

Financing Energy Access for the Poor

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Summary

This Policy Brief is divided in 3 parts. **Part I** provides an overview of current and anticipated **trends** in energy poverty and their impact on development. This part evidences the magnitude of energy poverty challenge vis a vis public resources and ODA, but also the significant opportunities related to emerging clean energy solutions. **Part II** discusses some of the key **financial and non-financial challenges** related to financing clean energy access for the poor. It highlights the critical contribution that MFIs can play in fostering clean energy access, but also the need to address wider non-financial barriers, market and government failures that prevent clean energy uptake; lastly, **Part III** presents the most defining characteristics of **CleanStart**, an innovative UNCDF-UNDP Program aimed at increasing poor households and micro-enterprises access to clean energy by addressing financial and non-financial challenges, supporting microfinance and the development of enabling environments for clean energy financing.

I. The context: energy poverty and its impact on development

The Persistence of Energy Poverty

Despite rising energy use across the world, billions of people in developing countries still have no access to modern energy services. The numbers are striking: 1.4 billion people — over 20% of the global population — lack access to electricity and 2.7 billion people — approximately 40% of the global population — rely on the traditional use of biomass for cooking. Worse, projections suggest that the problem will persist in the longer term: in the OECD 'New Policies Scenario', 1.2 billion people will still lack access to electricity in 2030 (the deadline for the proposed goal of universal access to modern energy services), 87% of them living in rural areas. Most of these people will be living in sub-Saharan Africa and other Asian developing countries. In the same scenario, the number of people relying on the traditional use of biomass for cooking will rise to 2.8 billion in 2030, 82% of them in rural areas.¹

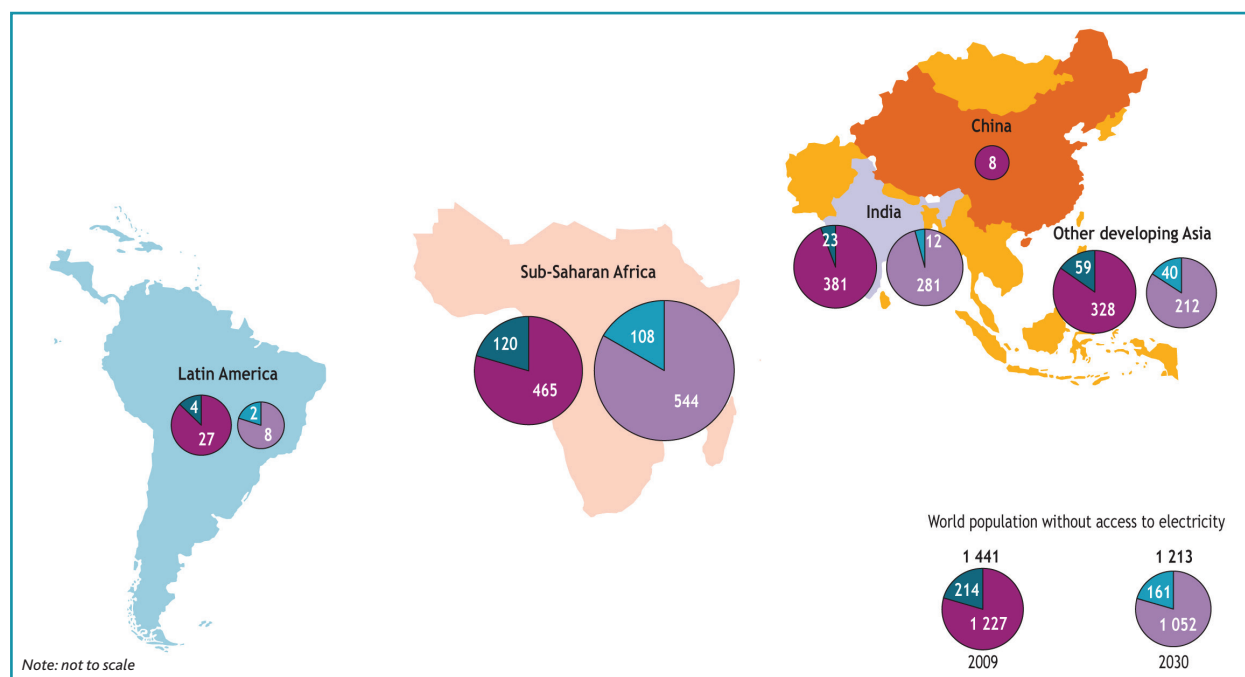
Table 1. Number of people without access to electricity and relying on the traditional use of biomass, 2009 (million)²

in millions	Number of people lacking access to electricity	Number of people relying on the traditional use of biomass for cooking
Africa	587	657
Sub-Saharan Africa	585	653
Developing Asia	799	1937
China	8	423
India	404	855
Other Asia	387	659
Latin America	31	85
Developing countries*	1438	2679
World**	1441	2679

*Includes Middle East countries. **Includes OECD and transition economies.

