 billion dollars⁷. This amount represents a sum more than triple the aggregate loan portfolios of all the world’s MFIs. In the case of energy lending, there is a special incentive in place that can be tapped – the carbon credits available globally that can allow MFIs to effectively subsidize their lending costs if they can document decreased carbon emissions, something that Grameen Shakti and XAC Bank in Mongolia have both already demonstrated (the latter with assistance from Seattle-based MicroEnergy Credits).

⁵ Morris, et. al, p. 18.

⁶ Armacost, Nicola, “Innovations in Microfinance: Energy, Water and Sanitation,” Arc Finance, October 2010, drawing on information from the publication “The Next Four Billion” by the IFC and WRI (March 2008).

⁷ Armacost, Nicola, op. cit.

4.8 Within this broad category there are many tantalizing possibilities. In Haiti, for example, the potential for converting food vendors from charcoal to liquid propane gas is tremendous. Beyond the positive environmental impact, food vendors could save an estimated \$300-\$410 annually from this conversion, according to USAID. This savings would represent a significant part of their income in a country where most of the population earns less than \$2 per day per capita. There are an estimated 12,000 food vendors in Port-au-Prince alone, many of them poor people who are, or could be, microfinance clients. Facilitating and financing these conversions could be a high-impact and profitable business line for MFIs. Fonkoze, the leading MFI of Haiti, is beginning to get involved in energy lending⁸ and could provide important leadership to these kinds of efforts.

4.9 Finally, more and better energy lending constitutes one piece of what microfinance needs to do to reform and upgrade itself as a leading social innovation. In addition, microfinance clearly must to adopt a credible approach to consumer protection, while at the same time returning to its double-bottom line roots through widespread adoption of social performance metrics and standards. Initiatives such as the Smart Campaign, the setting of minimum standards for social performance being established by the Social Performance Task Force, widespread adoption of the Progress out of Poverty Index (and similar social performance tools), and the seal of excellence initiative, all comprise part of an emerging holistic solution to take microfinance to the next level.

4.10 Product development with an emphasis on increasing savings options is also an urgent issue. Especially for countries where interest rates above 30% are the norm, realizing cost savings through applications of information technology and business process reengineering, and passing all or at least the bulk of those savings on to clients in the form of lower fees, is essential. In all of these initiatives, care must be taken to rebuild and maintain the “microfinance brand.” The global microfinance industry must recognize and come to terms with the reality that public support for what it does is not a given, but must be earned through savvy communications backed up by solid accomplishments, measureable results, and an open dialogue about shortcomings, lessons learned and unresolved questions.

4.11 In this context, the promotion of livelihood activities including micro-franchises to help ensure that more loans are used for productive, income-generating purposes is essential. At the core of many of the problems facing microfinance are loans going for micro-businesses that failed or that were never started. (Oftentimes, the failure to invest in profitable businesses leads directly to another problem – aggressive collection using questionable or unclear ethical standards.) By pushing the frontiers of assisting clients to establish and run profitable

⁸ In January 2011, Fonkoze began working with EarthSpark to provide Solar Home Systems. Fonkoze’s role was to provide financing of up to \$190 for these systems. Fonkoze also has pilots underway related to solar lanterns, solar mobile phone chargers, and clean cook stoves.

businesses, we will address one of the central reasons why microfinance is struggling today. Importantly, efforts to provide affordable, clean and renewable energy to the poor can accelerate and magnify the success of livelihood development approaches through increasing business productivity, health status, asset accumulation, and educational attainment. As mentioned above, provision of clean energy solutions can itself be a massively successful and pro-poor business opportunity for the poor, which could be arranged and financed by MFIs (or MFI-like financing arms of energy companies seeking to serve the base of pyramid clientele) while at the same time combating climate change. Given the demonstrated propensity of poor clients to spend on energy, and the latent demand this suggests for lower-priced clean energy solutions, this could be a leading edge of a new ethos of forward-looking, strategic, client-centric behavior amongst MFIs and allow them to be a force for enabling the world's poor to derive financial benefits from the emerging carbon trading market.

4.12 This vision of mutually reinforcing solutions is grounded in several promising efforts that are already well underway, which will be presented in the next sections of this paper.

5.0 Grameen Shakti (Bangladesh)

5.1 The link between renewable energy products for the poor, responsive financing mechanisms, and the benefits to the livelihoods of the poor can be seen most clearly in Grameen Shakti (Rural Energy, hereafter referred to as GS). What this case shows is how end-user finance combined with effective marketing, sales, deployment and maintenance can lead to a breakthrough in adoption of clean and renewable energy solutions by the poor and the middle class in the rural areas of a populous, energy-deprived country. It is important to note that Grameen Shakti does not arrange finance from its sister organization Grameen Bank (as many people assume). Rather, it adopted the lessons of Grameen Bank's decades of provision of microfinance and developed its own in-house financing approach and mechanism. This seems to be following a trend of rural energy companies having more success developing their own internal "MFIs" to meet the specialized funding needs of their clients than in partnering with existing MFIs.

5.2 Established in 1996, Grameen Shakti supplies renewable energy technology to more than 40,000 energy-impooverished villages in rural Bangladesh (out of an estimated 70,000). The road to this achievement was neither rapid nor smooth. Years of trial and error, and internalizing the resulting lessons, were leveraged by a leadership team that was composed of Grameen Bank staff on deputation (or who had retired) and engineers who were recruited from some of the county's leading universities. This multi-disciplinary team is strongly aligned with the Grameen philosophy of facilitating self-help through a businesslike approach.

5.3 I recall being in a Grameen branch in Tangail district around 1993, and looking out the window into a small, fenced in grassy area behind the modest, two-story building. A large solar panel lay there, apparently unused for months if not years – presumably an artifact of a failed experiment in applying a solar solution there. One overarching lesson is that for rural energy companies that seek to bring clean and renewable solutions to the poor and those in remote regions, and to MFIs seeking to open up a line of business in energy financing, patience and the long-term commitment of management is critical. Lessons can be drawn from the successes of organizations like Grameen Shakti to help compress the innovation cycle of organizations starting this kind of activity now. However, the needs of potential end-users and the organizations that can provide solutions are often idiosyncratic and require customization and refinement before they are optimized and internalized by the users and related organizations. Certainly Grameen Shakti has some unique advantages that will not apply to many other seeking to make investments in this space. These include operating in densely populated rural areas and being able to take advantage of its relationship with Grameen Bank, which has face-to-face interactions with its eight million clients every seven days, as a marketing partner.

