CLEANSTART
CONNECTIONS
ISSUE 1 ✳ NOVEMBER 2013

EXPANDING MARKET-BASED ENERGY FINANCE SOLUTIONS

A business-led approach to providing clean energy financing for the poor

COUNTRY PROFILES
Nepal and Uganda examined

GRID EXPECTATIONS
Micro-grids, macro growth

LEADING LIGHT
Connections talks to Patricia Kawagga of Uganda's Rural Electrification Agency

UNCDF
Microfinance • Capital Development

UNCDF is the UN's capital investment agency for the world's 49 least developed countries. It creates new opportunities for poor people and their small businesses by increasing access to microfinance and investment capital. UNCDF focuses on Africa and the poorest countries of Asia, with a special commitment to countries emerging from conflict or crisis. It provides seed capital – grants and loans – and technical support to help microfinance institutions reach more poor households and small businesses, and local governments finance the capital investments – water systems, feeder roads, schools, irrigation schemes – that will improve poor peoples' lives. UNCDF programmes help to empower women, and are designed to catalyze larger capital flows from the private sector, national governments and development partners, for maximum impact toward the Millennium Development Goals.

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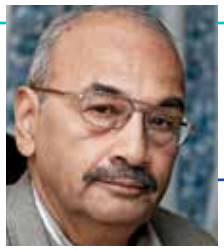

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Download a copy of CleanStart Connections or read online at: www.uncdf.org/en/cleanstart

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There are currently 1.3 billion people without access to electricity and 2.6 billion without clean cooking solutions globally. Providing them with access to modern clean energy services is not only critical to achieve the Millennium Development Goals (MDGs), but an immense investment and business opportunity. Harnessing this opportunity depends in large part on innovative business models in decentralised energy and requires strategic partnerships with the private sector.

Indeed, several energy enterprises are demonstrating a strong business case in serving low-income people, and expanding their businesses with ambitions to serve not just tens of thousands but millions of people. How can we make this the norm, and not an exception?

The business of serving low-income customers has inherent risks and structural challenges. Financing in particular remains a challenge for both customers and enterprises alike. Public finance, if used strategically to test innovation and build core capacities of energy enterprises and financial service providers on the ground, can leverage the private capital needed to expand viable business models. Doing this will dramatically scale up the energy market at the 'base-of-the-pyramid.'

The UN Capital Development Fund's (UNCDF) CleanStart Programme is an example of responding to this challenge. CleanStart will work closely with local financial service providers and energy enterprises to expand access to clean energy through microfinance, and meet the risk, liquidity and return requirements necessary to attract investment flows. UNCDF is well-placed to deliver on this commitment, with its special mandate to provide risk capital to the public and private sectors and through its experience in extending financial services in Africa and Asia, involving 8.4 million active clients as of 2012.

Achieving Sustainable Energy for All's objectives of 1) ensuring universal access to modern energy services, 2) doubling the global rate of improvement in energy efficiency and 3) doubling the share of renewable energy in the global energy mix by 2030, is a huge global challenge. The scale of the transition is too large and the ecosystem too complex for any one sector to lead alone. It requires alignment, collaboration and above all a bottom-up approach involving consumers, energy and financial service providers, civil society, investors, policy makers and development partners.

It is in this spirit that *CleanStart Connections,* a magazine, is being launched in parallel with *CleanStart Connect,* an annual forum supporting innovation and partnerships with key actors in the energy value chain. We are hopeful that they will deliver on the vision of connecting people, ideas and opportunities to bring about a greater range of quality, affordable energy products and services for all.

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THE PIVOTAL ROLE OF ACCESS TO MODERN ENERGY

Welcome to the inaugural edition of *CleanStart Connections*.

Energy is something most of us take for granted. Imagine how different our lives would be if we had no lights at home, nowhere to charge our smartphones or had to walk two hours daily just to secure one hot meal.

This edition of *CleanStart Connections* looks in detail at how most people in Nepal and Uganda access and use energy and what is being done to offer better solutions. It profiles entrepreneurs, technology experts and policy makers who are on the front lines of offering viable energy solutions to low-income people. It also gives a voice to the people whose lives have been transformed as a result. Finally, it examines some of the challenges that lie ahead as well as the opportunities there for us to take.

As part of UN Capital Development Fund's (UNCDF) CleanStart programme, *CleanStart Connections* highlights the latest developments in energy-finance markets serving low-income households and micro-entrepreneurs, while providing a platform for reflection, new ideas and partnership opportunities.

The publication provides real and exciting examples of how energy and financial service providers are together making energy markets work for the poor. The magazine will continue to look for answers to questions such as: how can customers make more informed decisions about their energy choices; how can partnerships between energy and financial service providers offer more opportunities to customers as well as contribute to economic growth; and what role can organisations such as UNCDF play in building an inclusive energy market?

Last, but not least, *CleanStart Connections* will provide updated information on what CleanStart itself is doing to address these important questions, how the Programme is progressing globally, and how it is pushing the energy access agenda forward.

> We stand at a critical juncture, where access to clean energy determines whether or not kids go to school, women are freed from menial labour, farmers improve their productivity or communities have access to information.

In just the last decade, we have been witnessing a leapfrog in technologies, transforming the way people manage money and communicate in even the poorest parts of the globe. Now is the time to seize the potential of these innovations while making energy access truly a reality for all. This will require CleanStart to keep its ears on the ground and listen closely to people, businesses, governments, investors, like-minded initiatives – and you.

We invite you along and look forward to making **CleanStart Connections** *your* magazine.

– The CleanStart Team

CLEANSTART microfinance opportunities for a clean energy future

CleanStart supports low-income households and micro-entrepreneurs to jump-start their access to clean energy through microfinance. It encourages greater financing choices for poor people, supported by high-quality technologies and services, and enabling ecosystems for energy and financial service providers to achieve scale and impact.

CLEANSTART'S FOUR COMPONENTS

FINANCE FOR CLEAN ENERGY to build the capacity of 18 financial service providers (FSPs) in six countries

TECHNICAL ASSISTANCE FOR CLEAN ENERGY to strengthen supply chains of energy solutions financed by partner FSPs.

KNOWLEDGE AND LEARNING to improve understanding and skills in the field of energy microfinance on a global scale.

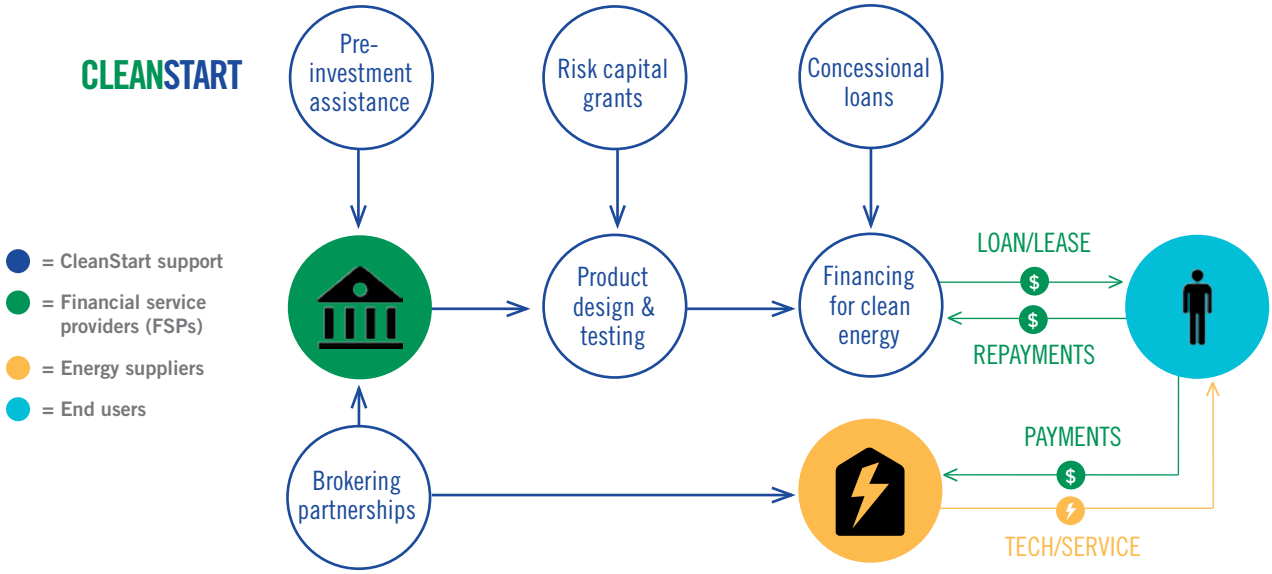
ADVOCACY AND PARTNERSHIPS to bring greater coherence and focus to efforts of key actors, co-creating an enabling policy and business environment for energy microfinance to reach scale.

OUR LONG-TERM VISION

Dramatically scale up energy financing for the poor, without subsidies, beyond the initial six developing countries (Nepal and Uganda and four other countries in Asia and Africa to be decided) with high levels of energy poverty. This would build on:

- validated financing business models;
- the commercialisation of technologies and services that offer value to low-income customers;
- a critical mass of technical and managerial capabilities;
- an ever-expanding knowledge base from research and network of partners; and
- evidence-based advocacy in energy microfinance

ONE CLEANSTART BUSINESS MODEL FOR FINANCING CLEAN ENERGY



WHAT DOES UNCDF MEAN BY CLEAN ENERGY?

Clean energy includes renewable energy (e.g. solar), relatively low greenhouse gas-emitting fossil fuels (e.g. liquefied natural gas) and traditional fossil fuels which, through the use of improved technologies and practices, produce less harmful emissions (e.g. improved cook stoves).

SNAPSHOT

The UN Capital Development Fund (UNCDF) is investing **US$26m** over six years (2012–17) **in six countries** in Asia and Africa to create **a clean energy future for 2.5 million people**.

CLEANSTART IS SUPPORTED BY THE AUSTRIAN DEVELOPMENT COOPERATION, NORWEGIAN AGENCY FOR DEVELOPMENT COOPERATION AND SWEDISH INTERNATIONAL DEVELOPMENT COOPERATION AGENCY.

Narendra Shrestha/UNCDF

EXPANDING MARKET-BASED ENERGY FINANCE SOLUTIONS

The search for market-based alternatives to deliver clean and low-carbon energy solutions to the poor in developing countries is coming up with some ingenious solutions.

Anisha Raya, age 17, grinds rice powered by a long shaft improved water mill at Mangaltar Besi Village in Kavre District, Nepal. (See page 17)

Expanding modern energy systems to underserved areas that are often off the electricity grid has traditionally relied on public finances such as grants and subsidies from national governments, multilateral institutions and non-governmental organisations (NGOs).

With the need for self-sustaining models of development becoming clearer, energy and financial services providers and governments alike are looking for market-based alternatives to deliver clean and low-carbon energy solutions to the poor who lack energy access.

One such approach by the UN Capital Development Fund's (UNCDF) CleanStart Programme supports households and micro-entrepreneurs to access affordable financing for low-cost, decentralised clean energy technology.

The CleanStart programme aims to build sustainable energy finance markets through microfinance, while supporting policies promoting the whole range of activities that create and build value in the process of supplying clean energy products and services.

UNCDF will launch the programme in six least developed and developing countries across Asia and Africa by 2017, including Nepal and Uganda, which are already CleanStart countries.

"Programmes like CleanStart can help the Alternative Energy Promotion Centre (AEPC) and accelerate government implementation of activities by bringing innovative financing mechanism and leveraging investment," said Dr. Govind Raj Pokharel, Executive Director of AEPC, part of the Government of Nepal.

Launched in Nepal in October 2012, CleanStart aims to help 150,000 low-income households and micro-entrepreneurs gain access to modern energy services. For this to be successful, however, the initiative must receive support from the private sector.

MOBILE PHONES TRIGGER SOLAR UPTAKE IN UGANDA


Frederic Noy / UNCDF

A 2012 working paper for the World Bank reported that in some African countries more people have access to a mobile phone than to electricity.

That is certainly the case in Uganda, where the number of mobile subscriptions, including a small percentage of fixed-line owners, had reached half the population by December 2011, or 16.7 million people, according to the Uganda Communications Commission.

Recharging mobile phones is now a booming business, one that barely existed a decade ago. It is proving to be a catalyst for the uptake of solar technology in off-grid areas.

For example, Moses Sabakaki, pictured with his spouse Roy Namukose, took out a microfinance loan with microfinance institution FINCA Uganda, to buy a 15-watt solar system costing UGX 380,000 (US$150). He now offers a mobile charging service to his neighbours in Takira, a village in eastern Uganda.

"When I received the solar panel, I started charging phones whereby I charge 8 to 10 phones per day, which exceeds UGX 3,000 (US$1.19) per month [in revenue]," Sabakaki says.