Note: The World Energy Outlook maintains a database on electricity access and reliance on the traditional use of biomass, which is updated annually. Further details of the IEA's energy poverty analysis are available at www.worldenergyoutlook.org/development.asp.

Figure 1. Number of people without access to electricity in rural and urban areas in the New Policies Scenario (million)³

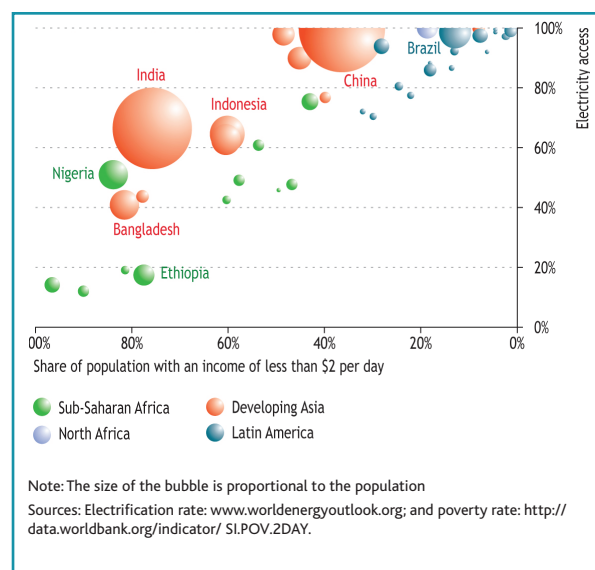


The boundaries and names shown and the designations used on maps included in this publication do not imply official endorsement or acceptance by the UNCDF, UNDP or the UN.

1. OECD/IEA World Energy Outlook 2010, 238-239
2. OECD/IEA World Energy Outlook 2010, Table 8.1, 239
3. OECD/IEA World Energy Outlook 2010, Figure 8.1, 240.

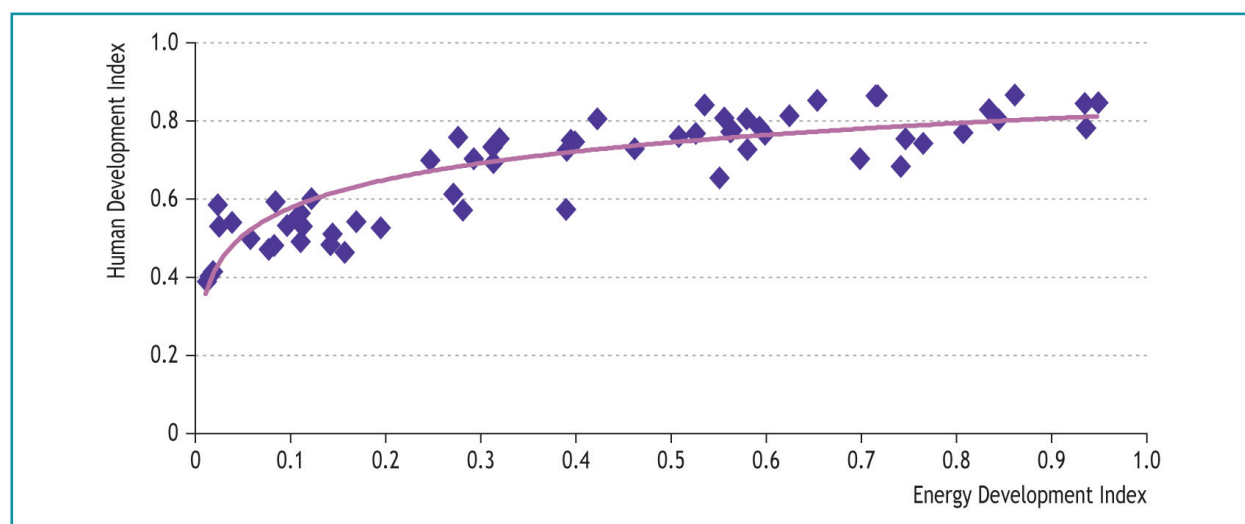
Energy is central to nearly every major challenge and opportunity the world faces today. Whether it is jobs, security, climate change, food production or poverty, energy is essential for inclusive and sustainable growth. In recognition of the importance of energy for development, the United Nations General Assembly has designated 2012 as the International Year of Sustainable Energy for All.⁴ Lack of access to modern energy services is one reason that many developing countries have been unable to break the vicious circle of poverty.⁵ There is a close correlation between income levels and access to modern energy: countries with a large proportion of the population living on an income of less than \$2 per day tend to have low electrification rates and a high proportion of the population relying on traditional biomass (Figures 2 and 3). Despite the absence of a specific MDG for energy, it is clear that the widespread lack of access to modern energy services among the poor severely impedes progress in meeting most of the MDGs as unequal access to modern energy closely correlates with wider inequality in human development (see Figure 2). Moreover access to sustainable