5.4 Indeed, Grameen Bank plays an important role in helping GS educate potential clients about its products. It's most affordable product, the Improved Cooking Stove (ICS), is popular among Grameen Bank clients. Grameen Shakti quickly discovered that demonstrating the usability and benefits of its ICS to potential clients was the most effective way to sell this product. Grameen Bank provides this venue by allowing GS to educate its clients about the benefits of switching to clean, efficient and, most importantly, money-saving products in its portfolio. As such, additional creativity in marketing, distribution and business models must be applied to create successful solutions, but this should not discourage practitioners and investors. After the section on GS, we will discuss additional models that have worked in areas with lower population density.

5.5 By way of background, the extent of energy poverty in Bangladesh is remarkable. Rural electrification is spotty and power outages common. Despite progress in recent years, fewer than forty percent of Bangladesh's 140 million people have access to grid electricity, and most of them live in urban centers.ⁱ Those living in rural areas and even some in the cities live without reliable electricity or any electricity at all. Natural gas is the dominant utility used to fuel Bangladesh. Once found readily under Bangladesh's soil, the resource has been depleted and sustainable alternatives have yet to be found. Fewer than three percent of Bangladeshis have access to natural gas for cooking, leaving the rest of the population to depend on biomass fuels, such as animal dung or wood, as their primary energy source in their stoves.ⁱⁱ (The diversion of animal waste use as cooking fuel reduces the amount that can be used as natural fertilizer, thereby decreasing the fertility of the land or increasing reliance on chemical fertilizers.)

5.6 In fact, the shortage of natural gas has led to rationing by the government over the past two years. Natural gas facilities exist only in Bangladesh's two biggest cities, Dhaka and Chittagong,

and links between the facilities and villages are no longer being built. This resource constraint has occurred at a time of increasing energy demand. Over the last decade, Bangladesh has experienced an eight percent increase in demand for energy per year.ⁱⁱⁱ To put this number in context, the U.S. Department of Energy's Energy Information Administration (EIA) estimates that demand for energy in the U.S. will increase by just 1.5 percent through the next few decades.^{iv} While the Bangladeshi government sees the need to create sustainable and efficient energy products for its people, it will take some time to meet the ever-increasing demand. Meanwhile, Bangladesh cannot grow without energy. It was, in part, this huge and growing gap between supply and demand that led to Grameen Shakti's creation.

5.7 With little or no access to energy, poor rural Bangladeshis turn to a variety of sources to meet their energy needs. As outlined above, many of the methods the rural poor rely on are hazardous to their health and the environment. Those that do not have access to natural gas, electricity or clean water must rely on environmentally unfriendly and risky methods of cooking and lighting. Kerosene lamps as well as wood burning and biomass fuels for cooking contribute to harmful indoor air pollution. Kerosene, a common source of lighting in rural Bangladeshi homes, emits carcinogens, carbon monoxide and carbon dioxide. These chemicals, especially carbon dioxide, are extremely harmful to the environment and contribute to climate change.^v "In Bangladesh, where rural life style dominates, indoor air pollution due to cooking is one of the most significant threats to human health and largest contributor of the global warming phenomenon," according to Mahabubul Islam.⁹

5.8 As we have seen, the rural poor in Bangladesh have little or no gas for cooking and no electricity for powering lights, fans, televisions or radios.¹⁰ Without access to modern energy products, it is more difficult for the poor to overcome poverty. "The poor must make do with solid fuels and inefficient stoves, and many are trapped in this situation: the health and economic consequence contribute to keeping them in poverty, and their poverty stands as a barrier to change," according to Islam.¹¹ It is this desire for change that fuels the demand for energy among Grameen Shakti clients.

5.9 It is important to note that the energy crisis in Bangladesh is symptomatic of growing pains in most developing countries. As incomes of its citizens increase, their desire for modern technologies and conveniences grows. The poor are not immune to this trend. In fact, the main demand for Grameen Shakti's energy technology is coming from the upwardly mobile poor. These people are often microfinance clients: they own businesses, send their children to school

⁹ Islam, Mahabubul. "Impacts of Biomass Cook Stove Use On Air Pollution, Global Warming and Human Health in Rural Bangladesh." EPA. 2002.

¹⁰ Ibid.

¹¹ Ibid.

and, importantly, receive remittances from relatives living abroad. Modern luxuries like cell phones, computers and televisions are in their sights. Investing in a solar homes system is seen as a priority given their increased ability to afford these technologies.

5.10 In 1995, Grameen Shakti began helping the poor break out of this energy trap. With startup capital from Rockefeller Brothers Fund and technical assistance by Sri Lankan-based Solar Power Light Company and Nepali-based Lotus Energy, Grameen Shakti installed its first 20 solar home systems. They grew slowly over time, seeing only small increments of additional demand until the early 2000s, when things began to take off. Today, Grameen Shakti has a total of 1,159 offices throughout Bangladesh. It employs 8,975 people, many of whom are young adults gaining skills and employment in emerging energy technologies. As of December 31, 2010, Grameen Shakti had reached the following milestones:

- Solar Home Systems Installed: 500,524 (including [184,933] in 2010 alone)
- Improved Cooking Stoves Installed: 172,516 (including [126,549] in 2010 alone)
- Biogas plants installed: 14,353 (including [5,127] in 2010 alone)

6.0 We will now briefly review the products that GS and deployed and how they are approached.

6.1 *Solar Home Systems (SHSs)*

For the first decade of its existence, Grameen Shakti exclusively offered SHSs. Millions of rural families in rural Bangladesh spend their lives in darkness breathing in exhaust from their kerosene lamps that provide the only source of light after dark with the exception of candles. Solar Home Systems are ideal for the sun drenched country packed with remote, inaccessible villages. The typical Solar Home System is twelve volt stand alone panels of a photovoltaic (PV) module, a battery, a charge controller, fluorescent lights, and wiring along with outlet fixtures for installation. These solar panels can be used to bring light into homes, stores and factories. They provide electricity to charge cell phones, television, radios and computers. Moreover, the cost savings from switching from kerosene lamps to the SHS is significant for the end-user. For example, a kerosene lamp costs a typical user approximately \$7 a month. With a twenty-watt SHS, this same user pays only \$5.30 a month for the duration of the loan (three years) and then pays nothing for light after that! In addition to monthly energy expenditure savings, the SHS allows this same typical user to work at night, either in the home or at their business. This will increase their output and thus their monthly income. From an environmental perspective, GS estimates that one SHS saves approximately 108 liters of kerosene annually [confirm]. With more than half a million SHSs throughout Bangladesh, that's almost 55 million liters of kerosene saved every twelve months.

6.2 Adapting the learnings of Grameen Bank accumulated over decades, Grameen Shakti developed its own financing methodology for its SHSs. This financing reduces the relatively high upfront cost and spreads payments out over a period that does not overburden its clients, who are generally amongst the rural middle class though a small number are poor and/or microfinance clients. There are three options available to those purchasing SHSs.