His solar home system also powers two lanterns for his business and home.

"It helps also my children when they read their books. They use that light and it is clear," he said.

"The Government's role is to create an enabling environment, [while] the private sector is mobilised to deploy energy services or products to the end-users," Pokharel said.

The opportunity for bringing renewable energy to the poor is immense.

More than two-thirds of Nepal's population is cooking in a traditional way by burning biomass, such as wood and charcoal, while more than four in ten still need reliable lighting services. Even urban areas face acute power shortages.

In Uganda only about 12 percent of the overall population can access electricity, and the rural electrification rate is only 4 percent.

BUILDING LOCAL BUSINESSES

Taking the microfinance route to finance clean energy innovation is a practical way to bring energy access to the poor and entrepreneurs.

"This is an entry point for further financial activities and income generation," said Binod Shrestha, Country Director of the not-for-profit development organisation Winrock Nepal.

Tapping into Nepal's extensive microfinance network to bring energy access to all will also develop local business and improve essential services like education, water and sanitation.

"Energy is linked to irrigation, education and climate change. Microfinance institutions have a membership base which they can reach out to and establish a critical mass for new clean energy technologies," Shrestha added.

BUILDING LOCAL CAPACITY

Shrestha believes that a holistic approach has a better chance of success in solving the complex task of getting clean energy systems to the poorest.

A 2010 project by Nepal's Ace Development Bank – with technical support from Winrock – and financial support from the Frankfurt School of Finance and Management found exactly this.

The project's capacity-building activities led to an improvement in governance and financial practices and better marketing of solar home systems to customers.

Suyog Shrestha, Ace's acting chief executive, says the project added a "new dimension" to the bank's lending practices by providing wholesale finance to microfinance institutions in the field to lend to clients hoping to buy the new solar power systems and thus access clean, dependable and affordable energy.

"This model is absolutely the right one if we really want these activities to be sustainable. It takes the money to the root of the problem – it has to be the people out in the field assessing the needs," Shrestha explained.

He said the project had a much greater impact than if the bank made the loans itself.

"It is important to reach out through [local] microfinance institutions to the people in need of the financing, to really understand the market by giving our partners freedom but at the same time integrating good monitoring systems," Shrestha said.

WHY WOULD MICROFINANCE INSTITUTIONS PROVIDE FINANCE FOR CLEAN ENERGY?

SOCIAL MISSION. Adding depth to their social mission is a common reason for including clean-energy finance in their portfolios. When the poor can afford to buy and use cleaner energy technologies they experience better quality of lighting, better health and savings.

ADDING VALUE TO FINANCIAL INTERVENTIONS. A business development service that improves micro-entrepreneurs' sources of income expands the microfinance sector.

IMPROVING FINANCIAL BOTTOM LINE. Development of new loan products and other market segments can also be an attractive reason for a microfinance institution to pursue clean energy financing.

A FINCA branch in Iganga, Uganda. FINCA is a provider of micro-finance.

Microfinance group meeting in Nepal

CARBON BONUS

In a very short period of time the UN's Clean Development Mechanism (CDM) has mobilised billions of dollars in public and private investment by funding projects in developing countries that reduce emissions of carbon dioxide (CO_2) and contribute to sustainable development.

The CDM, as defined in the Kyoto Protocol, allows emissions reduction projects that generate Certified Emission Reduction units to be traded in emissions trading schemes.

The CDM, as defined in the Kyoto Protocol, allows emissions reduction projects which generate Certified Emission Reduction units to be traded on international emissions trading schemes.

In Nepal, the AEPC has successfully registered five such projects that are being funded by the Mechanism. Four out of five of the projects are in the biogas sector, while one project activity promotes the use of micro-hydro, or small-scale systems that produce water-powered electricity.

Two more are in the works that would promote the use of improved cooking stoves and watermills.

According to a paper by the SNV Netherlands Development Organisation, presented at the 2013 Nepal Microfinance Summit, there is a great potential for microfinance institutions to earn returns by working with these kinds of CO_2 emission projects, despite the lower potential due to today's depressed prices caused by oversupply of certificates in the European market.

micro-grids

Gham Power's micro-grid solution, which supplies solar power to households and businesses in rural and remote locations, is a perfect case study in the successful application of a base-of-the-pyramid approach.

GENERATING CLEAN ENERGY, INCUBATING LOCAL ECONOMIES

Nepal has an energy crisis of serious proportions. Forty-four percent of its population has access to electricity via the grid, which would need another 500 mega-watts to meet full demand. Black-outs are common. As winter approached last year, power outages increased to 14 hours a day, a total of 98 hours per week.

Local solar and micro-grid start-up Gham Power is hoping to help alleviate the massive shortfall in energy for those on the grid while supplying some of the 56 percent of the population who remain off the grid.

Already well established in Nepal, Gham's business microgrid systems integrates solar into existing diesel-powered generators at hospitals, factories and businesses, substantially reducing fuel consumption and backup power costs.

Its lesser developed rural micro-grid solution combines solar power with appliances like wireless internet, grinding mills and chilling units, which then enable local businesses to generate more income by providing services for communication, healthcare, agriculture, and mobile banking.

Instead of merely installing a rural solar micro-grid to power households, Gham focuses on ensuring there's enough potential business activity that justifies a substantial installation, thus incubating businesses that in turn lift community income.

"It's not only about providing a model where the service or appliance is powered by solar, but about the community using that service or appliance to generate income," said Gham Chief Executive Sandeep Giri.

It's not only about providing a model where the service or appliance is powered by solar, but about the community using that service or appliance to generate income.

A community that adopts Gham's rural microgrid solution would receive a larger capacity network (ranging from 10 kilo-watts (KW) to 20KW) than it would otherwise if an energy service supplier started by supplying just households. In addition, the monetisation of electricity is not as clear in a micro-grid connecting only households than a network supplying both businesses and households.

"Yes there's certainly an increase in productivity in terms of kids being able to study after dark, but the monetary value of this is not as clear as the business scenario we're looking at," Giri explained.

What is the financial model that makes Gham's solutions sustainable, *CleanStart Connections* asked?

"When we look at the market for both of our grid systems, it was pretty clear to us that the lease model was the best in terms of market appetite," Giri said.

Following its successful product launch in April, Gham has a product portfolio of some 5MW; 4MW of which consists of business micro-grids.

"We are now seeing a lot of interest and the pressure is on to meet those orders," Giri said.

Gham Power is seeking partnerships with development banks, impact investors, local investors and multilateral organisations.

Currently it has an agreement with Clean Energy Development Bank Limited (CEDBL) to fund some of its deals and is

Gham Power installed a solar photovoltaic (PV) system at the hostel of Sitaram Higher Secondary located in Doti, far western Nepal.

working with other local banks to qualify for 'deprived sector lending.'

But impact investors in the United States – where Giri is located – and Europe who want to invest in these deals do not know Nepal and could use help in assessing credit worthiness of Gham's end clients, and in managing the overall risk factors.

The big question for energy service providers is: "How do these deals need to be packaged so that the investment case makes sense for funds that are already there for energy access or clean energy penetration in developing countries?

"The hard part of developing the projects and getting the customers on board has already been done. It's now about figuring out the finance so it opens up the market not just for us but a bunch of other private developers and engineering, procurement and construction," Giri concluded.

OPINION: MICRO-GRIDS NEED BUSINESSES TO DO THE HEAVY LIFTING

Off-grid clean energy systems are particularly suited to rural Nepal, since expanding the national grid to remote areas and transporting fossil fuels are prohibitively expensive. As a result, they will play a major role in meeting the country's energy access goals. Yet challenges remain to fulfilling this goal.

Since the majority of off-grid systems in Nepal can meet household power needs, such as lighting and mobile-phone charging, most operate on a very low load factor – an indicator of how steady an electrical load is over time.

Microhydro plants, the most popular off-grid systems for people in rural Nepal, have an average load factor of less than 30 percent – a level that signifies a very large amount of unused energy.

The limited use of alternative energy sources certainly adds further financial burden to residential customers, who are effectively forced to pay higher electricity tariffs. Furthermore, the systems remain unappealing to private investors and developers, leading to more dependency on limited development funds.

The solution to this problem lies in identifying and signing up new potential commercial users, who can more easily afford the off-grid power systems, thus lowering the overall cost of electricity produced by alternative energy sources for all.

Energy services can improve the productivity and efficiency of existing businesses, while creating opportunities for start-ups. For example, alternative energy sources can be used for existing commercial activities in Nepal such as agro-processing, the lumber business, and milling. Alternative energy companies can sign up new businesses by promoting innovative and easily used services like telemedicine units, mobile payment systems, and internet-based phone services.

A mobile payment system can readily fit into many Nepalese villages where the influx of remittance from people working abroad is high; in fact, Nepal was one of the highest global receivers of remittances as a percentage of GDP in 2011, according to the World Bank. Similarly, telemedicine centres could be a welcome relief to people living in remote areas, saving them several days of walking to reach hospitals for even minor treatments.

Anyone designing a project meant to promote the use of alternative energy options in Nepal must be sure to identify from the very beginning commercial uses that fit local needs in order for project results to be sustainable. Ensuring the success of the commercial users is crucial to the financial sustainability of such a project and the overall economic development of the community.

Nepal's off-grid electrification potential is certainly immense. Yet in order to scale up and sustain that potential, financial viability must be prioritised. Projects that seek to maximise commercial energy use are likely to be more successful and scalable in the long run.

Avishek Malla is Solar Energy Programme Officer at Nepal's Alternative Energy Promotion Centre

biogas

After over half a century's success, biogas is one of Nepal's key clean energy technologies.
By Saroj Rai

COOKING WITH GAS

Nepal has promoted biogas for over 50 years with considerable success. From its humble beginnings in 1955, biogas first caught the Government's attention in 1975 during the global oil crisis, resulting in the establishment of Nepal's first biogas company in 1977. This eventually grew into a fully-fledged national initiative, the Biogas Support Programme, in 1992.

The SNV Netherlands Development Organisation established the Programme with support from the Government of The Netherlands. The governments of Nepal and Germany, through German development bank KfW, also started funding it in 1997. Hundreds of NGOs, community-based organisations and cooperatives are involved in one way or another.

Arguably, Nepal's Biogas Support Programme has been the most successful rural development programme in the country, continuing unabated in spite of a decade-long armed conflict. The biogas sector currently has strong systems and structures in place as it gradually commercialises biogas in socio-economically better off parts of the country.

Annually, 22,000 biogas plants for use in households are constructed, a jump from around 16,000 five years ago.

Cooking with biogas in Kavre District, Nepal.

Recently, two biogas users' surveys revealed that 94 percent to 98 percent of these household-sized plants constructed under the Support Programme are still operating, albeit occasionally with lower level of feeding (input) and gas production (output). These surveys also report that 91 percent to 94.5 percent of people using biogas plants constructed during 2004 and 2005 are satisfied with their performance.

The Government integrated the Biogas Support Programme in July 2012 into the National Rural and Renewable Energy Programme, a multi-donor supported, government-executed national framework programme.

THE ROLE OF MICROFINANCE

Although biogas currently attracts a 40 percent investment subsidy, micro-credit is a crucial element in successfully reaching Nepal's poorest. In areas that already have a well-developed biogas market, the only reason why those without biogas are not buying the technology is because they lack the money. Any serious expansion of biogas use in Nepal will require more micro-credit opportunities. Availability of funding is not really

Biodigester being fed animal waste in Nepal

an issue, as Nepal's financial institutions have high liquidity due to limited investment opportunities in a country that has about one-fourth of its GDP coming from foreign remittances.

Moreover, the Nepal Rastra Bank, the country's central bank, has consistently put in place lending regulations that support the flow of concessional loans to rural areas through microfinance institutions. And of course there are funds available from development partners for micro-credit, some already earmarked for rural and renewable energy solutions such as biogas.

FOCUS ON CAPACITY-BUILDING

Going forward, policy makers' focus should be on capacity development of the biogas financing market to promote the wider availability of micro-credit and strengthen the linkage between the biogas and financial sector. Creating demand is not very difficult, provided financing is in place.

Policies must address the demand side of the biogas market equation and once this is done it will be much easier to address the supply side, meaning the development of the private sector. Consideirng the number of biogas companies in the country, any required capacity development can occur with little time and effort.

Nepal's biogas success story has been used as an example of best practice across the world and is now waiting for another smart intervention to provide further impetus. This is a great opportunity for the government and other development partners to make a big dent in renewable energy access for the poor in Nepal.

Saroj Rai is Senior Renewable Energy Advisor at SNV Nepal.

