



Innovative
Approaches
to Energy
Access for the
Urban Poor:

*Summaries of
Best Practices
from Case
Studies in Four
Countries*

Executive Summary

Rapid urban growth in developing countries has created an unprecedented demand for energy services. Cities face the enormous challenge of improving energy access to urban communities in order to improve education, health, and basic socioeconomic conditions. South Asia and Sub-Saharan Africa have the fastest growing urban populations in the world—projected to grow by 50 percent by 2025. This will put tremendous pressure on cities in these regions as they work to provide basic services, including energy services, to underserved areas.

While there is widespread understanding of the critical role energy access plays in sustainable development, there is still a lack of policies targeted at growing urban poor populations. The objective of these case studies is to share lessons learned in successful energy access initiatives and to provide a point of reference for energy practitioners. The case studies identify barriers to energy access that are unique to the urban poor, innovative approaches to finding solutions, and the roles of communities, service providers, and governments in successfully providing access to legal modern energy services.

Eight case studies focused on electrification and clean fuels were selected from India, Bangladesh, Colombia, and Brazil—all countries that have had varying success in providing access to modern energy services for slum dwellers. Common enabling

factors, such as collaborative stakeholder engagement, community empowerment, and project financing, were critical in developing new skills within communities and promoting microenterprises as energy service providers.

Innovative Approaches to Energy Access

The cases selected highlight several common barriers facing the urban poor in achieving access to safer, cleaner, and legal sources of energy. They also outline the innovative approaches adopted by all stakeholders. The communities, service providers, governments, and nongovernment organizations (NGOs) each played a unique role in providing legal electricity and clean fuels to the urban poor. Areas of focus included:

- **High cost of service** | The urban poor often face multiple constraints that go beyond limited disposable income. Due to the informal nature of their livelihoods, they are often unable to afford the required infrastructure, such as meters, wires, appropriate stoves, and safe construction materials. It was essential to establish funding mechanisms to make energy connections affordable. In Ahmedabad, US Agency for International Development (USAID) funds were granted to address the affordability gap. In Colombia, World Bank funds were disbursed through an output-based mecha-

Overview of Case Studies

Case Study	Brief Description	Country
Coelba Community Agent Electrification Project	Community outreach using members of local community as agents for mediation	Brazil
Commercialization of Improved Cook-Stoves for Reduced Indoor Air Pollution	Dissemination of improved cookstoves targeted at 400 urban slum households	Bangladesh
Electricity for Pavement Dwellers	Provision of legal electricity to people living on the pavements of Mumbai	India
LPG Mobile Retail Dealers	Mobile liquid petroleum gas retailers connect new customers and refill gas cylinders in homes	Bangladesh
Natural Gas Distribution for Low-Income Families	Connecting urban poor households to natural gas	Colombia
Safe and Legal Electricity Connections in Slum Communities	A community-based program to safe and legal electricity in New Delhi	India
Slum Electrification Project	Provision of legal electricity to slum communities in Ahmedabad	India
Sulabh Community Toilets and Biogas Plants	Construction of community toilets for slum dwellers, with attached biogas plants generating energy from solid waste	India

nism. In New Delhi, a NGO offered a one-time loan to the community and in Salvador, the service provider helped subsidize the costs in conjunction with a government-run social tariff program to ensure affordability of regular bills.