1. The client pays 15% up front and pays the remaining 85% over a term of 36 months with a 6% (flat rate) service charge.
2. The client pays 25% up front and pays the remaining 75% over a term of 24 months with a 4% (flat rate) service charge.
3. The client pays the total cost of the SHS up front and receives a 4% discount.

6.3 The capabilities and costs of SHS range from \$100-120 and 10 Watts to \$800 -900 and 130 Watts, with the most popular models being those in the [?] range in terms of cost and electricity generation.

6.4 As noted above, by the end of 2010, Grameen Shakti had sold [500,524¹²] SHSs with more than 20,000 additional installations each month.

6.5 In an effort to bring solar energy to more low-income people, Grameen Shakti has developed smaller SHSs that cost X% less than the most popular models, and also a so called micro-utility model, where a wealthier individual rents out use of their SHS to less well off individuals. As of November 2010, GS has sold over 32,500 small SHSs.

6.6 *Biogas Plants*

In 2005, GS began offering to build biogas plants for rural people and organizations on contract. Twenty-one branches located throughout Bangladesh produce biogas plants exclusively, of which 15 are financially sustainable.

6.7 Essentially, the “plant” is a container placed in the ground into which animal waste is deposited. As the waste decomposes, it emits gas which can be piped into household cooking stoves. The byproduct is slurry which can be used as a natural fertilizer. Ideal for animal farm byproducts, the biogas plants have been popular among chicken and cow farmers, whose excess waste is converted into clean gas used for cooking and generating electricity. GS estimates that Bangladesh has the potential to develop four million biogas plants and has a five year action plan to meet this demand.

¹² This figure does not include December 2010 sales.

6.8 The cost for installation of a biogas plant is \$200-\$400. The financing options offered by GS are:

1. The client pays 15% up front and pays the remaining 85% over a term of 24 months with a 6% (flat rate) service charge.
2. The client pays the total cost of the plant and builds it under the supervision of Grameen Shakti engineers. In this case, the technical and supervision fee is split into two installments, 50% prior to installation and 50% upon completion of the plant.

6.9 The clientele for this product tends to be better off than those using SHSs, as the cost is higher and the owner needs access to sufficient animal waste (mostly cow dung) to generate sufficient gas for cooking. GS does not build biogas plants before a sale is made; rather, they respond to market demand for these more expensive items. Biogas plants are designed and constructed after consulting with clients. As with its other products, GS offers free monthly maintenance visits by its engineers for three years. If maintenance is required after this point, GS offers customer service for about \$10 annually.

6.10 In some ways, GS unintentionally expanded its client base through its biogas and SHS product offerings. Due to the fact that both products are too expensive for the very poor, either because the technology itself is intrinsically expensive, as with the SHS, or the size and scope of is out of the average poor households' need, GS has found success marketing these products to a somewhat wealthier demographic. Many of GS's clients are middle income Bangladeshis or businesses looking for ways to cut costs. Large-scale farmers see the benefits of the biogas plants and sales, as seen above, are rising. This is certainly a lesson learned and only time and further innovation will lower these barriers to entry for the poor.

6.11 *Improved Cooking Stoves*

In 2006, GS added its third product to its offerings, Improved Cooking Stoves (ICS). These stoves are emerging as the most popular item among GS's products, both due to the low price and the obvious benefits. Indoor air pollution, as noted above, is extremely hazardous. A well-sealed chimney forcing smoke out of the house can save lives and save household costs, reducing by 50 - 60% the amount spent on buying firewood. Built with cement, brick chips and G.I. wire, the ICS are durable, solid and efficient. The stoves come in two sizes and are assembled by GS technicians outside each branch using locally made and readily available material. This marketing scheme allows passers-by to view the products, speak with the technicians and learn about the other GS products. In fact, my colleague, Nurul Alam, on a visit home to his native Bangladesh, purchased an ICS for his family home in Bangladesh after seeing them assembled outside a branch on his way home! GS technicians install the ICS in each client home ensuring

that its utility is maximized. As with the other products, free home visits and technical support are available after purchase and technicians educate their customers on maintenance and repair.

6.12 The average price for an ICS is roughly \$13, which a Grameen Shakti client pays in two installments, one before and one after construction of the stove. Due to the efficiency gains compared to traditional stoves, the fuel cost savings is significant. Grameen Shakti estimates users typically save \$3.50 to \$7 per month on energy costs, a significant savings for a typical rural Bangladeshi family making \$50 per month.

6.13 Today, 200 Grameen Shakti branches employ technicians who build ICSs. While it was important for GS to becoming economically sustainable, the ICS didn't help it meet this goal. In fact, GS basically breaks even on ICSs. The ICS costs about \$12 but they are sold for about \$13. But, the ICS is an important and popular tool for indoor air pollution mitigation. Not only that, the ICS meets the needs of all its customers, regardless of income level, and can start a family on a journey of adopting additional energy savings appliances and tools over time.

7.0 Success Factors of Grameen Shakti

7.1 As it sought to dispel the myth that energy technology is too expensive for rural people, Grameen Shakti created a business model with six main elements:

1. Developing appropriate, affordable and acceptable financing methods
2. Building community awareness through social activities and educational programs and leveraging the communications potential of its sister organization Grameen Bank
3. Providing excellent customer service
4. Training local youth people as tech support
5. Linking the technology to income generating activities
6. Focusing on women

7.2 Each of these factors is discussed briefly below.

Financing Methods

Grameen Shakti is one of the first companies to have successfully developed a financial mechanism to promote widespread access to renewable energy in rural areas on a commercial basis.^{vi} Through its financing method, it has made access to modern energy products more affordable to more people. Grameen Shakti's financing method evolved over time, adapting to the needs of its clients.

7.3 Its three financing options give Grameen Shakti's clients flexibility in choosing how to pay for their SHS. Grameen Shakti believes that the costs of all its products should be within reach

of the rural people it serves. If the costs are perceived as too high and the poor do not see the relative benefit of the new product compared with the traditional energy product, they will not be interested in switching. The new energy product must meet or be less expensive than energy products already in use.

7.4 Building Community Awareness

Grameen Shakti builds social capital and good will by going into the community to demonstrate the functionality of its energy products. Grameen Shakti found that the poor are more likely to try something new when they can see its functionality. By meeting with community leaders and local teachers, Grameen Shakti employees gain their trust. Grameen Shakti employees go door to door, distribute information about their products, and participate in community events to raise awareness and explain the benefits of their products.

7.5 Grameen Shakti organizes special programs for school children to expose them to renewable energy technologies, particularly since children's education and health are affected by inefficient energy products, like kerosene lamps or wood stoves. Grameen Shakti has already reached 5,000 children through these programs, which last an entire day and provide children with handouts and videos on the impact of renewable energy technologies. Additionally, children are taken on field trips to visit homes with SHSs, biogas plants and ICSs.