SNAPSHOT

By mid-July 2013, Nepal had some **298,000 household-sized biogas plants** constructed in all 75 districts. There are about **100 biogas companies** qualified to participate in the Biogas Support Programme and they have around **200 offices** in different parts of the country. **Over 260 microfinance institutions** are providing credit to biogas users.

FINANCING STRUCTURE OF A 6 METRE CUBED BIOGAS PLANT IN NEPAL

Source: CleanStart

FIRSTPERSON uganda's new breed of energy entrepreneur

A young Ugandan expands his business thanks to a microfinance-led clean energy initiative.

Frederic Noy / UNCDF

Young retailer Akim Baliruno has become one of the new faces of microfinance institution FINCA's push into clean energy in Uganda.

Meet **AKIM BALIRUNO**. At 25, the savvy retailer has already built a viable mobile phone business.

To buy stock he took out a loan from FINCA Uganda, a microfinance institution. It was because of this established relationship that FINCA approached him about becoming an agent for clean energy products.

In July 2013, Baliruno attended FINCA's very first training session for energy entrepreneurs in Uganda, part of a pilot programme. It was led by newly-appointed programme assistant Prossie Sansa Ikaaba, a former FINCA credit officer and agent for a solar home systems provider called SolarNow. Sansa's new job is to build FINCA's clean energy client base in Uganda's eastern region.

After impressing Sansa at the training, Baliruno was made eligible to purchase solar lanterns from FINCA for UGX 96,000 (US$38) each and sell them for UGX 130,000 ($52).

Eager to diversify his business, he took out a top-up microfinance loan for UGX 600,000 ($237) and FINCA handed him six Sun King Pro lanterns, a sturdy, portable lantern with a solar panel attachment the size of a magazine and featuring a lithium ferro-phosphate battery. FINCA has a partnership with Greenlight Planet, which supplies the lanterns.

Baliruno's sales pitch is based on the FINCA training.

"I tell them it's more cost effective in the long run compared to the cost of kerosene, and that children can read for longer and you avoid the risk of house fires," Baliruno explains.

"Plus, the solar lantern has the additional benefit of charging two mobile phones per day as well as powering a lantern for around four to six hours."

Within the first three months, Baliruno had sold three lanterns to other retailers on Bulumba's main street. His first customer was Matia Kabaale, a grocer.

"It's too expensive to pay for electricity so I decided to buy the solar light, which lets me keep my business going when it gets dark and to earn extra money from recharging mobiles," Kabaale says.

Baliruno has now found someone to mind his shop so he can go on the road in neighbouring towns and villages, spreading the solar message and aiming to make a profit in the process.

"For us it's easier to manage a smaller number of agents rather than having to deal with each client as they come," Sansa explains. "So what the likes of Baliruno do is go out and sell to the communities and then manage the after-sales service as their customers are nearer to them anyway."

By the end of December 2013 FINCA aims to have five contracted energy entrepreneurs in the eastern region.

"The next steps is that we're going to sign an MOU with those who have shown more interest and commitment in entering the solar lantern business, so we'll supply them as our agents and they will have a contractual obligation with us," Sansa says.

"We want to brand their shops with marketing materials, give them t-shirts and fliers so their work becomes easier, and we'll help them arrange meetings with the community leaders plus the people in the villages," she added.

TECHNOLOGYPROFILE | **briquettes**

Briquettes are compact and dense so they burn longer and are cleaner than normal charcoal.

Maimouna Nabawanuka, Yakuwa Community Development Founder

Jude Kabanda, Chairperson of Friends of Environment

BUILDING ALTERNATIVE ENERGY TECHNOLOGY BRICK BY BRICK

In Uganda, the East Africa Energy Technology Development Network has been supporting the development of new and improved energy technology since 1998, ranging from large-scale projects such as micro-hydro to domestic briquette production.

"We make a link between the supply side of the energy sector by building the capacity of energy entrepreneurs, and then we link the suppliers to the demand side and move to communities to enable them to realise what is available," explains the Network's Regional Board Chairperson May Sengendo.

"You must have a skill in order to become a member and you come into this network to use these skills down [the value chain] as well as at the policy level," Sengendo said, referring to the importance of grassroots involvement.

Two network members involved in briquette-making are Friends of Environment Chairperson, Jude Kabanda, and Yakuwa Community Development Founder, Maimouna Nabawanuka.

Both make briquettes from waste materials collected locally in their neighbourhoods, such as banana peels, wood shavings and charcoal dust, which are carbonised, or partially pre-burned, a step that makes the briquettes virtually smokeless. Clay is used as a filler.

Kabanda's organisation uses molasses as a binder, which he buys from a sugar factory on the outskirts of Uganda's capital, Kampala. The materials are then compressed by hand or machine.

Biomass briquettes are an affordable alternative to fossils fuels, charcoal and firewood, and are suitable for domestic and industrial use. They can be used in traditional or more efficient stoves. Depending on their ingredients, they have the potential to be a source of renewable energy.

Kabanda explained the benefits of briquettes on his packaging: "Because of the compact nature and heavy density, these briquettes burn longer and are cleaner than normal charcoal, making them more efficient, longer lasting, smokeless and convenient to use."

While labour-intensive, briquette production does not require a high level of capital, given the minimal cost of ingredients and the fact they can be made by hand or with a machine. The growing popularity of briquette production in Uganda has been encouraged by the relatively low cost of charcoal dust.

For Kabanda and Nabawanuka, briquettes are now their livelihoods, thanks to the support of the East Africa Energy Technology Development Network. Kabanda's production is 350-400kgs per month, or approximately 4.2 tonnes per year.

"The [Network] has linked me and other entrepreneurs to financial institutions for some financial support, which has enabled me to improve the quality of the product, especially in terms of packaging and branding," Kabanda said.

However, there is room for significant future growth in selling briquettes in Uganda. A 2012 report by the Global Village Energy Partnership concludes that by using locally available machinery briquette micro-entrepreneurs can grow to become small-to-medium scale producers of 20 tonnes of briquettes a year. With sufficient investment and imported equipment, new businesses could open medium-to-large scale production facilities of up to 200 to 2,000 tonnes per year.

TECHNOLOGYPROFILE

improved watermill

Improved watermills are a simple and effective solution for building local businesses and radically improving the living standard of Nepal's mountain communities. By Lumin Kumar Shrestha

NEPAL'S COMMUNITIES TAP THE POWER OF ABUNDANT WATER RESOURCES

The 'improved watermill' is a technology that is helping traditional mills in rural Nepal to provide more energy for agro-processing plants and electricity for homes. Leading Nepalese NGO the Centre for Rural Technology has been actively involved in promoting their use by providing technical support to rural people and motivating and supporting local water mill owners. The National Improved Water Mill (IWM) Programme's main objective is to improve living conditions of traditional water mill owners and users by increasing their productivity, while meeting many of their energy needs.

REACHING REMOTE AREAS

A big part of that is helping companies producing and selling improved watermills to extend their reach into more remote hilly and mountainous areas of Nepal where there is little access to energy.

Improved watermills are versatile, and can provide a wide range of services for agro-processing and micro-enterprises, in addition to producing electricity. The technology uses local resources, as well as having a maximum operation rate of around 75 percent in the case of electrification, grinding and other end-uses.

> Improved watermills are the simple and effective solution for building local businesses and radically improving the living standard of Nepal's hill and mountain communities.

Improved watermills were developed in response to the demands of poor owners of traditional water mills – called *ghatta* in Nepal – who have few alternatives for making money.

After programme interventions and improvement of their existing watermills, owners discovered they could generate significant income and respect in their community. From the second day of installation they will be providing energy services to local people as an entrepreneur. The owners have created jobs at the local level after operating their enterprises. More than twenty productive end uses can be operated from IWM.

COST EFFECTIVENESS

This new kind of watermill technology has a comparative advantage compared to other forms of renewable energy in Nepal because it is easy to manage, operate and maintain, and because it is

Narendra Shrestha/UNCDF

Farmers in the Kavre district of Nepal grind corn using the improved watermill

FIRSTPERSON improved watermills raise living standards


CRT/N

It was beyond the expectations of Phasku community in Nepal's Dolakha district that they would have an improved mill for beating *chiura* (a type of beaten rice) and milling their grains.

Resident Hari Bahadur Budhathokki (pictured) is one of Phaksu's successful entrepreneurs whose accomplishments can inspire others.

He started his enterprises after installing an oil mill, spice grinder and huller in 2005. He then decided to install an improved watermill to run his chiura beater.

Bahadur opened the Triveni Chiura Mill in his village after investing 108,523 Nepalese rupees (US$1,063), including 20,000 Nepalese rupees ($196) provided by a government subsidy.

Bahadur has seen a vast improvement in his income. Today, he earns around 150,000 Nepalese rupees (US$1,470) from the mill a year from processing rice brought to him by villagers. His income increases especially during the season of festivals in the summer and in the autumn.

The mill is now providing services to 11 village development committees in the Dolakha district.

already well known in rural areas, thanks to the traditional use of water mills. It costs little to install and operate them, which has been a boon for both owners and customers, who prefer the new watermills over cheaper options like grid electricity and diesel-operated mills.

INSTITUTIONAL SUSTAINABILITY

The Centre for Rural Technology's improved water mill programme is unique in that it has focused especially on training and supporting water mill owners through their Ghatta Owners Associations. In fact, some Associations are already providing services to mill owners outside of the Centre's programme districts.

Lumin Kumar Shrestha is Programme/ Project Director of the Centre for Rural Technology, Nepal (CRT/N)

IWM TECHNOLOGY

Improved watermill technology is based on the principle of existing mills, but with various improvements.

The most significant is the replacement of the traditional wooden runner with an improved hydraulic metallic runner that has cup shaped blades.

Two types of IWMs have been developed, short shaft and long shaft. Short shafts are used solely for grinding purposes, whereas long shafts are installed for grinding and other end uses such as rice husking, saw-milling, lokta beating, chiuri expelling and many more including electrification.

Improved watermills are the simple and effective solution for building local businesses and radically improving the living standard of Nepal's hill and mountain communities.


Narendra Shrestha / UNCDF

Improved watermills are versatile, and can provide a wide range of services for agro-processing.

SNAPSHOT

9,000 improved watermills (IWMs) installed
400,000 households benefit
2,000 jobs created

Sources CRT/N

LEADING LIGHT: PATRICIA NAKKU KAWAGGA

CleanStart Connections talked to Patricia Nakku Kawagga, Photovoltaic Microfinance Coordinator at Uganda's Rural Electrification Agency, about the challenge of changing mindsets in communities that would clearly benefit from solar.


Frederic Noy / UNCDF

The Rural Electrification Agency (REA) provides grid and off-grid energy solutions for the country's rural areas. Its Energy for Rural Transformation Programme is supported by the Government of Uganda, the World Bank and a host of other partners.

The aim of the agency's solar framework is to target the off-grid market with solar photovoltaic (PV) and other solutions.

As of October 2013, there are 24 companies cleared to sell approved solar products as part of the programme which involves subsidies to improve the affordability of solar systems for households and businesses.

Why is REA putting so much effort into promoting solar as a major decentralised solution to Uganda's energy shortage?

Climate change is a key aspect of implementing the Programme. Maybe that would explain why the financial institutions have not quite got it right. They are not aware of how to make an assessment in terms of replacement of energy sources. They are still looking at cash flow, cash flow, cash flow.

Say you've been spending US$20 per week or per month on kerosene, if you replace that with a solar home system you are going to save a lot of money, but also the displacement of the carbon is good for [Uganda].

If you have a solar home system, you don't have to buy anything after you have finished the loan installments. It's yours. It's a renewable source.

What have been some of the perception issues with solar PV?

One of the misperceptions is that solar doesn't work. Before, if someone bought a lantern over the counter, they would take it home and not charge the batteries to full capacity. They would take it inside the house when they were going to the market, which meant that lantern was not charging. All that time is lost and by the time they come back at night, they want this lantern to give them four hours of light. And when it doesn't work, that's a big problem. So end-user training is very important. What we have now recommended for all the technicians is they

must install this panel up on the roof for maximum exposure.

The mindset is the challenge. You'll find households where they have a lantern but they still light a candle or a hurricane lamp, because maybe the mother or father will use the lantern in their room and the children will use the hurricane lamp. But when you look at the cost of still buying this kerosene, why can't they just buy another lamp?

What challenges is your programme currently facing?

We continue to think and see how to improve access to rural electrification. We realise it's a big challenge.

One of the problems we have is that most of the solar companies are located where they feel there is economic viability for them. The design of the programme is market-led, private-sector-led and it is based on demand derived from the communities. So when we invite solar companies to come and participate in the programme, they do make an economic assessment and ask, 'Where should I operate?'

In some of the districts of Uganda we have concentrations of maybe five or six solar companies providing services to end-users, and then you go to another area where you'll find none or you'll find one.