- **Illegal status of slum dwellers** | Due to the temporary nature of their houses, slum dwellers are often unable to provide the required documentation for electricity connection, such as proof of permanent residence. Many slum dwellers settle on illegal squatter lands and have no rights of tenure. The initiatives in Mumbai, Ahmedabad, and New Delhi demonstrate that the constraints related to illegal tenure could be overcome through individual arrangements and negotiations with the responsible agencies.
- **Lack of education and awareness** | Slum dwellers are often unaware of the health and financial benefits of legal and cleaner energy access, which were noted in almost all the documented cases. The cases of New Delhi and Bangladesh demonstrate that targeted awareness-raising and education campaigns, emphasizing the benefits of cleaner, more efficient, and legal energy access, ultimately facilitated the demand for such services by the urban poor community.
- **Lack of trust between communities and service providers** | Slum dwellers and energy service providers often perceive each other with suspicion. Utilities doubt slum dwellers' willingness and ability to pay for services, and slum dwellers view utilities as quick to disconnect service. This prevents the establishment of a relationship between urban poor communities and energy service providers, and their capacity to negotiate for services. Several of the cases demonstrate the importance of building and facilitating healthy customer and service provider relationships. The Ahmedabad, New Delhi, and Salvador cases highlight the energy service providers' need for assurance that the urban poor can be responsible customers. Similarly, urban poor populations have to be convinced that the appropriate agencies and authorities recognize and will address their concerns. This relationship can be fostered through training and involving community members to liaise between the customers and service provider, as seen in Salvador, Brazil.
- **Lack of infrastructure** | Narrow roads and unplanned dwellings prevent the construction of the basic infrastructure required to provide access to energy. In Bangladesh, service provider Totalgaz, the liquid petroleum gas (LPG) division of Total Oil, established a system for convenient access to LPG cylinders. Mobile retail dealers (MRD) were trained and employed to bridge the gap in availability and demand. As a result, energy access was secured while also creating livelihood opportunities for the urban poor.
- **Empowering communities** | The cases from New Delhi, Ahmedabad, Mumbai, Salvador, and Bangladesh demonstrate the importance of supporting and investing in communities. Whether through community organizations, leadership, participation, or building capacity at the local level, community empowerment was found to be a crucial factor for enabling energy access.
- **Collaborative engagement of multiple stakeholders** | Engaging and working with multiple stakeholders was critical to the success of most of the initiatives documented. The involvement of all stakeholders was crucial to program success, but sustainability and replicability of these initiatives was contingent upon the willingness of service providers, NGOs, and communities to take these initiatives further.
- **Using simple, innovative technologies** | The Sulabh, India, case and the improved cookstoves case in Bangladesh demonstrate the importance of simple and innovative technologies in facilitating cleaner energy access.
- **Access to credible information** | The cases from Colombia, Brazil, and India demonstrate the importance of accurate data in enabling properly targeted subsidies, effective interventions, and successful energy access projects.
- **Enabling policy environments** | A successful social tariff program in Brazil and amendments to the Slum Act in Mumbai ensured continuity of energy services provision to the urban poor community.
- **Establishment of financial and institutional mechanisms to ensure continued access to energy services** | To address issues of affordability in Ahmedabad, community bill payment centers were set up to ensure convenient access by the urban poor and monthly billing (vs. bimonthly billing).



This study demonstrates several common barriers and highlights diverse ways to overcome them. It shows that success depends on several enabling factors working together, such as stakeholder collaboration and community empowerment. Sustainable initiatives that have the potential to be replicated in other urban poor communities depend on the continued commitment of stakeholders, and the presence of strong financial and institutional mechanisms.

COELBA Community Agent Electrification Project | Brazil

Background

In 1999, Companhia de Electricidade do Estado da Bahia (COELBA), the electricity distribution company, financed two pilot electrification and energy-efficiency initiatives in the slum communities of Barrio de Paz and Barrio Jardim da Mangabiera in Salvador, targeting 6,000 households. The aim of the project was to increase market reach and minimize inefficiencies. The two communities were characterized by extreme poverty and had high levels of electricity non-payment. A socioeconomic survey of electricity consumption patterns found that old refrigerators accounted for 70 percent of residential electricity consumption, inefficient lighting accounted for 20.6 percent, and televisions accounted for 8.4 percent.

In 2000, COELBA launched the first phase of Projeto Agente COELBA in 11 communities of Salvador, with a team of 19 agents, targeting 20,000 households. *Cooperação para o Desenvolvimento e Moradora Humana* (CDM), a local nongovernmental organization (NGO), won a 12-month contract with COELBA through a competitive

bidding process to serve as lead implementer for a project. CDM's role was to hire, train, and supervise the COELBA agents, organize events and educational programs, participate in planning and further development of the project methodology, and, in general, support COELBA's access, acceptance, and credibility in these communities. The project has gradually expanded over time, as CDM has continued to serve as prime implementer through consecutive contracts with COELBA. The project has since been scaled up and replicated in other areas of Brazil.

Innovative Approaches

This case was an example of collaborative stakeholder engagement. Households and community associations in intervention areas are both primary beneficiaries and key partners in this program. Community associations played an essential role in direct implementation and monitoring of activities. They also benefitted from the social fund created for reinvestment of financial gains within Projeto Agente COELBA. Existing community associations were identified and invited to become