Figure 3. Household income and electricity access in developing countries⁷



sources of clean, reliable and affordable energy relates not only to physical infrastructure (e.g. electricity grids), but also to energy affordability, reliability and commercial viability. In practical terms, this means delivering energy services to households and businesses that are in line with consumers' ability to pay.

Figure 2. Comparison of the Human Development Index to the Energy Development Index⁶



4. UN Secretary-General Ban Ki-moon is leading a new global initiative called "Sustainable Energy for All". This initiative calls for private sector and national commitments and aims to attract global attention to the importance of energy for development and poverty alleviation. The goal is to meet three objectives by 2030: 1) ensuring universal access to modern energy services; 2) doubling the rate of improvement in energy efficiency; 3) doubling the share of renewable energy in the global energy mix.

5. UN Secretary-General's AGECC, 2010, *Energy for a Sustainable Future: Summary Report and Recommendations*, 14

6. OECD/IEA World Energy Outlook 2010, Figure 8.17, 265.

7. OECD/IEA World Energy Outlook 2010, Figures 8.3 and 8.4, 242.

Innovative Approaches to Energy Poverty

Traditionally, many energy access programs have employed a 'minimalist' approach, focusing mostly on the basic energy needs of the poor at household and community levels. Rural electrification programs, for example, primarily provide basic home lighting, rather than electricity for other power applications (e.g. for heating, cottage industries and agro-processing) that would help increase incomes. Other necessary inputs in reducing poverty – among them access to information, market linkages, business development services and access to capital – have not always received the attention they merit.⁸

Addressing the enormous energy challenge faced by the developing world requires a series of more integrated and significant investments. In a context in which the international outlook for ODA is dim, it is increasingly evident that fostering market-based solutions and mobilizing the private and financial sectors will be critical to achieve progress in energy access, particularly in terms of 'clean' energy. Innovative financing solutions and public-private partnerships are especially important to achieve progress in rural areas, that are unlikely to benefit from large public investments and that need to exploit the potential of decentralized, off-grid solutions.

The Potential of Decentralized Clean Energy

Many poor people in rural areas lack modern energy because the grids simply do not reach them. In urban and peri-urban areas, the issue of connecting poor people residing in illegal settlements remains the

single biggest inhibitor to enabling access to energy to the poor. These challenges and the failure of governments and markets to address them have seen the growth of decentralized energy solutions based mostly on fossil fuel such as diesel-fuelled micro-grids and liquefied petroleum gas. Unregulated diesel micro-grids are common where entrepreneurs provide power services to local communities. Low barriers to entry (small investments in generators enable battery recharging at a fairly low cost) have enabled a highly competitive industry to develop. However, concerns over energy security, oil price volatility and climate change are driving efforts to find decentralized energy solutions – in both urban and rural areas - that use clean energy. *Non-electrical clean energy technologies offer particular opportunities* for modernization of energy services for the poor, for example using solar energy for water heating and crop drying, biogas and modern biomass for heating, cooling, cooking and lighting, and wind for water pumping.⁹ Technical development and expanding production scale has given clean energy equipment wider availability and better performance and operating life. The same is true of the components needed for clean energy systems, such as inverters, charge controllers and voltage regulators, as well as efficient end-use equipment such as LED lighting fixtures. As climate change concerns encourage countries to transition to low-carbon development pathways, clean energy systems are becoming less expensive in absolute terms and relative to fossil-fuel alternatives.¹⁰

Low-income households and micro-enterprises can gain five **key benefits** by adopting clean energy systems:

8. UNDP Energy and Environment Group, *TOWARDS AN 'ENERGY PLUS' APPROACH FOR THE POOR: A review of good practices and lessons learned from Asia and the Pacific*.

9. Beyond grid-substituting technologies there is growing interest in grid-complementary solutions whereby unconnected households have access to applications that require the use of the electricity and gas grids for recharging or refilling energy applications. This is particularly the case in urban areas where grids are present but poor households are unconnected because their settlements are illegal. Energy service companies offer powerful batteries, sometimes for free, and charge a recharging fee to customers to enable them to continue to power lights, televisions, water heaters, fans and other household and retail appliances. Similar services are offered by gas companies using canisters of liquefied petroleum gas.