Now, given the distances and the need for actual contact between the end user and solar company, we still have so many gaps, so many gaps.

How effective are your current partnership structures?

With the regulated financial institutions, they have a branch network already there throughout the country. The staff, the systems, the money, the clients, everything seems to be already there. It's just a matter of introducing this product and the numbers will come in.

Unfortunately that is not the story on the ground. Despite their advantages, they have been very slow. One, they look at solar PV as a risky area, so they approach it with a lot of scepticism. Two, they have not clearly dedicated attention to this product. Their staff have other loan products. When you bring in something like solar PV, they don't quite understand what that is.

Now, the advantage with the unregulated institutions, the Savings and Credit Cooperatives (SACCOs) is that they are quick to make a decision. Although they are cash-strapped, they've done extremely well and brought in numbers greater than all the financial institutions together.

What else has worked well?

The pay plan model has also taken us by surprise. It has worked extremely well. Unfortunately these small entrepreneurs don't have the financial muscle, so not so many companies have been able to do it. But we want to replicate this in phase three and identify other companies that can offer a pay plan.

Children in Bulumba, eastern Uganda, gather outside the town's first retail outlet for solar lanterns.

Our other model is fee-for-service. This is lease not-to-own so you get the comfort of a good system. The advantage is the client doesn't need a huge down payment.

With this particular model, if this system is not working, then the company can't expect the monthly service fee to be paid. So it ties them to making sure they're on their feet constantly throughout the life of these systems. You as the end user don't have to do anything apart from paying your service fee.

What is next?

What we're looking at in phase three is to identify one specific bank that can consider doing a separate energy unit or a complete spin-off. We've had a chance to visit Bangladesh. It's one of the fascinating models that we have looked at, such as Grameen Shakti. So we want to see if we can do that here. Do we have one bank that has the faith to say yes?

Solar is a viable business. The demand is out there. People have just not had the opportunity to access it.

When you talk about microfinance, people bring out the issue of interest rates. Interest rates are high that's why people aren't borrowing. In my experience as a microfinance practitioner, interest rate is not the biggest problem. Access is. If only I could access that loan. Clients do appreciate the cost of borrowing and they know they need to pay an interest rate.

When you look at money lenders, they have even tripled the interest rate, yet they still exist, they thrive. Now that tells you something, that the financial institutions are not allowing access. These potential clients will go to money lenders, and in the case of our programme, they go to the SACCOs, the pay plan and the fee-for-service model because the bank has locked them out. That is where the challenge is. We need to unlock a few things with the financial institutions.

TECHNOLOGYPROFILE

pay-as-you-go

With a few simple components and a great deal of ingenuity, social enterprise Lumeter Networks is providing electricity for the base of the pyramid – securely, cleanly and profitably. *By Mitra Ardron*

MAKING CLEAN ENERGY AFFORDABLE

In our increasingly modern world, 1.4 billion people still lack access to electricity. They light their homes with kerosene, impacting health, education and communications. Most of them can't afford the high upfront costs of clean energy solutions such as solar and wind.

The number of energy poor is growing each year, as population growth outstrips self-funded or grant-funded rural electrification. There is a concerted effort to bring energy to all by 2030, which the International Energy Agency (IEA) predicts will take $30 billion annually. Critical to this prediction is that only 40 percent of the expansion will come from expanding existing utility grids.

Currently nothing like that number is being spent. So what are the barriers to [scaling up]?

When I was Executive Director of Natural Innovation.org I would talk to companies working in rural electrification, and they would describe the biggest challenge as collecting small amounts of money from mainly rural customers.

Pre-payment, where customers have to buy credit before they gain access to electricity, has long been used for serving poorer communities. In the UK, where I grew up, coin meters were standard in rental houses. Several companies, such as Simpa Networks, and Azuri, pioneered an approach of pre-paid solar home systems in India and Africa.

I believe that achieving rural electrification for all requires leveraging the talent of companies working in countries across the world's South. These companies know what is necessary to introduce technology in their areas – supply chains, local labour etc. – but they lack the means of removing risk from the collecting of payments, which is crucial to freeing up the project finance or working capital required.

Girl with first purchased Lumeter Network token.

We created Lumeter to solve this particular challenge through creating a pre-payment technology, and making it available to partners worldwide.

Our first meter was trialed in Peru in February 2013, where a 500W wind turbine installed by our partner WindAid was shared between four houses. The lessons learned from this trial were incorporated into a second version of the meter that Zamsolar is piloting in Zambia, with 1KW of solar panels shared between seven houses.

We are currently raising money both for Lumeter and for our partners so that these pilots can be expanded to village-scale, and are looking forward to deploying our first village-scale system in India as well.

NUMBERS NEEDED TO BRING ELECTRICITY TO ALL BY 2030

	ANNUAL INVESTMENT	PEOPLE GAINING ACCESS ANNUALLY
ON-GRID	$11b	20m
PICO-SOLAR	$7.4b	10m
MINI-GRID	$12.2b	19m

Source: International Energy Agency 2011

THE TECHNOLOGY

#1 The first part of our solution is our low-cost meter, which measures power and time in both grids and standalone systems and other electricity enabled equipment, and allows for management of pre-payment and of loads.

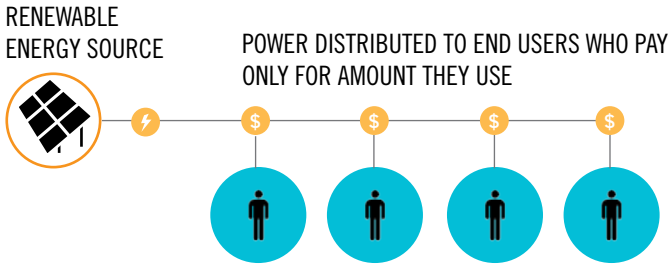
#2 The second component is SMS and cloud based accounting software. It integrates with mobile-money and mobile top-up, allowing consumers to pre-pay for electricity from the existing agent networks in their villages.

Lumeter recently started working with equipment developers and manufacturers (Original Equipment Manufacturers) to integrate our meters. The primary market is of course solar home systems and solar lanterns but there are many other areas where pre-payment can speed development. For example we are working with one partner on integrating it into a solar pump, and another on a battery-charging business-in-a-box. In both cases, the purchaser is pre-paying for the use not just of electricity but of the equipment or service – water pumping or battery charging – that is enabled by the electricity.

Crucial to the growth of this sector will be the availability of affordable financing, on terms accessible to Lumeter and its partners. The high cost of capital is directly limiting the amount of energy services the poor can access.

Mitra Ardron is CEO of Lumeter Networks, a developer of pre-payment technology.

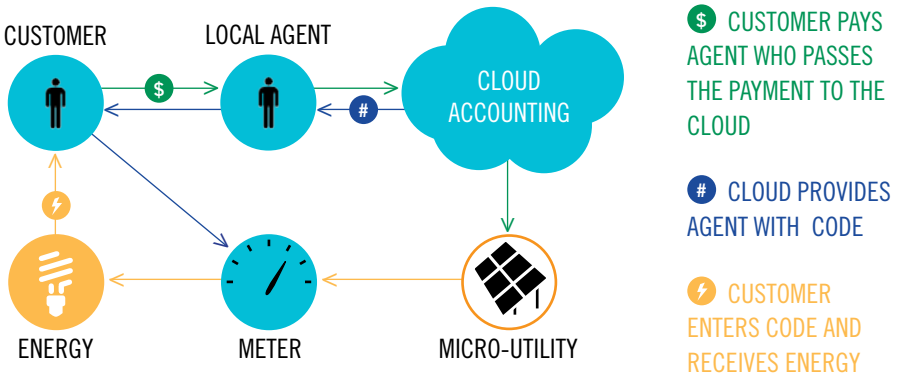
MINI-GRIDS



We started with mini-grids, which is where a solar panel, wind turbine or biomass generator is shared across multiple homes. The IEA predicts mini-grids will meet 40% of the world's electrification requirement.

The term 'mini-grid' is often used to refer to large systems used by the military, hospitals or universities, but for rural electrification purposes it is crucial to design them so that the target customers can pay for them with the roughly $2 per week they save on kerosene, candles, batteries and phone charging.

With the high cost of the financing available to developing country entrepreneurs this works out at roughly 10–100 watts per household being used for about 5 hours a day. Lowering the cost of finance, so that the cost of energy can be lowered, will be crucial to families having access to greater energy services.



With the financial infrastructure mostly established, CleanStart is helping the government build capacity and roll-out effective, modern clean energy systems.

FINANCIAL SERVICE PROVIDERS ARE READY TO SUPPORT CLEAN ENERGY IN NEPAL

Nearly a third of Nepal's 31 million people live below the poverty line, with certain marginalised groups and geographic regions facing higher rates of poverty. The Government is actively seeking to encourage both urban and rural development measures.

Providing modern and reliable clean energy solutions is one such way to spur development. They give the poor much-needed and affordable access to energy while also supplying small businesses a number of growth opportunties.

In a financial services market that has a high growth potential, like in Nepal, existing microfinance networks can be used to deliver customised loan products without incurring extra cost.

For example, loan officers can use the existing credit histories of active clients to assess and manage credit risk. Furthermore, microfinance providers can improve the viability and prospects of core loans and savings services since modern energy can reduce household outgoings or increase incomes through better productivity or longer working hours.

In Nepal, that potential for growth lies in clean energy financing through microfinance institutions. With microfinance already established in much of the country, scaling up loans to poor consumers for new energy technologies could be a cost-effective and profitable strategy for financial service providers.

Having relatively more established and traditional financial service providers (FSPs) involved in financing clean energy will help to reduce some uncertainty. For example, these providers are able to stem the risk of over-lending to clients by carefully pricing and designing loan products and terms in line with clients' current spending patterns.

Getting right the type and amount of loans made to purchase clean energy technologies increases the ability of clients to repay their energy loans while allowing them to realise the longer-term savings and benefits that come from migrating to clean energy.

Yet experience shows that even well designed financing schemes will not be enough to encourage the widespread adoption of clean energy technologies in Nepal. A number of other challenges must be overcome, including institutional and regulatory barriers and a general lack of knowledge and understanding about the use and benefits of these relatively new technologies.

GOVERNMENT VISION: CLEAN ENERGY FOR ALL

Over the next two decades, the Government of Nepal aims to increase the percentage of energy produced by renewable technologies to hit 10 percent of total energy generated, with the hope that almost 30 percent of Nepal's people will have access to electricity produced by these alternative energy sources. To help make these goals possible, the Government hopes for investments worth US$1.08 billion flowing into renewable energy by 2020. The ultimate goal is for every household to one day have installed at least one renewable energy system.

In 2012, the Government adopted the five-year National Rural and Renewable Energy Programme (NRREP), a government-led umbrella programme for all

CLEANSTART SNAPSHOT

CLEANSTART FUNDING

$1.3 million over four years (2012-2016)

BENEFICIARIES

More than **150,000 low-income households and micro-entrepreneurs** will gain sustainable access to clean energy through microfinance.

TECHNOLOGY OPTIONS

SOLAR LANTERNS

SOLAR HOME SYSTEMS

IMPROVED COOKSTOVES

DOMESTIC BIOGAS

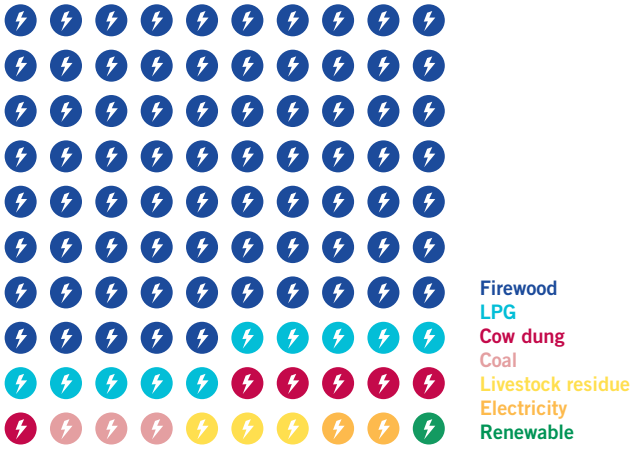
Narendra Shrestha / UNCDF

The small town of Nepalthoko in Sindhuli distrcit where the only source of light is solar panels.

EXISTING ENERGY USE

Currently, 87 percent of people in Nepal get their energy from the burning of traditional biomass fuels like wood and charcoal; not even one percent of energy is derived from renewable sources.

The majority of people use firewood for cooking, followed by liquefied petroleum gas (LPG), cow dung, biogas and kerosene. Kerosene is used much more in cities, however, since it is costly and frequently unavailable to those living in rural areas



Courtesy of AEPC. Data sourced from Government of Nepal, Ministry of Finance Economic Survey 2012

renewable energy initiatives being tested and run in the country.