Objectives	To reduce the number of illegal connections and strengthen the ability of low-income consumers to pay for their energy consumption	
Urban Poor Details	About 35 percent of Salvador's population lives at or below the poverty line and informal slums cover 60 percent of the city. There are widespread instances of illegal access to electricity in urban slums, as well as high levels of inefficient energy use.	
Service Provider	Companhia de Electricidade do Estado da Bahia (COELBA), Grupo NeoEnergia	
Energy Service Access Provision	A private, investor-owned utility company invested money in piloting and scaling-up slum electrification with heavy community involvement component. Subcontracts were given to NGO intermediaries—one international NGO and one local organization—to design and deliver a program to selected communities. Extensive social surveying and community participation throughout project design, implementation, and assessment were carried out.	
Stakeholders + Roles	FINANCIER	COELBA
	BENEFICIARIES	Residents/customers of Barrio de Paz and Barrio Jardim da Mangabiera
	IMPLEMENTER	Association of Volunteers in International Service (AVSI), <i>Cooperação para o Desenvolvimento e Moradora Humana</i> (CDM), and COELBA
	PRINCIPAL	COELBA
Duration	2000—to date	
Status	Ongoing in 67 communities, with 102 community agents	

important collaborators in the project. Association of Volunteers in International Service (AVSI), an Italian NGO, mobilized the slum dwellers and their organizations to participate in the physical and social renewal of their neighborhoods. recognized this aspect of the project methodology as essential to gaining legitimacy and improving the utility's image in the communities, thereby ensuring a high level of participation and communication, as well as reducing resistance to change.

Overcoming Barriers to Energy Access

Informal urban settlements had high levels of illegal access to electricity, widespread inefficiencies in energy use, and significant challenges in the client-company relationship. After the privatization of the electrical sector in 1995, it was apparent to utility companies that illegal and irregular access to electricity was rampant, resulting in systemic losses and significant public safety concerns. Households were accustomed to high levels of energy consumption due to use of low efficiency light bulbs, faulty electrical installations, and other inefficiencies. As a result, energy consumption was consistently above the customers' ability to pay.

Results and Impact

Over an 11-year period, Projeto Agente COELBA has expanded service from 6,000 households to 200,000 households in Salvador city alone. Direct employment created has grown from 6 community agents in 2000 to 102 community agents in 2010. Indirectly, at least 200 jobs were created through the energy efficiency efforts and a Social Action Fund, created by the Community Agent project as a vehicle to channel funds generated by the sale of scrap metal and chlorofluorocarbon gas to address social and economic problems in the communities. Recent analysis by COELBA estimates that Projeto Agente COELBA saves between 26,000 and 44,000 MWh/year of energy, depending on the method of analysis, just from its refrigerator exchange program. Individual households that received new refrigerators through the subsidized program

saw a reduction of consumption of 43 percent per month. To date, COELBA has distributed or sold 68,911 new refrigerators, and rates of repayment are higher than among the average consumer. Reduction in household energy costs has contributed to important behavioral changes, including increased spending on food, health, education, and clothing, resulting in improvements in the quality of family life.

Developing and refining the community agent methodology was an innovative response to the main challenges of slum electrification and previous attempts to address isolated issues. The project has gradually and consistently targeted a larger number of communities. The innovative energy efficiency initiatives have been formalized and have gained international recognition for their impact: Nuova Gelateria, a vehicle through which COELBA sold new, high-efficiency units at a fraction of retail costs; ValeLuz—a socioenvironmental initiative developed parallel to Projeto Agente COELBA—stimulated the recycling of light bulbs and old appliances; and the Social Action Fund was expanded to 21 cities in Bahia and Pernambuco.

Best Practices

The case offers a methodology to empower and train community agents. Points of entry in each community were identified by engaging civil society, thus, empowering residents as key implementers through the community agent model. The result was an increase in energy access, affordability, and quality of service provided. Energy efficiency and conservation were improved through direct interventions. The project took advantage of incentives created by the Government of Brazil and the regulatory agency, reducing household energy costs and recouping COELBA's financial losses. A high level of community involvement, led by respected NGO and community-based organization intermediaries, facilitated COELBA's communication and direct engagement with residents.

Commercialization of Improved Cookstoves for Reduced Indoor Air Pollution | Northwest Bangladesh

Background

On dry days in Bangladesh’s urban poor communities, cooking mostly takes place in the scarce outdoor common space, making the area smoky and polluted. To address health and energy issues in low-income households, US Agency for International Development (USAID) designed a pilot project, with Winrock International, to reduce the effect of indoor air pollution (IAP) by introducing improved cookstoves. To sustain the effort, the social marketing of cookstoves had to be commercially viable. The project was structured around social awareness-building on the adverse effect of IAP, microfinancing, and community integration.