10. UNEP Finance Initiative, *Financing Renewable Energy in Developing Countries: Drivers and Barriers for Private Finance in Sub-Saharan Africa*, 11.

(i) Reduced energy expenses. Around 80 percent of poor people's energy expenditures are for fuel for cooking and lighting. Most of the poor in the developing world devote 10–25 percent of their energy spending to biomass, kerosene, candles, batteries and, to a limited extent, diesel for pumping water. Reducing energy expenditures without foregoing access to energy can significantly improve household finances, creating disposable income. Electricity services reduce or eliminate expenditures for kerosene lighting, dry cell batteries for sound equipment, and car batteries for televisions. Home PV systems may be used for running lights, televisions and radios for a few hours every day, usually replacing kerosene, candles, dry cells, and lead-acid batteries externally charged from local diesel generators.¹¹

(ii) Increased net incomes. Electricity favours the development of home enterprise, including the production of handicrafts, textiles, embroidery, garments, processed food, woodworking etc. The most widespread use of energy for income generation is lighting, which extends working hours by allowing shops and businesses to stay open until late at night. Clean energy technologies in addition to electricity generation can enhance productivity and improve livelihoods. For example, in Sikkim, a state in northeast India, over 150 cardamom growers have increased the value of their produce by drying it using biomass gasifiers.¹²

(iii) Reductions in household expenses, particularly for health care. Clean energy technologies can offer benefits with respect to air pollution and related health concerns, as well as greenhouse gas emissions, deforestation and forest degradation, which in turn impact on local economic development. Improving traditional biomass use can significantly reduce local and indoor air pollution and lower associated health impacts, particularly for women and children in developing countries.¹³

(iv) Savings in time and effort. Introducing technologies such as biogas and improved cookers significantly reduces the time and toil spent collecting and processing fuel wood and cooking. Time saved from collecting fuel wood is 40–50 percent and can amount to 4–8 hours per day.¹⁴ This is particularly important for women and young girls, who are mostly responsible for collecting fuel wood and cooking. Other benefits of clean energy valued by low-income families are better-quality lighting for children's studies, power for room fans and information and communication technologies, and extended social networks no longer limited to daylight hours.¹⁵

(v) Potential for Reduction in Carbon Emissions with associated secondary revenue streams realized via carbon finance. Adoption of clean energy by the poor can contribute significantly to reducing CO₂ emissions.

11. Multi-country case studies conducted by UNDP found that the monetary gain from clean energy savings varied widely between countries and technologies but were nonetheless moderate to significant. Introducing home PV systems reduced expenditures on kerosene and dry cells by over 30 percent in Bangladesh and 80 percent in Nepal. By contrast, a study in Indonesia found that monthly instalments paid for home PV systems were much higher than the savings from reduced kerosene usage. However, people were willing to pay for the vastly superior quality of lighting and elimination of fire hazards and toxic fumes.

12. Cardamom dried in this way conserves its natural colour, contains 35 percent more oil, and does not smell burned, as does cardamom dried using the traditional method. It fetches prices 10–20 percent higher in local trading centres. The technology makes the working atmosphere healthier, and the more efficient combustion of fuel wood brings savings of 50–60 percent. Low-cost gasifiers similar to those used in Sikkim can be used for other produce such as tobacco, ginger and cashews.

13. The hundreds of million households that continue to depend on traditional biomass are exposed to indoor air pollution that causes significantly higher mortality than in electrified houses. According to the World Health Organization projections by 2030 over 1.5 million people would die every year due to the effects of breathing smoke from poorly-combusted biomass fuels. This is more than 4 000 people per day. More than half of all deaths attributable to indoor air pollution are children under 5 years of age.

14. Various researchers have reported average time savings of 0.16 hours from the use of improved cookers in India, up to 3 hours from the use of biogas plants in Nepal, and up to 3.5 hours from use of biogas plants in Sri Lanka. Savings are especially high in fuel-scarce areas. If one adds to this the time saved from cooking and cleaning, total time savings brought about by the use of biogas plants can amount to 6–7 hours per day.

15. The rapid acquisition of televisions, refrigerators and fans once electricity becomes available attests to the preferences of the poor and the high value they placed on these intangible benefits. Anecdotal evidence exists of improved school enrolment. Among rural households in Nicaragua, 72 percent of children in a household with electricity attend school, compared with 50 percent of those in a household without electricity.

A traditional cook-stove, for example, emits about a tonne more CO₂ per year than a more energy efficient cook-stove. On a global scale, this translates to the avoidable emission of almost 500 million tonnes of CO₂ every year and this is expected to grow close to 600 million tonnes by 2030. Although carbon finance instruments such as the CDM and voluntary carbon

markets contain considerable challenges, more and more clean energy providers in developing countries are designing clean energy business models for bottom of the pyramid populations which have carbon finance revenue as a secondary (or even primary) revenue stream.