7.6 Customer Service

All of Grameen Shakti's products come with free after-sales service for one to three years, depending on the product. As with most appliances and technology, the energy products sold by GS need maintenance and upkeep. Clients receive monthly maintenance visits from Grameen Shakti engineers and are trained on how to repair their purchases themselves. Once the free service term expires, clients can purchase technical assistance on a yearly basis for \$4-10 a year, depending on the product. In addition, GS buys back SHSs if grid electricity becomes available and a client wants to switch; this option encourages many clients to purchase SHSs even in an uncertain environment. Clearly, the maintenance quality provided by GS is a critical factor in its success and distinguishes it from many other efforts globally that have bogged down and not scaled up beyond the pilot phase.

7.7 Training Youth

Each month, GS trains and employs 300-400 local youth, ages 18-30, as technicians for the ICS and SHSs. To date, GS has trained more than 8,000 youth as social engineers. These young people are trained to build the cooking stoves and repair the SHSs. This education gives them transferable skills which they can use for a lifetime. The youth enable GS to provide services throughout Bangladesh, bringing quality services to their most popular energy efficient items.

7.8 Linking technology and income generating activities

Through its micro-utility initiative, GS encourages entrepreneurship and income-generating activities through use of its products. Selling a SHS to a community member who can sell low cost, renewable electricity to his or her neighbors is viable way to bolster their monthly income and make purchase of a SHS affordable. GS also contributes to the local manufacturing value chain by purchasing as many locally-made components as possible. While this still mostly applies to the ICS, as the SHSs are made in Japan or Germany, GS is looking toward the day when each part of its products can be made in Bangladesh.

7.9 Empowering Women

Women and children are the main victims of energy poverty and inefficient energy sources. GS makes them a key part of its operations on many levels. More than 3,000 rural women have already been trained as technicians and entrepreneurs. GS has 46 Grameen Technology Centers (GTCs) where women receive training and education on how to repair and maintain components of the SHSs. Women learn how to assemble accessories, such as cell phone chargers, and to install and provide after-sale technical support for both SHSs and ICSs. These women earn about \$100 a month, far more than they would if GS did not employ them. Moreover, these skills enhance a woman's value to her household and her community and offer the promise of future employment.

7.10 In addition to the unique business model characteristics listed above, GS moved into other unchartered areas. In 2008, GS and a JP Morgan Chase subsidiary, Climate Care, began a relationship focused on buying and selling carbon credits. Climate Care, a leader in carbon market reduction projects, focuses on sustainable “bottom of the pyramid” markets. In fact, Climate Care wrote the playbook for carbon market offsets and improved cooking stoves that is used globally today. Climate Care provides upfront financing to GS for the production of its ICS. According to Edward Hanrahan, President of Climate Care, Climate Care essentially buys the pollution that *didn't* happen.

8.0 Faulu Kenya

Kenya has a long way to go to addressing energy poverty. According to the important paper *Using Microfinance to Expand Access to Energy Services*, “less than 15% of Kenya's total population has access to electricity and in the rural areas, five percent area connected to the grid.” Traditional biomass is the source of 95% of the rural population's energy needs. “In addition to contributed to widespread loss of forests,” the report notes, “reliance on inefficient biomass sources has detrimental impacts on health, gender roles and income poverty in

Kenya.”¹³

8.1 One of the leaders in bringing energy lending to rural Africa is Faulu Kenya, one of the leading MFIs in Kenya with more than 300,000 clients and full national coverage. It is a Deposit Taking Micro-Finance Company, registered under the Micro-Finance Act, and it offers both savings and credit services. Faulu Kenya has grown impressively over the last 16 years, with more than 90 outlets throughout Kenya. Faulu Advisory Services (FAS) is a sister company to Faulu Kenya. Through the FAS business consultancy, Faulu Kenya formulates strategy and responds to new opportunities to improve the lives of a growing number of poor people, and catalyze the growth of micro, small and medium enterprises. FAS has driven the energy lending business within the Faulu group of companies.

8.2 In 2009, FAS and Faulu Kenya's partnership with Arc Finance led to the creation of a new clean energy division within Faulu Kenya, which links product sales and affordable financing to improve energy access for a growing number of clients. Arc Finance provided a \$20,000 catalytic investment. Since the pilot's launch in March 2010, Faulu Kenya's new energy division has disbursed \$150,000 in loans to new and existing clients, supporting the purchase of more than 2,500 solar lanterns (benefiting 15,000 people). This volume nearly quadrupled the division's initial sales goal. The pilot has successfully laid the foundation for Faulu Kenya's energy division as a permanent part of the MFI's business. Building on newly gained experience and capacity, the division is now in the process of diversifying its portfolio to include four additional solar technologies. Thanks in part to Arc's financial support and guidance, today the energy division is a thriving, permanent venture. Kenya has a large untapped market with 29 million people without access to electricity—this represents about 86% of the population.

8.3 Faulu's recent achievements build on work in the energy arena dating back to 2003, when they began providing financing for liquefied petroleum gas at 10% flat interest in amounts averaging \$90 (but with no upper limit). One of the reasons this was established was “to prevent the diversion of business loans to the purchase of energy equipment.”¹⁴ LPG systems, which include a gas cylinder, a regulator, a burner and sometimes a lantern, can serve as a source of clean-burning cooking fuel but also can be used for lighting, refrigeration and powering electric generators and small engines, according to the important SEEP Network publication, “Using Microfinance to Expand Access to Energy Services.” Faulu Kenya also started providing loans of \$140-\$380 for solar solutions at a 20% flat interest rate in 2003. Both LPG and solar loans are repayable over roughly one year. Faulu Kenya works in partnership with five energy providers for LPG (Kenol Kobil, Total, BP, Shell and Caltex) and one for solar (Chloride Exide).

¹³ Kabuta, John et.al, “Using Microfinance to Expand Energy Services: The Emerging Experiences in East Africa of Faulu Kenya and Kenya Union of Savings and Credit Cooperatives (SEEP Network, 2007), p.10.

¹⁴ Ibid., p. 11.

8.5 KUSCCO, established in 1973 as a national association of savings and credit cooperatives that accounts for 40% of Kenya's national savings, has followed a similar path, though there are a few differences. It works with multiple solar energy partners, has somewhat more flexible loan terms and typically finances 66.5% of the system cost. As of December 2010, [X] LPG units valued at [\$Y] have been financed, and [Y] solar units valued at [\$A] have been financed.

9.0 Barefoot Power, D.Light, and Sun King

9.1 Solar kits that include lanterns and cell phone charging capability are a promising innovation with potential to wean the world's poor off of kerosene for lighting and ensure that people get the most value out of their mobile phones. For low-end lanterns such as D.Light's Kiran, the upfront cost is \$10 and the running cost is \$3 per year, compared to a \$3 upfront cost for a kerosene lantern and at least a \$21 annual running cost. Thus, these solutions can pay for themselves in 4-6 months and generate at least \$18 in savings per unit after the first year.