NRREP is implemented by Nepal's Alternative Energy Promotion Centre (AEPC) and is supported by a number of development partners, including the governments of Denmark and Norway, as well as the United Nations Development Programme. Set up in 1996 by the Ministry of Environment, the AEPC acts as an intermediary institution between policymakers and private businesses and non-government organizations (NGOs) working on the ground.

Nepal's government first began to tackle the issue of energy access in the late 1990s, making the need for new kinds of renewable energy technologies for the rural poor a key part of its national development plan.

This was later followed by the 2006 Rural Energy Policy, which sought to promote private business' role in expanding energy solutions and to replace the inefficient and unsustainable use of biomass energy with cleaner energy sources. It also promotes community-managed energy service delivery.

Finally, a 2012 directive, made by the Nepal Rastra Bank, made an institutional link between finance and energy by requiring commercial banks to make 10 percent of their loans to the agriculture and energy sectors within the next three years.

GOVERNMENT CLEAN ENERGY TECHNOLOGIES TARGETS

	TARGET 2017
MINI AND MICRO HYDRO POWER	25MW (MAX CAPACITY)
SOLAR HOME SYSTEMS	600,000 SYSTEMS
IMPROVED COOK STOVES	475,000 STOVES
BIOGAS	130,000 HOUSEHOLD SYSTEMS

Source: National Rural and Renewable Energy Programme (NRREP)

CENTRAL RENEWABLE ENERGY FUND: FROM SUBSIDIES TO CREDIT

Approved by Nepal's Government in October 2013, the Central Renewable Energy Fund (CREF) is the core financial mechanism responsible for the effective delivery of subsidies and credit support for the renewable energy sector.

The Fund, consisting of over US$116 million in commitments from the Government and donors, provides both subsidies and credit. CREF will work as an endowment fund, allowing it to earn revenue and hold on to surpluses, in the hope that the Fund will be self-sustaining well beyond the lifetime of the NRREP.

While government subsidies have opened up a market for renewable energy technologies, reducing financial risk for companies and consumers, there is a general lack of knowledge among potential consumers about these subsidies and how to deal with bureaucratic hurdles. The situation is improving somewhat as a service mindset evolves, predominantly in the urban market.

Subsidies, however, will not be enough, says Govind Raj Pokharel, Executive Director of Nepal's Alternative Energy Promotion Centre.

"The government is there to provide subsidies, but microfinance institutions or bank and financial institutions are needed to fill the financing gap," he explained.

Nepalese woman cooks at improved stove at Kuseshwor village, Sindhuli, Nepal

FINANCIAL SERVICES IN NEPAL

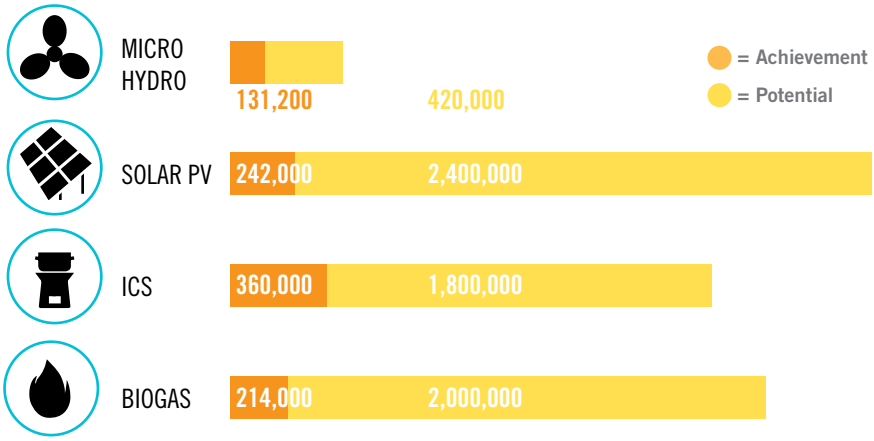
Over the past decade, Nepal's financial sector – in terms of both number and types of institutions – has grown rapidly due to reforms and liberalisation. The microfinance sector in particular has become more diversified in recent years since microfinance NGOs began to commercialise and transform into microfinance development banks.

As a result of these changes and improvements, the microfinance industry has been able to improve its performance and expand its outreach across the country in a sustainable way, including a growing number of microfinance institutions that have formed specifically to offer retail loans to the poor.

Currently, there are three kinds of microfinance institutions operating in Nepal: microfinance development banks; financial intermediary NGOs; and savings and credit cooperatives.

Nepal's commercial and development banks do not lend directly to the poor, but rather provide funds to these newly-established retail microfinance institutions, as part of the 10 percent required by the Nepal Rastra Bank. Banks are the main providers of loans

RENEWABLE ENERGY TECHNOLOGIES POTENTIALS AND ACHIEVEMENTS



Source: AEPC Anticipated Sector Development 2010

Young Nepalese Anita Pyakurel grinds the wheel of the cow dung collection tank to produce bio gas at Bela village in Kavre district, Nepal.

larger than US$5,100 (or 500,000 Nepalese rupees) whereas microfinance institutions are the predominant providers of small loans to low-income households and rural people.

The strength of Nepal's financial services sector is due in part to the variety of players operating in the market. A wider and deeper reach can be obtained through strategic partnerships with financial sector players that operate in less remote areas, such as microfinance institutions and cooperatives as well as their support networks.

Some of the main development banks, such as Ace Development Bank and Clean Energy Development Bank Limited are also listed on the Kathmandu Stock Exchange, meaning they have a secure investor base.

Meanwhile, the country's central bank, the Nepal Rastra Bank, has started granting approvals for public deposit mobilisation for microfinance institutions, thus opening doors for a new source of funding for lending portfolios.

Nepal also has a very mature microfinance wholesale financing market which consists of specialised microfinance wholesale banks and commercial banks that provide funds to retail microfinance institutions under the mandatory Deprived Sector Credit Programme.

STRATEGIES FOR ENERGY FINANCING

Based on the growing stability and reach of Nepal's financial services market, CleanStart invited microfinance providers and wholesale lenders– meaning banks that only deal with intermediary lending agents as opposed to the borrower – based in the country to apply for CleanStart support.

Nine short-listed institutions submitted their business plans. A general review of the business plans shows some interesting trends.

TECHNOLOGY OPTIONS AND LOAN SIZE

Based on the business plan proposals, financial institutions in Nepal are most interested in financing biogas, solar lanterns and solar home systems, and improved cook stoves.

Many wholesale lenders also expressed an interest in providing direct financing for larger energy systems like micro-hydropower. The interest in improved cook stoves is likely due to the Government of Nepal's commitment to bring improved cooking solutions to all households by 2017, as well as the potential for lending institutions to leverage international carbon financing.

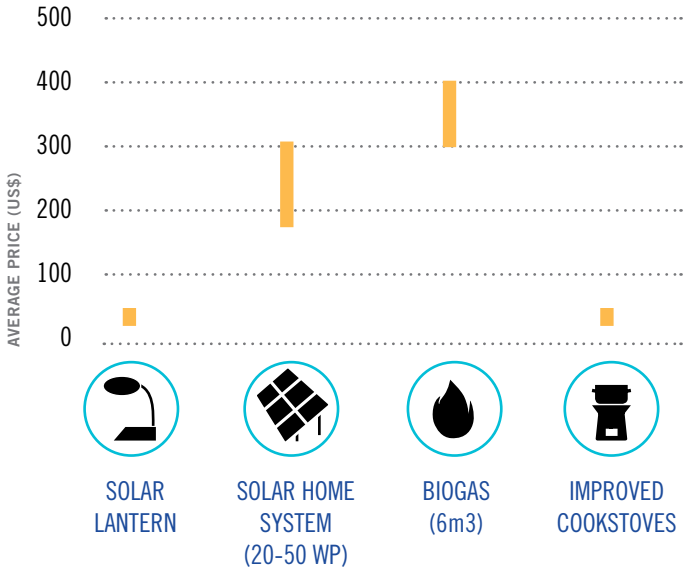
On average, proposed loan sizes ranged from US$60 to $290. Many but not all technology options that can be purchased and used by low-income consumers in Nepal are within this loan range.

RENEWABLE ENERGY TECHNOLOGIES TARGETS FROM FSPs

	TARGET	
SOLAR LANTERNS	23,064 SYSTEMS	
SOLAR HOME SYSTEMS	65,108 SYSTEMS	
IMPROVED COOK STOVES	66,273 SYSTEMS	
DOMESTIC BIOGAS	14,831 SYSTEMS	

Source: Three-year business plans from top-four FSPs submitted to CleanStart

PRICE RANGE PER TECHNOLOGY



Source: Business plans from FSPs submitted to CleanStart

CleanStart proposals also show that the lending institutions assume that, over time, clients who become familiar with clean energy will be interested in taking out additional loans for other kinds of clean energy systems.

BUSINESS MODELS AND INNOVATION

Based on the proposals, many providers envision a financing model that includes a wholesale lender, a local financial institution and an energy product supplier who can also provide installation and after-sales support.

Financial service providers generally prefer a clear delineation of roles and responsibilities among these three parties as a way to avoid risk and build on strengths.

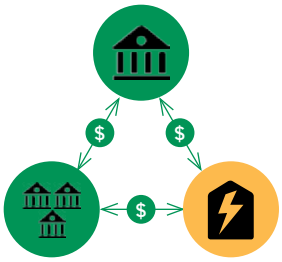
Those that applied to CleanStart are also keen on testing or expanding other financing models, such as vendor financing – where consumers access credit through the product suppliers themselves – and agent models, where local retailers promote specific technologies or loans. Some proposals also plan to explore ways to harness information technology in monitoring energy loans and facilitating payment.

Lastly, many of the applicants emphasised the importance of connecting energy access with the ability of consumers to make more money, and plan to create such linkages through their enterprise loans or to offer business development services.

In their business proposals, the applicants have also identified clear areas where they require further assistance to ramp up their energy lending activities.

Some of these, consistent with CleanStart's initial analysis of the renewable energy market in Nepal, include help with technical knowledge about clean technologies and the unique characteristics of energy microfinance; brokering partnerships with energy product suppliers; financial product development, marketing and management; business plan development; linking energy loans with a consumer's ability to earn extra income; accessing the carbon credit market; client impact assessment; and exposure visits.

CREDIT DELIVERY MODEL



Financial service providers (FSPs) like clear delineation of roles.

Wholesale lender: provides refinancing

Local financial institution: mobilises clients, reviews loan applications, collects repayments

Energy supplier: conducts marketing, installation, after-sales

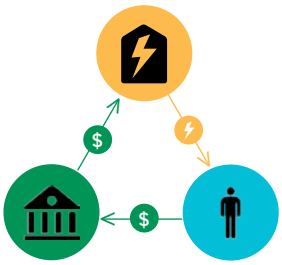
Infographics: credit delivery models, risks and benefits

Financial service providers in Nepal, Uganda and the world over share common views about energy microfinance risks. However, with the right credit delivery models the benefits clearly outweigh the risks.

CREDIT DELIVERY MODELS

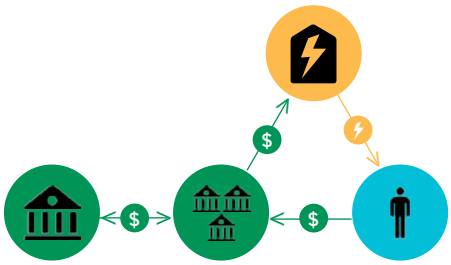
Offering energy loans is a true partnership effort, and there are various ways of making it work.

DIRECT LENDING



Commercial banks or microfinance institutions lend directly to the end user. Credit recovery from clients in remote areas is a major challenge for commercial banks.

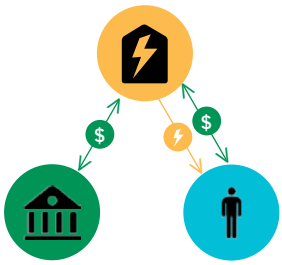
WHOLESALE FINANCING TO MFIS



Commercial banks provide wholesale loans to local financial institutions (LFIs) for energy lending. LFIs such as cooperatives have deep outreach, but often lack capacity in delivering and managing credit.

There are also dedicated wholesale funds set up for specific technologies (e.g. Central Renewable Energy Fund in Nepal).

VENDOR FINANCING OR RENT-TO-OWN SCHEMES



Initially, a vendor obtains a loan from a bank to acquire working capital. The vendor settles its loan through cash and credit sales by becoming an intermediary between its customers that need credit and the bank. In effect, the vendor ensures the repayment of the loans from the end-users.