II. Expanding Access to Clean Energy: Financial and non-Financial Barriers

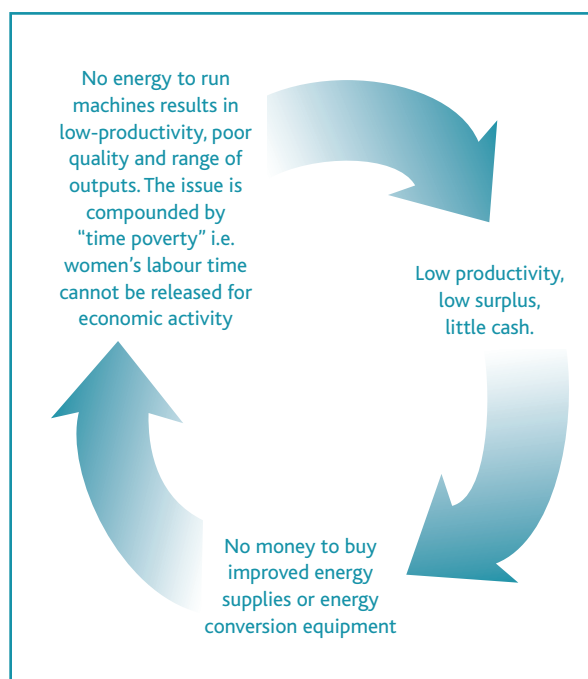
Financial Barriers to Energy Access

In urban and rural areas alike, the costs of equipment, recharging and refilling are obstacles to uptake, leaving markets underdeveloped and supply chains weak. Prime among the barriers to clean energy access is the high upfront cost of clean energy and the lack of end-user finance schemes tailored to the poor. Large numbers of people suffer a vicious cycle of energy poverty in which they stay energy poor because they do not have the means to buy improved energy services, even when they can have access to them (see Figure 3).

There is evidence that the continued growth in clean energy markets¹⁶, which initially reflected sales to people living above the poverty line in urban or peri-urban areas, is constrained from reaching new market segments by the lack of appropriate end-user finance. End-user financing takes many forms. **The dominant models are dealer cash sales and consumer credit through commercial banks, which limit adoption by the poor.** Growth is constrained by limits on the availability of credit, features of existing credit products that are tailored mostly to the needs of high- and middle-income consumers, and the transaction costs energy service companies and traditional banks face in delivering systems and financing to low-income consumers living mostly in rural areas. Furthermore, credit provided by energy service companies is limited because they lack the lending or leasing expertise that

financial institutions have and providing credit is a significant drain on their working capital. Similarly, while financing solutions through conventional banks can play a critical role in the commercialization of household clean energy technologies, banks are unlikely to be the main providers of end-user finance to low-income consumers because of conservative banking practices, the high transaction costs of delivering financial services to remote and dispersed communities, and the very small margins on microloans.¹⁷

Figure 3. The Vicious Cycle of Energy Poverty



16. UNDP, Financing Options for Renewable Energy

17. Traditional commercial banks may, however, play an important role in providing secure credit lines to MFIs.

The Potential of Microfinance Institutions

In countries with maturing microfinance markets, particularly in LDCs, MFIs are well placed to supply finance schemes tailored to the needs of poor consumers. MFIs are by virtue focused on expanding financial outreach to the poor, and therefore have unrivalled knowledge of, relationships with and access to low-income people. They have extensive branch networks on the ground, and an inherent knowledge about the communities in which they operate and most of all how poor clients manage finances. In return, clean energy has the potential to improve the quality of MFIs' loan portfolios and create a new, higher-return 'star' segment of the market. Carbon credit markets, particularly the voluntary one, are potentially additional income streams for MFIs taking up this opportunity.

Most MFIs do not understand the range, purpose or potential of clean energy technologies; their value to low-income clients; or their contribution to MFIs' objectives. Many perceive clean energy lending as a niche business for specialist MFIs. Some view clean energy lending as complex, requiring significant changes to lending methodology and adding operational costs. Lack of knowledge constrains the expansion of clean energy through MFI financing. More basic research and product development is needed in the technology itself and its impacts on users, the environment, and financing and marketing systems. However perhaps the most significant current knowledge gap is how clean energy for the poor can be linked to carbon credit markets to create a sustainable, environmentally friendly and economically efficient revenue stream.