9.2 Owning solar kits can also represent a business opportunity, as users can charge other people's lanterns and mobile phones for a fee, and/or sell these kits on a commercial basis. Owners' businesses benefit by saving money on energy expenditures (which can be diverted to more productive investments) while also keeping shops open for extended hours in the evening. The poor, including microentrepreneurs and microfinance clients, stand to benefit tremendously. Indeed, according to the UNDP, bright, reliable light extends the workday and increases productivity, which can increase monthly income by 15-30%, and more than double the time that students can study in the evenings. (One suspects it also reduces visual impairment from students trying to read using dim kerosene light.) Finally, for every kerosene lantern replaced, we prevent 0.5-1.0 ton of carbon dioxide from being emitted into the atmosphere.

9.3 Turning the productive potential of solar kits into reality will require developing production, distribution, financing and maintenance processes that can scale. Three organizations have established leadership positions in this area and show potential to collectively revolutionize lighting and charging options for the poor worldwide during the next 5-10 years.

9.4 Barefoot Power, a "pro-poor energy company" based in Australia, has been focused on selling solar lamps and charging solutions on a global basis, though half of its worldwide sales of 200,000 units have been in Uganda and Kenya. These solutions include solar kits that typically retail for [\$10-\$120] and include one or more lanterns that provide [five] times the light of a kerosene lamp and the ability to charge the user's cell phones (or those of neighbors for a fee).

9.5 It took six years for this path-breaking organization to reach one million people (assuming five member families) and it projects reaching the next million in less than a year. They are primarily serving the base of the pyramid, with 80% of its sales being in 0.5W-1.5W systems

(the most affordable it markets), though they have higher end options with more capabilities that generate up to 15W.

9.6 Barefoot Power sees great potential in partnering with microfinance, both for financing entrepreneurs to sell low-end solar kits and users for SHSs. According to CEO Steward Crain, “We have partnered with Oikocredit to help deliver microenergy businesses to many countries around the world. We are partnering with MFIs to bring our solutions to market, both via end-client loans for some home lighting kits (\$50-\$200) but also for micro-energy retailer business loans for selling lower-cost products (\$10-\$20) for cash. The latter has proven most exciting, as one of our best entrepreneurs reach 700 households with his loan-financed energy business in just two months, benefitting more than 3,000 people and earning him about \$1,500 in a short period of time.”

9.7 He adds, “Because we're selling for cash without end-consumer finance, the role for MFIs drifts upstream to the retailer. This is actually a better spot for MFIs to engage in, as they don't need to worry about performance of the product for the 1 year loan, just provide working capital to the retailer. If a retailer sells 1 lamp per day, they can reach 200-300 households in a year, several complete nearby villages, and similar outreach as a microfinance loan officer. If this retailer could then be offered credit to extend to these households, you could have an MFI 100% focused on energy. In the EU/USA/Australia, about 0.3% of the workforce is employed by the energy industry - about 1 person per 300 people, or per 60 households. We could easily do the same, to lend energy assets to 1 person per village, who then on-sells or on-lends those products to everyone in the village. Large 50-200W (\$500-2000) solar charging stations can be one way to help make this happen in a more structured way, which would pay back in 1 year, and be large enough to attract even the most corporate MFIs.”¹⁵

9.8 The organization d.light serves customers in 25 countries with products including the Kiran S11, which it claims is the world's most affordable solar LED lantern, and other products with more capabilities, such as the Nova S201 premium solar lantern with mobile charging. As of late 2010, they had reached 300,000 households with their products, working through a global distribution network coordinated by its offices in India, East Africa, China and the United States. Greenlight Planet, a for-profit based in the U.S. that works with a sister organization in Kenya and has a U.S.-based non-profit affiliate as well, has similar products and capabilities, including the Sun King, which it claims is the “world's best solar home light affordable to off-grid families in India and Africa.” An exciting new partnership with Ujjivan, one of the leading MFIs in India, shows promise of pushing the frontiers of microfinance and solar energy companies working together.

¹⁵ Personal correspondence with Stewart Craine, January 12, 2011.

10.0 SELCO/SEWA (India) for Energy Lending

10.1 SELCO is an energy company focused on serving the base of the pyramid market with affordable solar solutions. Established in [X], they have installed more than [100,000] solar systems for residential and business use, mostly in its home state of Karnataka.

10.2 Beginning in 2005, SELCO formed an alliance with SEWA Bank in Gujarat. Loans finance solar home light, solar lanterns, and battery charging systems. Separately, SEWA also promotes smokeless cook stoves and solar cookers. Loans are available to SEWA members in amounts up to \$1,250 for secured loans, though for secured loans there is no upward limit except the value of the security. Loans are repayable over 35 months at an interest rate of 17%, though 7% is refunded upon completion of on-time repayment. SEWA markets these products through mobile vans and displays in monthly fairs, and through its ongoing contacts with members. Importantly, SEWA mandates that customers go through a 15-day trial period with solar technology, after which they can purchase it based on its demonstrated value to the client's household and/or commercial enterprise. Clients generally fall into three categories: those using fit for household consumption, street vendors who use it for business purposes (keeping their sales operation open at night), and energy entrepreneurs. In order to ensure adequate customer service, SELCO created a team to manage this part of the alliance and housed them in SEWA Bank building.

10.3 To date, uptake has been modest but is gaining momentum.

11.0 SEEDS (Sri Lanka)

11.1 The Sarvodaya Economic Enterprises Development Institute, or SEEDS, is an arm of the legendary Sarvodaya movement in Sri Lanka, focused on microfinance and related programs. Established in 1997, it began energy lending in 1998. It provides loans of US\$135 for grid connections but most interestingly in the context of this paper, also has formed alliances with 11 solar companies whereby they provide loans of \$225-\$900 to finance solar home systems to its clients. It also provides up to 50% of the total cost (which ranges from \$9,000 to \$18,000) of micro-hydro projects initiated by local communities.

11.2 The financing mechanism has evolved over time. For SHSs, the client pays 15% of the total cost, and SEEDS issues a loan for the balance, but it is paid directly to the solar company. As of August 2006, SEEDS had disbursed loans for 58,000 SHSs and 14 micro-hydro projects, amounting to \$8.56 million. However, loan recovery has been a problem, with portfolio at risk of 35%, due in part to incentives for loan officers that led to lending too many loans that were not properly appraised. Another issue was that their energy partner went bankrupt, which left a void in terms of service and maintenance. After some early achievements, it seems this program

has been phased out, but the lessons learned have informed a new generation of energy lending initiatives.