COMMONLY IDENTIFIED RISKS IN ENERGY LENDING

These threats, weaknesses and risks are commonly identified in energy microfinance business plans from Nepal, but are applicable to other countries, too.

LACK OF CLIENT AWARENESS ABOUT CLEAN ENERGY BENEFITS
Lack of human resources to mobilise demand in remote areas

RELIABILITY OF ENERGY SUPPLIERS
Untimely distribution, installation or after-sales service

POLITICAL INSTABILITY
Frequent changes in policies, weak legal framework, possibility of discontinuing subsidy or waiving loans in priority sectors

LACK OF KNOWLEDGE ABOUT CLEAN TECHNOLOGIES
Risk of becoming dependent on energy suppliers on energy loan decisions

LACK OF UNDERSTANDING OF DIFFERENT ROLES PLAYED BY MFIS AND ENERGY SUPPLIERS

LOAN DEFAULT
Delay in installation or after-sales service may prompt clients to cancel their loans

CONSUMPTION LOANS RISKY COMPARED TO BUSINESS LOANS
Clean technologies alone do not generate cash inflow unless tied up with income generating activities

LONG LEAD-TIME TO BE ELIGIBLE FOR ENERGY LOAN
New clients may need to wait two years to be eligible for an energy loan

FUND DIVERSION TO NON-ENERGY RELATED SECTOR
Difficult to monitor as LFIs are sourcing wholesale funds from different banks and wholesale lenders have limited outreach

GEOGRAPHICAL RISK
Difficult geographical terrain affects market entry and timely distribution or after-sales service

LOW CAPACITY OF LOCAL PART-NER FINANCIAL INSTITUTIONS

SOCIO-ECONOMIC BENEFITS OF USING MODERN ENERGY

While the challenges to introducing clean energy financing are significant, so are the social and economic benefits of these technologies.

	 MICRO-HYDRO	 SOLAR LANTERN / HOME SYSTEMS	 BIOGAS	 IMPROVED WATER MILLS (IWMs)	 IMPROVED COOK STOVES
LIVELIHOOD	Savings on kerosene (~54%), diesel (~23%), batteries (15–30%), increased income from productive end-use or selling basic energy utilities (e.g. bulbs, wires, switches), improvements in agricultural productivity	30–50% fuel savings, (batteries, kerosene) increased income (better working condition, longer working hours), mobile phone charging	~ $218 fuel wood savings, improved local employment (local manufacturers), high-quality fertilizer for farming, better working conditions (lighting, cooking)	Each long-shaft IWM creates at least one job, increased income of mill owner is four-fold ($146–$623/year) due to improvements in quantity & quality of grains processed, quantity of wheat flour ground increases ten-fold	~40% fuel wood savings, improved local employment (local manufacturers), 20–40% reduced cooking time
EDUCATION	Better lighting, longer study hours, access to information (TV, radio)	Better lighting, longer study hours	Better lighting, longer study hours	Children's time spent on labour-intensive agro-processing activities is reduced	Better school attendance (reduced time collecting wood, respiratory infection, burns)
WOMEN'S EMPOWERMENT	Involvement in micro-hydro user group, changes in gender relations (men's participation in agro-processing)	~ 3 hours saved from collecting fuel wood, more time for income generation or leisure	~ 3 hours saved from collecting fuel wood, more time for income generation or leisure	Women freed from manual grinding and hulling, trained to operate as entrepreneurs	~ 3 hours saved from collecting fuel wood, faster cooking means more time for income generation or leisure
HEALTH	Reduced risk of fire from kerosene, candles; time saved used in recreation or socialising	Reduced risk of fire from kerosene, candles	Reduced indoor air pollution, better sanitation	Reduced time, effort carrying heavy loads for long distances for agro-processing; improved performance increases the availability of food in communities	Reduced indoor air pollution, eye disease, burns
ENVIRONMENTAL SUSTAINABILITY	Reduced carbon footprint (kerosene for lighting, diesel for electricity generation)	Reduced carbon footprint	~ 3 tonnes CO_2 emissions reduction (~3 tonnes fuel wood, 6.5 litres kerosene saved/year); biogas slurry provides natural fertilzer, preventing land degradation	~2.4 tonnes CO_2/year or 900L/year of diesel offset (based on fuel savings in existing diesel mills)	~ 2.5 tonnes CO_2 emissions reduction per stove; protects forests
					

Note: Nepal is used to illustrate the benefits

COUNTRYPROFILE

uganda

CleanStart research reveals huge pent-up demand for clean energy technology in a market humming with affordable solutions.

MATCHING CONSUMERS WITH TECHNOLOGY IN THE UGANDAN ENERGY FINANCE MARKET

As of 2010, just over 12 percent of Uganda's population was connected to electricity, with rural electrification standing at fewer than 4 percent. Access to electricity remains limited due to a power system that cannot produce enough energy and a national grid that is poorly maintained and does not reach very far geographically.

As a result, urban and rural poor households mostly depend on kerosene fuel and wick candles for energy and lighting. According to the latest Uganda Household Survey (2009/2010), 95 percent of Ugandan households still use wood and charcoal as a main source of energy for cooking. Rural families mostly depend on firewood, while about 70 percent of urban families burn charcoal. Both are a major cause of respiratory infections because of the noxious gases and smoke they give off.

For lighting, 66 percent of households use tadooba – a locally made paraffin candle – followed by kerosene lanterns (14 percent) and electricity (12 percent).

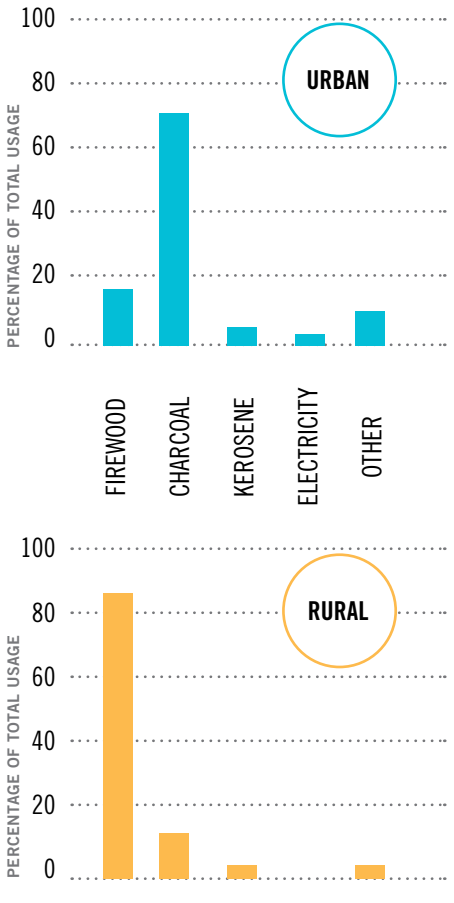
Julius Omoding, CEO of microfinance organisation FINCA, said: "We know these lamps that use kerosene have emissions of smoke and soot. While we don't have the concrete medical number to say how many clients have been affected, we can actually say that for our clients who've had access to solar, they don't have regular visits to the clinics complaining of coughs, flu and asthma.

"So we believe it's been a direct correlation in terms of health and benefits to the client."

Unequal access to modern energy is closely correlated with wider inequalities in opportunities for human development, in addition to severely limiting economic development.

Promisingly, awareness of clean and low-carbon energy technologies is slowly rising as they become less expensive and people learn more about them. CleanStart's research shows that not only are poor households aware of how much energy they need, but they are willing to pay for that energy, whether through microfinance or other means.

COOKING FUEL FOR RURAL AND URBAN RESIDENCES IN 2010



(Uganda National Household survey 2009/10)

CLEANSTART SNAPSHOT

CLEANSTART FUNDING

$1.3 million over four years (2013-2017)

BENEFICIARIES

More than **40,000 low-income households and micro-entrepreneurs** will gain sustainable access to clean energy through microfinance.

TECHNOLOGY OPTIONS

- SOLAR LANTERNS AND SOLAR HOME SYSTEMS
- IMPROVED INSTITUTIONAL COOKSTOVES
- BIOGAS SYSTEMS (INSTITUTIONAL, AND HOUSEHOLD)
- BIOMASS BRIQUETTES

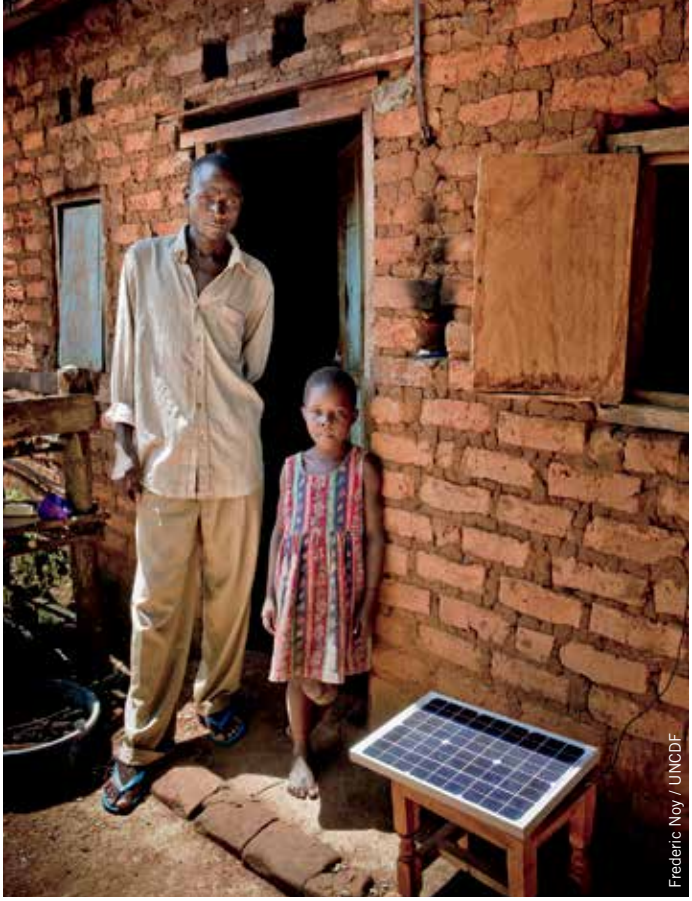
Uganda's Ministry of Energy and Mineral Development (MEMD) estimates that only 6 percent of the country's population is currently using modern energy technologies. Achieving the Government's ambitious goal of increasing reliance on renewable energy sources to 61 percent by 2017 will require some big changes.

Through its Power Generation Program, the Government is aiming to increase the amount of electricity the country generates and that people can access through a range of technologies, including those that use biomass, biogas, hydropower, cogeneration, solar, wind, peat and geothermal. Most of the new electricity will be provided using hydro, biomass and geothermal technologies, however.

But the high upfront costs of clean energy technologies, a limited awareness of their benefits, high rates of poverty and a lack of financing mechanisms that are specifically designed with consumers of electricity in mind are all major barriers that must be overcome if Uganda hopes to meet its ambitions goals.

Julie Marks / UNCDF

Locally made cookstoves being sold in a market in Uganda



Frederic Noy / UNCDF

This farmer in eastern Uganda took out a FINCA agricultural loan to purchase a 15-watt solar system for his family

FINANCIAL SERVICE PROVISION

Uganda's financial sector has undergone impressive growth since the turn of this century, following the passage of a series of laws that improved governance. With total assets of US$4.23 billion as of June 2012, Uganda's financial sector is still small by global standards, however.

A financial inclusion survey conducted in 2009 by the non-profit Finscope revealed that only 29 percent of Uganda's population has access to formal financial services. However, as Uganda's microfinance sector matures and reaches more and more people, microfinance institutions are well placed to develop and supply tailored finance schemes to meet the needs of poor consumers.

Uganda now has a four-tier system of financial institutions: commercial banks, credit institutions, microfinance deposit-taking institutions and non-regulated institutions such as savings and credit cooperatives, credit-only NGOs, unregulated microfinance companies and community-based organisations that offer microfinance services to the poor in rural and remote areas of Uganda.

Low outreach and banking infrastructure in rural areas of the country have excluded a majority of potential users while high interest rates and wide intermediation spreads have excluded a large number of potential borrowers from the market, particularly the poor.

The microfinance sector has become more diversified in recent years because of the commercialisation of microfinance NGOs, which has transformed them into microfinance deposit-taking institutions. These new kinds of microfinance institutions are expanding their reach and have been improving in performance over the last few years.

Estimations based on a combination of MIX Market data and data collected by UNCDF in July 2013, showed Uganda's microfinance industry served over 556,000 borrowers and nearly 2 million depositors.

The Rural Electrification Agency (REA) (see page 18) provides subsidies for solar home systems under a World Bank programme. Even with REA's subsidy, the high upfront cost of equipment still remains a major challenge.