First experiences with clean energy loans showed higher default rates than with more traditional microfinance. Much of this arose from technology failure and

clients understandably not wanting to pay for faulty systems. Other problems emerge when MFIs lend to non-traditional clients such as better-off households, schools, hospitals and small rural enterprises. While they had experience assessing and managing the risks of loans to very small borrowers, they had little experience with loans to others. Even though technological risks have gradually subsided with standardization and improved reliability,¹⁸ a significant risk is still represented by clean energy systems performing below client's expectations or failing altogether during the repayment period, which may cause default, weaken demand for clean energy loans and undermine MFIs' reputations. Another potential risk is the arrival of grid electricity within the repayment period. Clean energy systems and end-use equipment have evolved with sales mostly to high- and middle-income consumers. Demand from low-income consumers is uncertain, and MFIs risk developing financial products for systems that their clients may not want. This can slow energy portfolio growth and erode commitment to clean energy financing as it fails to deliver the expected returns. Yet growing sales of micro-technologies such as PV panels, improved biomass cookers, LED lamps and solar batteries demonstrate that they meet a basic market demand, including from low-income groups. Also, MFIs' experience in offering energy financing suggests the marketing risk can be managed by offering systems and applications that improve on existing practice¹⁹ and by offering solutions at a price in line with what clients already pay for traditional energy.²⁰

Non-Financial Barriers to Energy Access

Appropriate financing arrangements are critical to overcoming the barriers to energy access by the poor. However, the importance of removing non-financial

18. Also, supplier buy-back or maintenance guarantees have eliminated the risk to the consumer and MFI altogether, though such guarantees are far from universal.

19. such as LED lamps offering brighter light than candles or efficient cookers producing more heat than traditional cookers, or offer a heretofore unattained benefit, such as fans and home entertainment.

20. MFIs need to carefully gauge their loan terms to ensure that repayments are similar to what clients would pay for traditional energy, while reinforcing the value of longer-term savings achieved by migrating to clean energy. This helps avoid overextending borrowers and undermining their ability to repay energy loans.

barriers should not be understated. A lesson learnt in the past few years is that many approaches to off-grid renewable energy barriers tend to emphasize economic and technical barriers but ignore or downplay end user values and behaviour.²¹ Findings from independent evaluations of sustainable energy projects have found that sustainable market development involves different groups of interdependent stakeholders from the users of the technology, to the supply chain (i.e. retailers and maintenance technicians), policy makers and financiers.²² Each of these groups of stakeholders typically encounters a number of barriers (often non-financial) that prevent them from using or supporting the sustainable energy technology. This means that only by addressing the specific financial and non-financial barriers there can be a significant impact on the sector.²³ Products must be extensively tested among the purported users (including women) before launching, and they should be robust and tamperproof, particularly when disseminated in remote rural locations.

In this context, financial instruments alone cannot be effective without concurrent actions on both the demand and supply side of the clean energy market. Expansion of energy services to the poor at a large scale is unlikely to happen through existing market mechanism routes alone. For the most effective impact, energy access projects should adopt an integrated sector-wide approach, which would include strengthening of conducive policies, institutional capacity development, private sector support, entrepreneurial skills development, productive uses of energy for income generation and the facilitation of access to finance and markets. Such an integrated approach will lead to improved household living standards while increasing the capacity to pay for energy and other services. Poverty reduction impacts can be maximized only when such measures are built into the energy access programs.

A recent review of various programs in the Asia-Pacific region identified a number of conditions which enable significant expansion to occur, including:

- a product that has been extensively tested and demonstrably accepted by users;
- a supply chain that has at least a few reliable technology suppliers;
- well-tested delivery models and end-user financing schemes, and a critical mass of competent service providers, including technology suppliers, project developers and others; and
- assurance of medium- to long-term funding, either from the government and/or development partners (eliminating uncertainties in the minds of end-users, technology suppliers and others).

Besides the existence of a clear national policy, national and local government bodies and civil society organizations need to directly intervene to create demand for clean energy solutions through awareness building, training, demonstrations and piloting. On the supply side, quality control plays a critical role in the adoption of clean energy devices by communities, as sub-standard performance can cause a decline in demand for clean energy systems and discourage finance institutions from entering the clean energy market because of the high risk of loan defaults. To address this, there is a clear role for public policies to help mitigate technological risks by establishing standards and regulate the quality of the devices produced and marketed. In addition, supplier buy-back and maintenance guarantees for large systems (e.g. efficient stoves for institutions) can reduce the risk of technological failure. Also, public grants may be required to cover the costs of research, product design and market-testing of clean energy devices that are suited to the peculiar household energy usages of each location.²⁴

21. Sovacool et al, *Halting hydro: a review of the socio-technical barriers to hydroelectric power plants in Nepal*.

22. C. Worlen, *Meta-Evaluation of Climate Mitigation Evaluations*

23. See Glemarec, *Financing Off-Grid Sustainable Energy Access for the Poor*

24. Communities in which people prefer to squat for cooking, for example, will require different cook stove designs than communities in which people cook standing up. In cold localities, combining cooking and heating systems will accelerate adoption of efficient stoves.