12.0 Emprenda, Argentina

12.1 In Latin America, there are an estimated 90 million people, mostly in the rural areas, who lack access to electricity. However, due to a variety of factors including a number of ill-timed, highly subsidized government initiatives to supply energy to the poor that have stifled private initiatives while rarely succeeding on their own terms¹⁶, the growth of rural energy companies, working alone or in partnership with microfinance institutions, has been minimal to date.

12.2 One promising exception to this trend is Emprenda, a microfinance institution working in both rural and urban settings in Argentina. Since 2004, Emprenda has pioneered the provision of solar systems for electricity generation to poor rural households in the northwest of Argentina. By effectively combining solar energy and microfinance, over 1,300 solar systems (benefiting 7,800 people) have been installed and financed in remote rural areas. In 2008, Emprenda established a partnership with Grupo ACP, a leading and well-established player in microfinance and social ventures in Latin America. Through this partnership, Emprenda launched a pilot project in Peru in 2010, which aims at creating a network of rural micro-franchises that can provide energy solutions for rural households, including loans to finance purchases. GENERA is the brand under which Emprenda is developing the approach that it will expand to other areas in Latin America.

13.0 Livelihood Development Through Technology-Enabled Microfranchises: Grameen Foundation's Community Knowledge Worker (CKW) program in Uganda

13.1 One of the central tenets of many approaches to microfinance can be captured in the phrase, "borrower knows best." According to this school of thought, MFIs are well served by respecting and investing in the "survival skills" of clients by providing capital to their self-chosen (but often peer approved) microbusinesses. Among other benefits, this approach avoids the high costs that have traditionally been incurred in designing and delivering business opportunities to the poor and advising them on their business operations. Furthermore, it inculcates clients taking responsibility for business setbacks rather than blaming them on the MFI. Another aspect of this philosophy is avoiding the trappings of central planning that attempts to limit the number of certain types of businesses (to prevent market saturation) or incent businesses that bring environmental, social or economic benefits to the community. In

¹⁶ See Morris, Ellen, et.al., "Using Microfinance to Expand Access to Energy Services" (SEEP Network, 2007) which notes on page 18, "The energy-financing programs of several MFIs and energy companies in Latin America and Caribbean were severely disrupted by poorly planned government interventions in the energy sector."

this paradigm, the client and her preferences are paramount – treated, if you will, as an empowered CEO, restrained only by her solidarity group which serves as a “Board of Directors.”

13.2 The application of this philosophy in microfinance still has merit, but its limitations are also becoming apparent, especially in an environment where there is increasing competition between microentrepreneurs, between MFIs, and between MFIs and the formal financial sector. Increasing numbers of borrowers are struggling to repay relatively high-cost loans and manage liquidity after investing in low-value added businesses, and in some cases they are diverting loan capital to consumption or paying off loans from other sources. As pressure builds on loan officers to recover loans that were not invested in profitable businesses, the issue of what constitutes ethical collection practices grows in importance (and is rightly a pillar of the Smart Campaign being spearheaded by the Center for Financial Inclusion). The prevalence of businesses that have neutral or negative implications for the socio-economic development of the client and community, or for human health and environmental stewardship, becomes increasingly important as the number of microenterprises grows. (Examples include cigarette manufacture or trading, light manufacturing or food vending using inefficient energy sources or high polluting technologies, and selling unregulated and unproven pharmaceutical products, chemical fertilizers and pesticides.) These issues are exacerbated by overpriced or nonexistent energy solutions that cause illness and hamper educational attainment as well as business profitability.

13.3 In response, a new generation of livelihood development strategies that work alongside microfinance has emerged, the most effective of which avoid the pitfalls of earlier approaches while ensuring that financial services end up facilitating economic upliftment of the client and the wider community. MFIs providing these services effectively differentiate themselves from those using stripped down models that are coming to dominate many markets. There are many livelihood strategies and institutional approaches to rolling them out. One of the most far-reaching organizational commitments to this strategy is the “Livelihood School” of the BASIX group in India. Some exciting models involve setting up microfinance clients (or other entrepreneurs of modest means) to sell reading glasses (Vision Spring) and non-prescription drugs and other health-promoting products (Living Goods and Health Keepers¹⁷). In fact, the field has such potential that it has spawned a center at Brigham Young University to advance theory and practice.

13.4 A subset of livelihood strategies that effectively respond to the challenge of encouraging the poor to seek financing and invest loan capital into productive income-generating activities, or of having the skills, confidence or product around which to start a micro-business, has been to

¹⁷ A project of Freedom From Hunger, based in Davis, California.

develop and promote “microfranchises” which are often referred to as “businesses in a box,” especially ones that are designed to bring benefits to the community. Among the microfranchises being promoted today, some of the most exciting are those that are technology-enabled and that bring benefits to the wider community through their inherently pro-poor, pro-development nature. One of the earliest examples of this was Grameen Telecom¹⁸ in Bangladesh, which set up more than 300,000 “village phone operators” who significantly increased their incomes during the years before mobile phone penetration reached very high levels even in the countryside. Beyond the incomes earned by the village phone operators and the ancillary benefit of them becoming familiar with new technology earlier than even many of their wealthy neighbors, the phones usage by people in the villages allowed for improved health and livelihood outcomes, and more rapid and effective disaster response, across the country.

13.5 Grameen Foundation adapted the village phone model for Uganda, Rwanda and Cameroon in partnership with MTN, and elsewhere with other partners. In anticipation of the limited life-cycle of the voice services business for Village Phone Operators, GF worked with Google and MTN to develop SMS search-based information services in the areas of Health and Agriculture. The services were built with content from trusted local organizations and tested with poor users, and then marketed nationwide by MTN. Called Google SMS Tips, these services were provided for free, launched alongside a set of other fee-based SMS services targeting the non-poor (Google Search and Trader), revenues from which were intended to cover the cost of the free services. In the first nine months of service, Google SMS Tips products received more than three million queries from 250,000 unique phone numbers, with over 25% of people using the service at least 10 times.

13.6 Despite these early successes, GF learned through an impact study that the availability of information through the phone was increasing knowledge among the poor, but was not always rapidly leading to the hoped-for behavior changes. As a result, GF began to modify its approach to better leverage trusted village-based “intermediaries” – such as village phone operators – who could reach those who do not own phones, serve as translators for those who are illiterate, provide reminders, and reinforce the information provided through the phone to those around them.