Meanwhile energy companies in Uganda and international and national donor organisations – in cooperation with financial institutions – are trying to raise awareness about the benefits of improved cook stoves, solar energy and biogas, but so far they have reached few clients, and only those living in mostly cities or suburban areas.

FINANCIAL ACCESS IN UGANDA

Source: Access to finance (FinScope 2009 Report)

ENERGY AND GENDER IN UGANDA

FINDINGS FROM THE FIELD

A UNCDF CleanStart assessment of Uganda's energy and financial service markets was conducted in 2012 to guide future clean energy access programs.

It showed that people living in both cities and the countryside needed energy most for lighting and cooking, followed by the need to run small equipment, such as mobile phone chargers, refrigerators and radios.

Today, poor households in urban areas spend a quarter of their income on energy per month, while those in rural areas spend a bit less at 21 percent. Most of their energy budget goes toward fuel like paraffin, firewood and charcoal.

Owners of small businesses also need energy to run small equipment like hair-dryers, water pumps, generators and refrigerators. In off-grid and unreliable grid areas, lighting is essential for children to read for longer hours in the night and it provides security and helps prevent household accidents.

"Around the world, energy is a women's issue and it can mean the difference between safety and fear, freedom and servitude, and even life and death," declared the incoming Chief Executive Officer of the UN Sustainable Energy for All initiative, Kandeh Yumkella, during an address on International Women's Day 2013.

"Today, the long hours of unpaid work that women perform each day searching for firewood and other energy sources robs them of time to engage in more productive activities."

The East African Energy Technology Development Network has as part of its mandate to promote the economic empowerment of both women and men.

The Network's Dr. May Sengendo is also a senior lecturer at Makerere University's Women and Gender Studies Department.

"We've found so many women and men getting into innovations in energy and becoming energy entrepreneurs," she said.

Sengendo cites the example of a group of women and youth in Nansana, a rapidly expanding urban centre not far from Kampala.

Dr. May Sengendo, East Africa Energy Technology Development Network Chairperson

"They were finding it so difficult to pay for a vehicle to come and collect rubbish. But these women had realised why don't we try to make briquettes from the waste to get some money, but what they didn't have was the technique," Sengendo said.

"So we worked with the community and they started making really good briquettes. Now they know how to package their product and can go to a microfinance institution because they have books of accounts," Sengendo said.

MAKING SOLAR ENERGY AFFORDABLE THROUGH SOCIAL ENTERPRISES

Small Solutions is one company in Uganda striving to provide affordable clean energy systems.

"Basically what we try to do is offer high quality, affordable alternatives to whatever else is on the market," said Leslie Morris, Small Solutions' managing director.

Adding to the supply challenge, most clean energy technologies or components are imported from China and have a reputation for being cheap but not durable, Morris added.

For example, the UNCDF CleanStart-commissioned study interviewed solar energy users like Makindu, who lives in Buikwe, a small town in Uganda's south-east.

He complained of cheaper, poor quality batteries that do not last for a long time, implying that they do not get value for money. A high quality solar battery costs at least 900,000 UGX (US$354).

Solar lanterns and solar home systems are currently sold through a range of marketing and distribution channels, such as dealers and small companies in urban areas, regional centres, and direct distribution from head office, franchisees, warehouses and regional distributors.

Barefoot Power and Small Solutions, solar PV system suppliers, use a micro-franchising system with entrepreneurs, and have dealers with small companies in rural areas, providing bulk sales to companies, NGOs, Savings and Credit Cooperative Organisations (SACCOs) and entrepreneurs.

BARRIERS TO CLEAN ENERGY TAKE-UP

DISTRIBUTION CHANNELS

Distribution channels are mainly located within and around Uganda's urban centres. Other channels such as local retail shops could be used as sales points for the less complicated technologies such as solar lanterns or improved cookstoves.

Currently, consumers can access clean energy systems either through banks or microfinance providers or directly through local and international producers and suppliers.

HIGH COST

Traditional energy technologies in Uganda are more or less affordable for the average person. For example, wick candles and lanterns cost only 500 UGX ($0.20) and 10,000 ($3.94), respectively. Paraffin is also quite cheap.

Meanwhile, many Ugandans perceive clean energy technologies such as biogas, liquefied petroleum gas (LPG) and solar energy to be much more expensive. This is partly due to the relatively high upfront costs of buying a clean energy system. The installation of a biogas system can cost 1.2 million UGX ($473), a sum that is too expensive for most potential consumers in Uganda.

LIMITED UNDERSTANDING

People have a good understanding of the traditional technologies and can use them without much trouble. For example, Moses from Kawempe, a district in the capital city of Kampala, says his family have been using their three stone fireplaces reliably since the time of his great-grandparents.

As a result, consumers are often hesitant to try new energy technologies like biogas that require the installation and use of a totally different energy system. The CleanStart survey found such misgivings common across Uganda.

STRINGENT LOAN TERMS AND CONDITIONS

The survey interviewed a few clients who had accessed credit from one of Uganda's microfinance programmes. The respondents say the financial products they were given to choose from were inappropriate and limited to funding only solar energy systems. They could not borrow more than 150,000 UGX ($60). Indeed, not many financial institutions currently provide loans that cater to the full-range of clean energy products on the market, and when credit for them is extended, it is limited to people who already have business loans.

LIMITED AFTER-SALES SERVICES

The survey found a general lack of qualified technicians to provide maintenance and service for these new technologies, with the result that most users reverted to traditional technologies once the new one broke down. More often, suppliers are incapable of providing after-sales services due to the high operational costs involved or lack of trained manpower.

LOW LEVELS OF AWARENESS

Communities are not aware of most new energy technologies except for new improved cook stoves and solar systems that have been marketed fairly well in Uganda, the study found. New energy technologies like LPG and biogas are not quite known and understood.

Dr May Sengendo, the Regional Board Chairperson of the East African Energy Technology Development Network, says awareness is still low. The network has changed tactics in part by learning to use the local language when using written communications to promote the new systems.

Frederic Noy / UNCDF

A solar lantern enables tailor Robinah Kyayise to work at nighttime

FINANCING OPTIONS

SOLAR LANTERNS AND HOUSEHOLD SYSTEMS

The solar PV market in Uganda has steadily grown over the past 10 years, with new companies, social enterprises and foreign investors tapping into it.

Today, there are over 20 registered solar photovoltaic (PV) companies involved in producing, selling and distributing solar PV lamps and solar home systems in the country, with many of the large ones being pre-qualified and certified by Uganda's REA for meeting national quality standards.

Solar Now, an energy social enterprise, sells its products on part credit and part cash sales. Small Solutions and Barefoot Power also sell bulk to dealers and microfinance institutions, including FINCA Uganda and Opportunity Bank, who then sell the products to their customers.

Solar Now sells, installs and services solar home systems, which come with a credit facility. Clients make a down payment of 25 percent and pay the rest in 12 monthly installments. While SolarNow makes a margin on the system, the interest margin is only 10 percent, as compared with the 20 percent flat rate charged by microfinance institutions.

SolarNow customers have a repayment rate of 99.5 percent and over 60 percent decide to buy a system upgrade after they finish paying off the first system. SolarNow offers 24 months of free maintenance and warranty.

By October 2013, the company had sold over 3,000 systems in Uganda to consumers who purchased them from 36 franchised shops. It plans to replicate this model in other east African markets in 2014, according to its managing director, Willem Nolens.

Solar Sister, which adopts a door-to-door model to distribute its products, has just started working with Kiva, the world's first online lending platform, to provide low interest loans to entrepreneurs in Uganda. This helps them come up with deposits for stock, so they can get started, and also to allows them to get more stock as they grow.

IMPROVED INSTITUTIONAL COOKSTOVES

With over 20,000 schools in Uganda, and only a quarter of them using improved institutional cook stoves (ICS), the estimated market for this product is large at $90 million. The available market for institutional stoves for private secondary schools alone is 1,000 schools, valued at $5 million.

JULIUS OMODING, CEO OF FINCA, ON THE IMPORTANCE OF PARTNERSHIPS

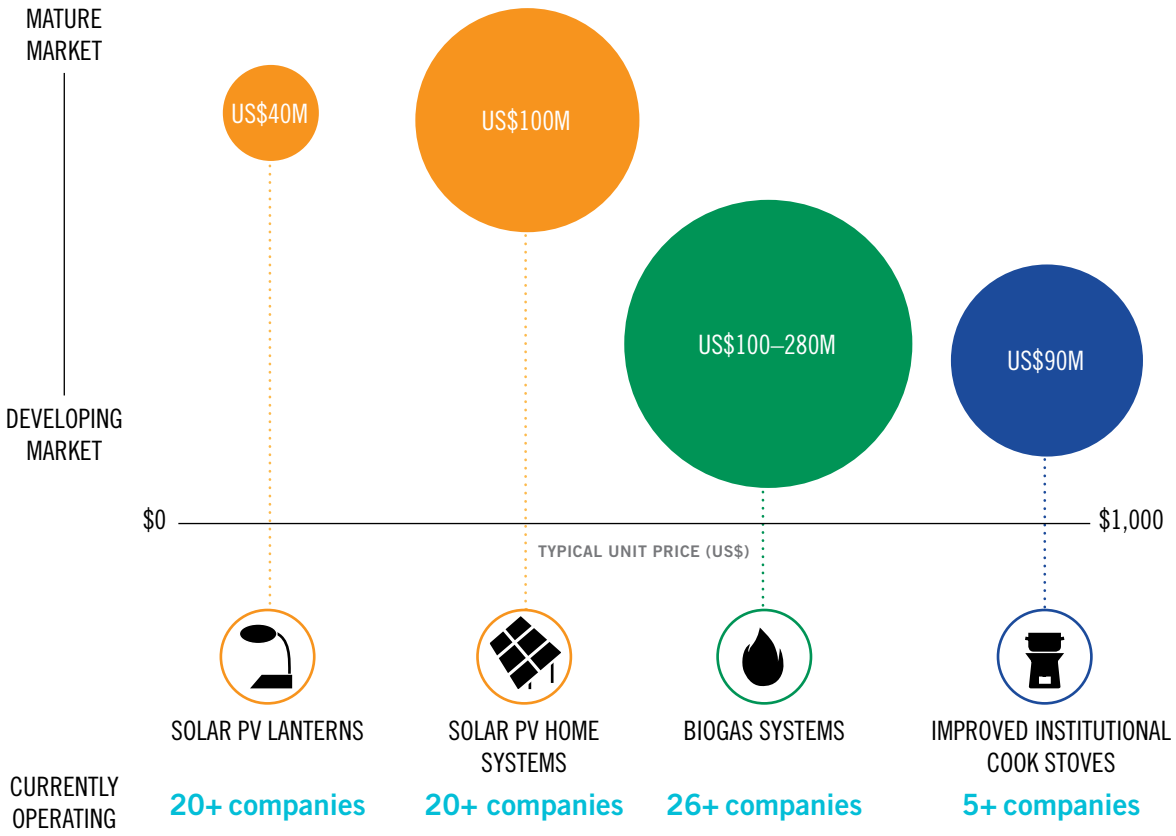

Frederic Noy / UNCDF

The partnership model is one that works well, said Julius Omoding, CEO of FINCA, a microfinance organisation.

"We've begun to work with partners because we believe that FINCA alone cannot cover the whole of Uganda," he said, adding that FINCA has been working to clarify that its role is not a competitive one.

"It's not a competition. It's really a complementary service," Omoding said.

UGANDA TECHNOLOGY MARKET SCAN



The price of an ICS varies with its size, but a 200-litre stove costs approximately $940, and can cook for up to 400 students. A medium-sized school requires four to six stoves at a total cost ranging between $3,800 to $5,600.

At Ugandan company Ugastove the customer institution is required to pay 50 percent upfront and the balance on delivery. Ugastove uses a variety of channels to market and distribute its stoves, from selling directly from its factory in Kampala, to distribution through its three warehouses in Gulu, Lira and Arua.

However, despite many efforts to publicise the efficiency and affordability of these stoves, the majority of potential institutional consumers in Uganda, particularly schools, but also restaurants, community centres and hospitals, are generally not aware of their value or even their existence. Indeed, many people perceive competing, cheaper stoves that do not use clean energy as being able to do the same job.

BIOGAS SYSTEMS – INSTITUTIONAL AND HOUSEHOLD

In 2007, the total potential market size for biogas in Uganda was estimated at 200,000 units or $100 million to $280 million (252 billion UGX to 707 billion UGX) in market value.

Currently, there are only 5,000 units being used in the country, meaning an enormous potential for biogas systems financing for both domestic and institutional users. There are currently 26 companies producing biogas systems in Uganda, all of them members of the National Biogas Association of Uganda, which promotes awareness-raising, information sharing and quality control.