III. A framework for Action: CleanStart

The Value of Clean Energy Products to MFIs

As discussed, in countries with relatively mature microfinance markets, microfinance institutions (MFIs) are well placed to supply such financial products. MFIs are, by their nature, focused on expanding outreach to the poor, and therefore have unrivalled knowledge of, relationships with and access to low-income people. For clients who do not wish to bear the liability and risk of owning a clean energy system, cannot afford the upfront cost, or lack confidence in unfamiliar technology, MFIs can finance lease — or hire — purchase agreements or offer to finance the monthly fees of energy services. This is arranged through formal negotiated agreements with energy system suppliers and service providers, which usually retain ownership of the systems while MFIs provide financing to cover equipment rentals and fees for energy services. This type of financing is especially suited to MFIs existing lending models and can be delivered cheaply by piggybacking it on existing lending services, though some upfront investment is necessary for research, product development and negotiating agreements with energy system suppliers and service providers.

Clean energy, in return, has the potential to improve the quality of MFIs' loan portfolios and create a new, higher-return 'star' segment of the market. Carbon credit markets, particularly voluntary ones, are potential additional income streams for MFIs taking up this opportunity. The traditional core business of MFIs has been loans and savings accounts.²⁵ In mature microfinance markets, the growing challenge for MFIs is not liquidity to finance loan portfolios but growth limits on their lending portfolios with existing clients, as local markets become saturated. In these microfinance markets, **clean energy financing therefore presents a**

strong value proposition to MFIs in terms of adding a new product line with significant latent demand and high growth potential over the next 10–15 years. Also, the ability of clean energy to either reduce household expenses or increase incomes presents a potential breakthrough for MFIs struggling with declining yields from their existing loan and savings portfolios. Not only do the expenditure savings reduce the risk of default, but savings can also make an enterprise more viable and enable MFIs to market new savings products to mop up savings as people adopt clean energy.

The CleanStart Approach

With CleanStart, UNCDF and UNDP (UN agencies with recognized expertise in microfinance and energy) joined forces to develop an innovative approach to increasing poor households' access to sustainable, low-cost clean energy. CleanStart uses four independent though mutually supportive methodologies: (I) **Finance for clean energy**, that uses the capabilities of MFIs to provide end-user financing for sustainable, low-cost and low-carbon decentralised clean energy systems and services to low-income households and micro-entrepreneurs. (II) **Technical support** to key actors across the energy value chain. (III) **Advocacy and partnerships**, that support the efforts of national and international actors to create an enabling policy and business environment and builds links with related sectors. (IV) **Knowledge-management**, that improves understanding and awareness of the potential for stimulating the adoption of sustainable clean energy through microfinance, as well as of the knowledge and skills needed to add clean energy finance to lending portfolios.

25. Loans are typically \$100–\$200 for first-time customers, rising to \$300–\$500 for customers seeking to grow their mostly home-based businesses and to as much as \$5,000 for entrepreneurs and agricultural production and processing. While MFIs are beginning to offer other financial services such as insurance, leasing and payments, these remain minor next to loans and savings.

(I) Increasing Access to Energy Finance

CleanStart provides targeted assistance to selected MFIs in countries where conditions are judged most favourable for the achievement of the CleanStart model.²⁶ The selected MFIs are helped to take advantage of opportunities and mitigate risks associated with scaling up end-user finance for clean energy systems and services. CleanStart strengthens MFI capabilities by providing:

- **pre-investment technical assistance** to build awareness and confidence based on international experience and to develop outline business plans;
- **strategic market research** to assess from the bottom-up the energy needs, clean technology options, and clean energy value chain as well as to map out potential partners;
- **technical assistance and risk capital grants** to broker partnerships with technology suppliers, ensure quality of the applicable technical components (both for installation, operations and maintenance) and cover the up-front cost of introducing a new product line;
- **concessional loans** to provide access to initial liquidity to finance clean energy lending before MFIs deploy their own equity and existing lines of credit to scale up their lending.

(II) Building Sustainable Energy Value Chains

CleanStart methodology includes rigorous diagnostic work that identifies client need and demand, assessment of capability of the energy supply-chain to respond to identified demand, and the deployment of technical assistance to ensure that the energy supply chain most effectively responds to client needs. CleanStart technical assistance support to the energy value chain will happen simultaneously at different levels:

- at the **end-user knowledge level** through substantial end-user awareness of the benefits of new fuels and technologies provide and of how to use them;
- at the **energy company/supplier level** to improve understanding of demand and adaptation of energy technologies and services to the needs of low-income clients;
- at the **energy support service level** through improved quality assurance and capability to effectively and reliably install and maintain technologies and services; and
- at the **end-user finance level** through improving MFI understanding of client energy and financing needs and developing appropriate energy lending to end-users.