13.7 With support from the Bill and Melinda Gates Foundation, GF undertook a nine-month test of concept to ascertain whether having a “community knowledge worker” (CKW) – a farmer leader nominated from within their village, who could access actionable, relevant, and simply-

¹⁸ Grameen Telecom is a non-profit member of the Grameen Family of Companies. It has a large, though minority, ownership stake in GrameenPhone, a for-profit mobile phone operator that leads the market. For information on the Grameen Family of Companies, see Khalid Shams paper, “Accelerating the Reduction of Poverty in Bangladesh through the Grameen Family of Companies,” (Grameen Foundation White Paper Series, 2009).

communicated agricultural information through the phone – could serve as that trusted intermediary and improve the ability of farmers to adopt better agriculture practices and improve their yields and incomes. We also saw that making the model sustainable would present unique challenges given peoples’ inherent unwillingness to pay for information, especially when they do not see the immediate value in it. Realizing that smartphones offer a two-way channel for information flow, we modified the model to include collection of mobile survey data about farmers for organizations serving them, for which several expressed a willingness to pay. Based on the success of the pilot, GF received further support from Gates Foundation in 2009 to scale the program nationwide.

13.8 Over time, there will be up to 1,500 CKWs – microfranchisees who take out a small loan, and from the fees they earn from performing their CKW services are able to pay back the cost of the CKW Kit (phone, insurance, charging solution, marketing materials) and make a small profit.

13.9 The mechanism works as follows: GF staff communicates performance targets to CKWs every month through an application on the phone, which tells them how many farmers they need to visit, how many information tips they need to deliver, and how many surveys they need to conduct that meet data quality requirements.

13.10 Based on their performance, CKWs are categorized into four levels each month, and are paid using MTN Mobile Money according to a clear incentive structure, with current maximum profits of 40,000 UGX (~\$20) per month, to a minimum of 10,000 UGX (~\$5) per month.

13.11 If a CKW is performing poorly, GF’s field officers visit them to understand whether they are having problems with the phone, personal or family issues, etc. They receive refresher training on a regular basis, and if a CKW shows very poor performance for a certain number of months, they are asked to leave the program and give back their phone. The team spends significant time upfront in the recruiting process to find candidates who meet the criteria and are most likely to succeed in their role, minimizing the number of CKWs who drop out.

13.12 In addition to earnings from performing the CKW role, the charging solution they use to charge their own phones is able to provide a CKW with an additional income flow from charging farmers’ mobile phones. Over time, GF expects to provide additional “lines of business” that CKWs can offer in the community, utilizing the mobile phone.

13.13 It is important to note that CKW demographics closely mirror that of their farmer “customers”, with 40% of both groups falling below the \$1.25/day income band in recruitments to-date, which means that a CKW in that income band, who earns \$15 from part-time CKW services, increases their monthly income by approximately 40%.

13.14 One other important demographic note is that according to baseline surveys, only 30% of CKWs recruited to date are female, but female CKWs are significantly more likely to reach female SHF (28% vs. 18% for male CKWs). This reinforces the importance of prioritizing female recruitment and support in microfranchise programs targeting poor women with valuable services.

13.15 Data collection is an important element of the CKW model. It allows partners such as government agencies, donors, and commercial entities to pay a fee to access CKW services, thus enabling them to improve the frequency and granularity of their data collection. This in turn improves the efficiency of their monitoring and evaluation or customer research efforts. These fees then subsidize the cost of information dissemination, allowing it to be provided by CKWs to farmers for free. The data collection component also allows organizations to use the feedback to improve products or programs to better meet farmer their needs.

13.16 If successful, GF believes the CKW model, aligned closely with existing agriculture extension efforts, will reduce the cost of adoption of new and improved agriculture practices, show improved yields and incomes, and ultimately demonstrate a model that can be scaled to reach millions of smallholder farmers throughout Sub-Saharan Africa and South Asia.

13.17 Progress to date has been encouraging. Almost 280 CKWs have been deployed, the majority in collaboration with the World Food Program. CKWs have registered more than 9,300 smallholder farmers from 1,500 villages as of mid-January, and over 30,000 information tips have been disseminated from a database containing tips on 35 crops, agricultural inputs (seeds, fertilizer) five livestock animals, weather, and price information in 32 markets. . .

13.18 Over the next few months, the CKW program will begin to measure adoption of the information and recommended techniques, which will provide a true picture the effectiveness of this model.

13.19 A robust technology platform has been developed to enable these services, leveraging a smartphone-based mobile phone front end, and a back end infrastructure that contains a Content Management System, Salesforce.com-based CRM and Monitoring & Evaluation reporting system, and software project management solutions. Five applications have been developed for use by the CKWs and farmers, with others in development:

- **CKW Search**, an on-demand keyword based search of an agriculture content database
- **CKW Survey App**, a customizable platform for delivering mobile surveys

- **Pulse**, a field force management app allowing two-way communication with CKWs and field staff
- **Purchase for Progress Information Channel**, which sends reminders to farmers regarding best practices, notifications of WFP tenders and buying prices, etc.
- **Bulk Buyer App**, which allows Farmer groups to post & search for traders; buyers search, register for alerts (in development)

13.20 While this program shows great promise, such microfranchise models – especially those that seek to deliver measurable impact as well as scale and sustainability - are highly complex, and require a long funding runway before the model can be left to flourish on its own. GF is working closely with a large number of partners in this effort to ensure that not only does it maximize the synergy across organizations with aligned impact goals, but the learnings can be utilized by others and replicated.

13.21 As an example variation of the CKW program is underway in Indonesia, focused on non-agriculture livelihood services, with the support of Qualcomm. As of January 2011, it had recruited more than 5,700 entrepreneurs, over 60% of which are poor and 11% are very poor, and they were reaching more than 350,000 customers.

13.22 Clearly there are natural synergies between mobile phone-enabled microfranchise programs, and efforts to address energy poverty. Learning from each other’s models, and seeking viable opportunities for combining them could potentially add portfolio diversification for microfranchisees, and increase the reach and relevance of services available to the rural poor.

* * *

14.0 Lessons Learned from the Global Experience to Date

14.1 While grappling with the questions of how to address energy poverty, climate change and the challenges being faced by the global microfinance movement – and, in particular, how existing solutions that address two if not three of these issues can be championed – a few lessons emerge that are worth distilling.

14.2

- 1. There is a clear need for affordable, clean energy solutions for the poor and middle class, and growing evidence of demand as well as a compelling “business case”.** With billions being spent annually on proven inefficient and unhealthful energy sources, the need

for better sources of energy is obvious. As the affordability of clean technologies decrease, making these products available to the poor is a smart investment in their future. As evidenced by the success of institutions and energy companies above, offering these technologies through end user or entrepreneurial financing is sustainable and can even lead to a more diversified client portfolio.

14.3

- 2. To date, there has been more success in having energy companies internalize the lessons of microfinance to create in-house financing units than in having MFIs actively partner with rural energy companies or create in-house energy companies.** While there are examples of successful partnerships between MFIs and energy companies, historically MFIs have had a hard time finding reliable energy companies with which to partner. In addition, energy companies have been reluctant to partner with MFIs, seeing them as too risky. However, a growing body of sound practices and lessons learned is guiding a new generation of partnerships between energy companies and MFIs.¹⁹

14.4

- 3. Improved cook stoves have enormous potential for bringing immediate benefits to the poor while also addressing climate change.** The simple act of funneling cooking emissions outside the home will save lives and time within a household. It will cut back on the fuel necessary to heat the home, reducing the impact on the environment. Importantly, improved cooking stoves are inexpensive to produce and, as we have seen, are popular among the poor.