Microfinance loans have been tested for biogas systems, but institutions are reluctant to do more because the systems are built into homes, meaning they cannot be reclaimed unless they are included with a mortgage.

One solution is to provide loans to biogas installers, who are at lower-risk for default. They, in turn, make the loans to their clients in what is a form of vendor financing.

Currently a number of new biogas producers are entering the market, importing new, cheaper systems from China, which have undergone quality control measures and are significantly quicker and cheaper to install.

FIRSTPERSON seeing homework in a new light

Solar lanterns bring new meaning to reading and writing for students in Kirugaluga School in Uganda

David Ntege, founder and pastor of the Kirugaluga school, and Chairperson of the Wakiso District Association.

Every evening in Uganda, tens of thousands of students set about doing their homework by the light of a kerosene lamp or candle. These are the traditional options for people who live in areas that are not connected to the power grid or who simply cannot afford electricity.

Exposure to kerosene fumes can cause health problems, such as dermatitis and eye irritations, and drowsiness. Toxic to humans and animals, kerosene is a crude oil derivative and also has environment problems. Sitting in the girls' dormitory at Kirugaluga Baptist Primary School, some year-six students recall the perils of studying by candlelight.

"Sometimes candles can lead to fire and more than once I've burned my book," one girl recounted. "I have knocked over a candle and set fire to my bed," said another.

The village of Kirugaluga is about a one hour drive north of Kampala, in the Wakiso district, and has no electricity. But for these boarders, and their male classmates, the risks associated with kerosene and paraffin are a thing of the past. Their school has acquired seven solar lanterns. They are charged by day via solar panels installed on the roof of the girls' dormitory, and are then shared by night between the boys' and girls' dormitories, situated in separate, basic brick buildings on the school grounds.

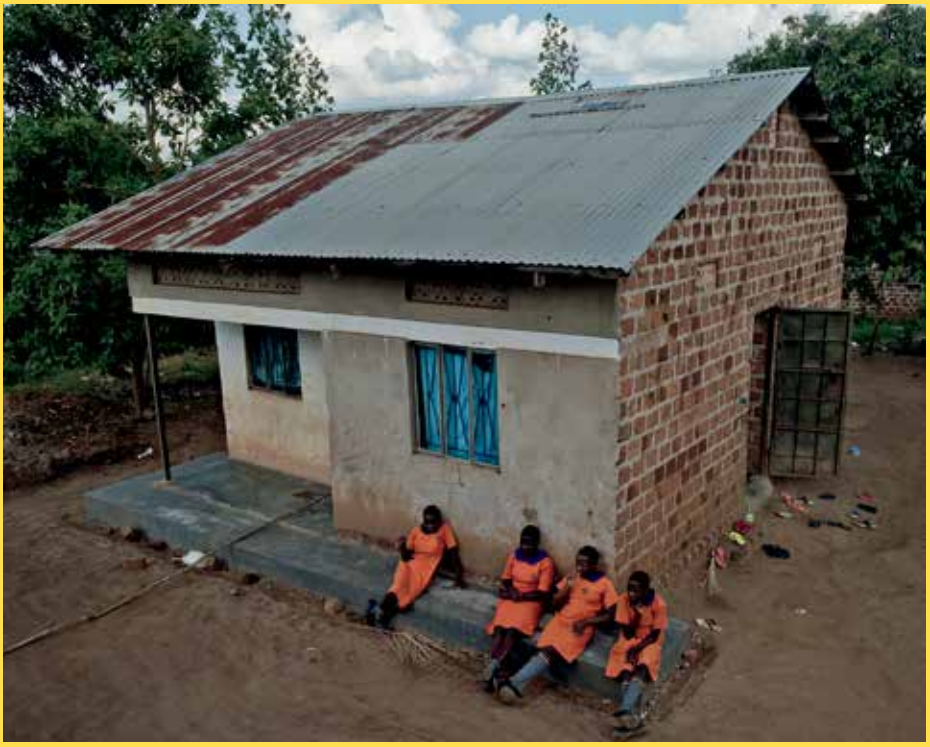
Good quality lanterns, like the ones in use at the Kirugaluga school, provide 10 times more light than a kerosene lamp and can therefore be used by several students at once.

"Using solar lights is important because we see what we are writing and they are useful in reading books. I read books in order to be a nurse," one pupil said.

The solar technology has had a remarkable impact on the students' learning outcomes, the school's bursar and matron of five years, Regina Zawedde, said, by making homework easier as well as improving air quality inside the dormitories. As she lives in a separate room in the girls' dormitory to supervise the students, Zawedde herself has also benefited and said that having a brighter solar lantern makes checking homework at night more straightforward.

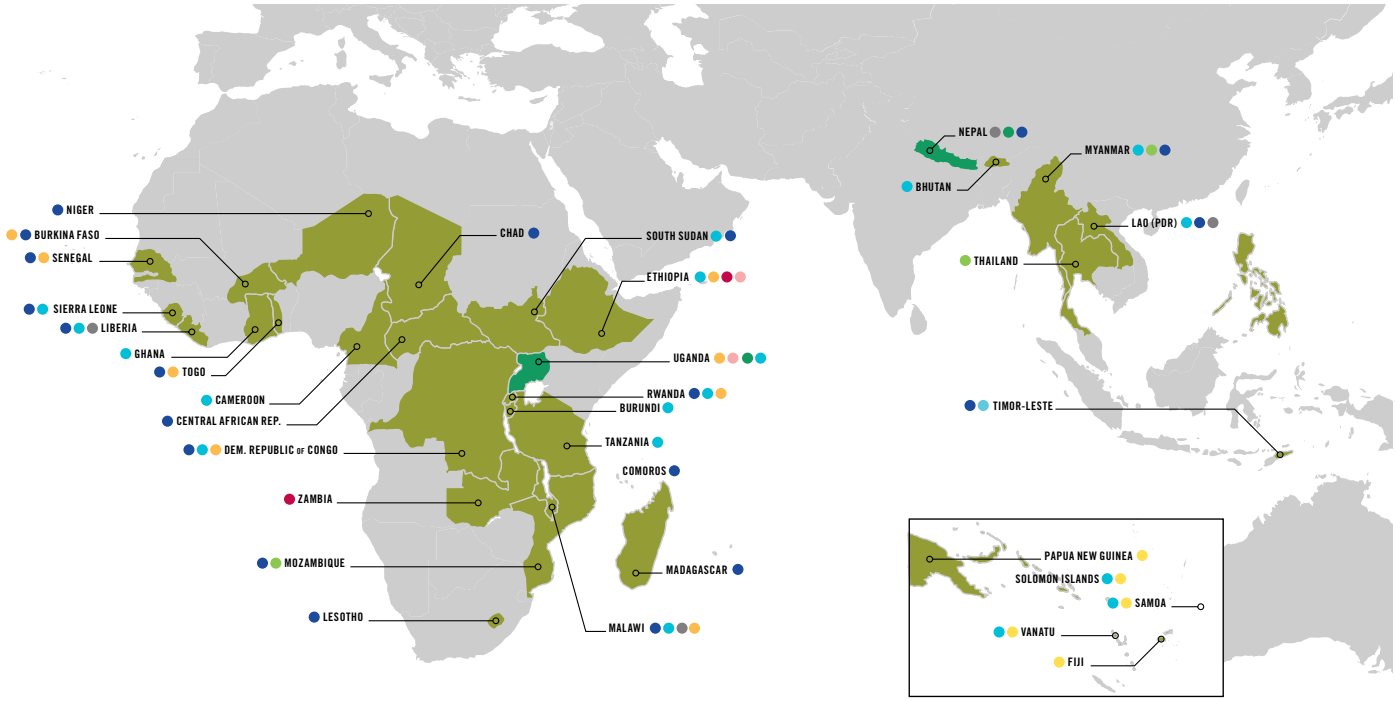
The school purchased the lanterns outright from an agent of Small Solutions, a social enterprise founded in Germany that specialises in providing access to renewable energy to promote human development. But this was no ordinary agent. David Ntege is a founder of the school, its pastor and also the chairperson of the Wakiso District Association. He has sold solar lanterns to the school as well as to several small businesses in Kirugaluga and neighbouring villages.

Small Solutions has three basic sales channels for solar products: via the networks of its partners, such as Solar Sister and Opportunity Bank; through its proprietary model centering on community associations, and directly via its own agents. "Small Solutions has its own direct sales network that consists of about 250-300 smaller scale distributors and sales agents around the country, so we sell direct to them cash upfront, mostly, and they then sell to customers," said the Leslie Morris, the Managing Director of Small Solutions Technology Consultants.



Students studying by solar lamp light in their dormitory at the Kirugaluga school. Photos by Frederic Noy / UNCDF

UNCDF's approach to financial inclusion



= Inclusive Financial Sector Programme

= PFIP (Pacific Financial Inclusion Programme)

= MM4P (Mobile Money for the Poor)

= MicroLead

= YouthStart

= MicroInsurance

= Remittances

= MAP (Making Access Possible)

= CleanStart

UNCDF, the UN's capital investment agency for the world's 49 least developed countries, promotes financial inclusion and strengthens public finance for local development.

UNCDF provides seed capital – grants and loans – and technical support through inclusive finance programmes to ensure that more households and small business gain access to credit, savings, insurance and other financial services that expand opportunities and reduce vulnerabilities.

UNCDF's ability to provide risk capital directly to the private sector is helping bring new financial products to underserved and hard-to-reach markets while spurring innovations. Through its flexible grant and loan instruments, UNCDF supports a wide range of providers (e.g. microfinance institutions, banks, cooperatives and money transfer companies) and financial products and services (e.g. savings, credit, insurance, payment services and remittances). UNCDF is a strong promoter of responsible finance and client protection.

Partnership with other UN agencies: UNCDF is also active across the spectrum of inclusive finance issues, including remittances with IFAD, micro-insurance with ILO, and agricultural finance with IFAD and the FAO.

MAKING ACCESS POSSIBLE (MAP) is a diagnostic and programmatic framework to expand access to financial services.

MICROLEAD improves access to financial services in some of the world's toughest markets, and attracts leading microfinance institutions into underserved markets.

YOUTHSTART reaches youth in sub-Saharn Africa with financial and non-financial services, in particular savings and financial education, that are both responsive to youth's needs and protective of their rights.

MOBILE MONEY FOR THE POOR (MM4P) adapts mobile money solutions to the more challenging environment faced by many least developed countries.

CLEANSTART assists financial service providers to develop products that will enable off-grid poor people to afford clean energy technologies.

PACIFIC FINANCIAL INCLUSION PROGRAMME (PFIP) helps to provide sustainable financial services to low-income households in the Pacific Islands.

Download a copy of CleanStart Connections or read online at www.uncdf.org/en/cleanstart

CLEANSTART CONNECT

25-26 NOV 2013
BANGKOK THAILAND

Building last-mile energy markets: financing scale and impact

Each year, the poor spend US$37 billion on poor-quality energy solutions to meet their lighting and cooking needs. This represents a substantial and largely untapped market for the private sector to deliver better alternatives.*

* From *Gap to Opportunity: Business Models for Scaling Up Energy Access*, IFC, 2012

Innovations in decentralised energy present unprecedented opportunities for businesses to serve the "last mile" of the energy market. There is significant potential for market growth, but much more could be done to catalyse businesses that offer value to low-income customers. How can we make this work and take the market to the next level?

Hosted by the UN Capital Development Fund (UNCDF), CleanStart Connect is an annual forum which brings together people, ideas and opportunities that are co-creating an energy market for the underserved. CleanStart Connect 2013 will focus on the role of finance in building an ecosystem for energy businesses to reach their full potential. Specifically, it will consider the following themes:

- End-user financing through loans and pay-as-you-go schemes;
- Start-up/working capital for small-scale manufacturers/distributors; and
- Financing growth of business models from "blueprint to scale."

CleanStart Connect 2013 brings to the table leading energy and financial service providers, investors, policy makers and development partners who are building an inclusive energy market in Asia and Africa to find answers to such questions as:

- What greater financing choices can be offered to low-income customers?
- What is needed to unleash financing throughout the energy supply chain?
- How can different stakeholders be incentivized to make the ecosystem work?
- What partnerships are expanding the market, and how can more be brokered and supported?
- What ideas would benefit from further pilot-testing or research?

Above all, CleanStart Connect is a space for participants to gain fresh ideas, make new connections and reaffirm they are part of a growing movement – one that offers a greater range of high-quality and affordable energy products and services to those at the last mile.

WE LOOK FORWARD TO HEARING YOUR STORIES AND ASPIRATIONS

UNCDF
Microfinance • Capital Development