(III) Promoting Enabling Environments for Clean Energy Financing

The challenge of improving low-income households' access to clean energy systems and services is daunting and a number of **broader interventions are needed to create an enabling environment**. In addition to providing direct financial and technical support to MFIs and actors across the value chain, CleanStart conducts advocacy to influence donors, governments, and other relevant institutions towards providing additional financing or designing and implementing complementary activities in the clean energy sector. This involves collaboration with **governments and donors**, with **national and international commercial banks** and wholesale financing institutions that refinance microfinance portfolios, as well as with **carbon brokers** that are working on energy projects and trading on the major voluntary and compulsory carbon markets. Also, CleanStart builds partnerships with related programmes nationally and internationally, providing technical support when needed and raising awareness

26. The lessons from first-generation projects and insights from discussions with MFIs suggest that the countries with the most developed microfinance and energy markets provide the best environment for CleanStart.

of the potential of clean energy to contribute to MDGs and climate change mitigation. This stream of work builds on existing upstream policy support and reform initiatives that UNDP has supported in many countries, often as part of Global Environment Facility-funded projects, to put in place appropriate legal and regulatory frameworks for decentralized energy services, support countries' mainstreaming of energy access into their poverty reduction strategies, and get donors and governments to commit to scaling up energy investments nationally.

(IV) Sharing Lessons Learnt Globally

CleanStart will help MFIs and other stakeholders gain confidence in and learn from the results of CleanStart and other programmes, indirectly facilitating the scaling up of end-user financing globally. This is strategically important because clean energy finance is still at an embryonic stage. An improved and more comprehensive body of knowledge about demand for and the supply of clean energy end-user financing will enable reliable investment decisions by stakeholders including MFIs, clean energy companies, carbon traders, communities, households, financiers and governments. The impact of financing clean energy under CleanStart approach will be studied through carefully designed and independently conducted research. Research will focus on three areas:

(i) **Client value, impact and demand for clean energy finance.** Research will assess the potential benefits of clean energy and end-user financing towards reducing poverty and meeting low-income households' and micro-entrepreneurs' energy needs. The aim will be to improve understanding of the needs and preferences of potential customers, quantify current energy expenditures and customers' willingness and ability to pay for clean energy systems, or quantify how existing energy practices affect climate change and the benefits of shifting to clean energy systems and services.

(ii) **Institutional value and the supply of clean energy finance.** Research will assess the potential benefits of clean energy and end-user financing for suppliers such as MFIs, energy companies and carbon market players. This will help improve understanding of the voluntary carbon market, good practices to stimulate demand, the emergence of innovative partnership models, and why solutions do or do not work for clients and providers.

(iii) **Impact of policy and regulation.** Research will assess the extent to which national policies and regulations encourage or impede the poor's microfinance-assisted adoption of clean energy technologies, policy measures to encourage and facilitate access to carbon market financing for clean energy, and how to integrate clean energy into policy dialogue on the MDGs. CleanStart will also provide grants for 'research into practice' in response to knowledge gaps among stakeholders on financial products, delivery systems and partnerships and business processes.

Finally, CleanStart will contribute to develop **training curricula on clean energy** and work towards the integration of clean energy microfinance into the curricula of the leading international microfinance training institutions.²⁷ CleanStart knowledge products will be consolidated in a series of publications widely disseminated in the microfinance, clean energy and carbon trading sectors and to other stakeholders, including via a **dedicated CleanStart website** designed to offer a public, global repository of knowledge on clean energy end-user finance and a platform for discussion, dialogue and learning among practitioners.

Summing up

Current and anticipated trends in energy poverty are alarming and show that increasing access to energy will be critical to achieving progress in most development areas. On the one hand, the magnitude of the energy poverty challenge is significant; on the

27. Such as the Boulder Institute of Microfinance, Yale University, and the Frankfurt School of Finance & Management.

other hand, public resources (domestic or ODA) in developing countries to address this are evidently not sufficient, especially when it comes to finance clean energy solutions. In this context, it is key to adopt a comprehensive approach that addresses simultaneously both financial and non-financial barriers to clean

energy uptake. **CleanStart** is an innovative approach that builds on successful experiences around the globe to increase poor households and micro-enterprises access to clean energy by supporting microfinance, enabling policy and regulatory environments as well as more efficient value chains.

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