14.5

- 4. Financing for clean energy amongst the poor and middle class in the rural areas of developing countries needs to take into account the importance of the supply chain and in particular, maintenance issues, in particular for solar home systems.** Grameen Shakti addressed this well by focusing on local women and youth to train, educate and employ as technicians. This saved the costs of hiring outside technicians and provided local people with well paying jobs and highly desirable and transferable skills. In addition, as much as possible, GS purchased supplies from within Bangladesh. Many developing countries are resource rich and it's worth looking into local supply chains that can provide needed parts for these renewable technologies and also add much needed regular business to local supply chains.

¹⁹ A good summary of the lessons learned can be found in Morris, op. cit., pp. 23-29, which includes an excellent section on “criteria for energy microfinance partnerships” that includes what an MFI should look for in an energy company partner and vice versa.

14.6

5. **The “low hanging fruit” for MFIs may be, as part of their SME portfolio, actively financing entrepreneurs who sell clean and renewable energy solutions to the poor, the middle class, other entrepreneurs.** This is certainly not well tested with energy technologies and MFIs don’t have many examples from which to learn. However, much like financing any other business idea, providing a loan and a SHS to a poor entrepreneur could be just as successful as any other business venture. The fact that clean energy is a sought after and much needed commodity among the poor, make it all the more likely that these entrepreneurs will succeed.

14.7

6. **While it will take a long-term investment to secure, carbon credits from the voluntary exchange can assist in lowering the cost of clean and renewable energy solutions for the rural poor and middle class.** [Add a few sentences more here.]

14.8

7. **Successful livelihood support programs can address several of the problems being faced by the current generation of MFIs, especially if the business case for them is clearly articulated so that they do not end up marginalized within their host organizations’ expansion plans.** [Add a few sentences more here.]

14.9

8. **Technology enabled microfranchise initiatives initiated by MFIs, agriculture development organizations, mobile operators and others hold great promise for contributing to, and benefitting from, the impact of renewable energy initiatives in the rural developing world.** [Add a few sentences more here.]

14.10

9. **Grameen Shakti’s “total solution” comprising the entire value chain (excluding manufacturing) will be difficult to comprehensively replicate, though lessons from its success can be leveraged by many types of organization.** There are too many unique factors in its history. However, the reason for its existence is that the poor demanded these products. The Bangladeshi's are not the only energy starved poor people in the world. There is demand for these products. How these are brought to the poor is still to be figured out.

14.11

10. **Cross collaboration and marketing.** One of the ways GS benefits from its relationship with Grameen Bank is through cross promotion at GB group client meetings. This relationship seems natural between these organizations but is perfectly replicable. Finding opportunities to reach the poor through partnering with other MFIs, renewable energy companies or even local schools can increase access to clients and further community knowledge and ownership about ways to mitigate their inefficient energy sources with clean, renewable and affordable alternatives.

14.12

11. **Show, don't tell.** The poor are skeptical of new technology, especially when they have to take out a loan to purchase it. Grameen Shakti found that demonstrating how their products work, like the ICS, quickly made the benefits and usability obvious to potential customers. Much like in the US, where we can try out everything from a car to a sweater, the poor want to test it before they buy it.

14.13

12. **There is a significant opportunity for creating "green jobs".** Not only can clean and renewable energy technology give the poor a new avenue to advance their livelihoods, but they can also be educated, trained and employed in the execution of such technology. They can act as key liaisons between the MFI and the community, giving credibility to the unknown. Grameen Shakti's "technology centers" are a prime example of putting this concept into practice.

14.14

13. **The opportunity for cooperatives.** Simply because the SHSs and biogas plants are too expensive for a single household does not mean a group of villagers could buy into one. Microfinance solidarity groups could come together for this purpose, especially if they live close to one another.

15.0 Conclusion

15.1 There are concrete examples of, and a growing body of knowledge about how, energy companies can partner with or borrow techniques from microfinance to grow to meet the massive need for clean and renewable energy. Furthermore, successful livelihood development efforts for microfinance clients (and the poor generally) benefit poverty reduction efforts, the bottom lines and social missions of MFIs, and sometimes, the battle to combat climate change. Indeed,

the growth of the energy sector in the rural areas is itself a massive livelihood development opportunity for the poor and MFIs, and to the extent that energy poverty is addressed, most if not all livelihood programs will benefit.

15.2 There is a dearth of practical examples of MFIs consciously taking concrete steps to prepare their clients for climate change, but the steps to be taken are fairly clear. According to Professor Dowla, the center around climate-proofing loan products, the promotion of savings and insurance (which are good in their own rights), disaster planning, improved remittance services, focusing on water supplies for clients, and information sharing. Early adopters of these measures will be at an advantage, commercially and from a social mission perspective.

15.3 The world's poor lack access to existing energy solutions that would make them more productive, healthier, effective agents for combating climate change – all the while spending less on energy than they do today. Many MFIs have lost their way and are searching for models for reinventing themselves in a way that benefits clients, enhances revenue, and burnishes their public image. Climate change continues apace, in a way that will negatively impact us all, and the poor most of all – which suggests the possibility of global collective action based on both solidarity *and* self-interest. Livelihood strategies, including those related to energy or that could benefit from addressing energy poverty, are tested and available for widespread rollout. Not preparing the poor for climate change will lead to massive and unnecessary social and economic disruption as well as significant public and private expenditures on disaster response and forced migration. In this context, there is a significant opportunity for energy providers, MFIs, microfinance clients, climate change and financial sector policy-makers, and the public to join hands and apply known solutions that will reinforce each other and address the crises of energy poverty, climate change and microfinance's rudderless middle age. In so doing, the poor and the organizations that serve them can become more productive, healthier, and greater contributors to establishment of just world where the negative impacts of climate changes are minimized. This is a project, and a future, worth working for. It will not be easy, but the stakes are high and the models, technologies and ideas to meet these challenges already exist.

ⁱ Grameen Shakti publication

ⁱⁱ Grameen Shakti publication

ⁱⁱⁱ Anas, A Z M. "Bangladesh's energy future: A case for public- private partnership." The Financial Express. December 14, 2010.

^{iv} "Rising Electricity costs: A challenge For consumers, regulators, and utilities." Edison Electric Institute. May 2006.

^v <http://greenanswers.com/q/21878/products-shopping/manufacturing-materials/does-kerosene-lanterns-burn-cl>

^{vi} Grameen Shakti publication