Innovative Approaches

The lack of availability of modern energy services, low incomes, and high prices of clean fuels are all factors that affect energy choices in Bangladesh. Despite rising awareness of health problems, poor people have few options but to use biomass. In 2005, Winrock International engaged The Village

Education Resource Center (VERC) and Concern Worldwide, Bangladesh, two local NGOs, in 2005 to implement an improved cookstove initiative. VERC was mainly responsible for identifying and disseminating improved cookstoves using a participatory assessment methodology, training the local cookstove manufacturing entrepreneurs; and managing the microcredit program. Since Concern Worldwide, Bangladesh was already running a USAID-funded women and children health project in the target area, they assumed responsibility for raising awareness of the adverse effects of IAP on health and promoting behavioral changes in health and kitchen hygiene practices.

The extensive research experience of the Bangladesh government in developing improved cookstoves for local conditions was useful during project implementation. An Indian cookstove model was adapted by local artisans to local needs. The project implementers also used innovative means of engagement to increase the use of improved cookstoves, such as social

Objectives	To reduce the exposure to indoor air pollution through changes in behavior and energy use practices	
Urban Poor Details	Peri-urban slums have an average membership of 5–6 persons per household and average daily income of less than US\$2 per day. Saidpur and Parbatipur represent typical urban slums with cramped huts that have poor ventilation within or among them.	
Service Provider	VERC, Bangladesh; Concern Worldwide Bangladesh; Appropriate Rural Technology Institute (ARTI), India	
Energy Service Access Provision	USAID-funded project implemented by VERC and Concern Worldwide, Bangladesh, supervised by Winrock International; VERC coordinated the technology intervention and provided training for micro-enterprises producing improved cook stoves; Concern Worldwide, Bangladesh implemented behavior-changing activities	
Stakeholders + Roles	FINANCIER	USAID
	BENEFICIARIES	Peri-urban slum dwellers of northwest Bangladesh
	IMPLEMENTER	VERC, Concern Worldwide, Bangladesh
	PRINCIPAL	Winrock International
Duration	2005–2007	
Status	Self-sustaining, with informal support from VERC	

marketing and training of entrepreneurs.

Overcoming Barriers to Energy Access

Amongst the urban poor in Bangladesh, many free forms of biomass—leaves, twigs and branches, waste paper, cow dung, jute stick, and straws—mainly gathered by women and children, are widely used for cooking fuel. Firewood is bought occasionally by this group, and families with higher collective income use firewood and kerosene. For people in this income group, the perception of free biomass for cooking had to be changed to encourage people to buy modern fuels.

Accessibility to energy in rural and peri-urban Bangladesh is dependent on many factors, including availability of alternative modern fuels, pricing, income, personal preference, and interest of the family head. High prices and lack of supply of modern energy services are the two main barriers for fuel accessibility. There was also a general lack of awareness of the negative health effects of IAP and its relationship to cooking indoors.

Results and Impact

Several women are now cooking indoors using two-pot fixed stoves with chimneys. Over 1,500 improved cookstoves have been installed in the project area. Laboratory and field tests show

reduction in cooking time and fuel consumption although the impact on actual lifestyles of the beneficiaries is yet unknown.

The project accomplished its primary objective of reducing the health impact of IAP by introducing improved cookstoves to peri-urban slum dwellers. The project also reached the goal of sustainability by implementing a commercially viable business model, and confirmed that improved cookstoves, when properly used, visibly and measurably reduce greenhouse gas emissions.

Best Practices

The project is being replicated by VERC in other parts of the country. The important factors for successful projects include: project developers to select appropriate partners with relevant work experience; having a clear project activity plan/coordination; and defined roles of partners. It is also important to utilize local technologies, human resources, skills, ideas, and culture.

It is important for the community to have input into any project that introduces new technology. The community must support any technology that they are to adapt, which makes project implementation easier. In addition, any technology or product intervention requires the support and involvement of local business.

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Electricity for Pavement Dwellers | Mumbai, India

Background

Since 1986, pavement dwellers in Mumbai have struggled to be recognized by city authorities. Households build temporary shacks along the roads and are amongst the poorest of Mumbai’s poor. With no legal recognition or proof of residence, services cannot be provided to them under Maharashtra state government policy. The basic rights for pavement dwellers in Mumbai were not recognized until 1995, when amendments to the Slum Act of the city were made.

Innovative Approaches

This is an example of a community-based initiative in which urban poor communities organized themselves in a structured manner to demand and acquire access to electricity. Although this was facilitated by an enabling policy environment that favored the community and its efforts, it was the pavement dwellers themselves, working with community-based organizations (CBOs) and nongovernment organizations (NGOs), who were able to structure their approach to the service

providers. Members of the Mahila Milan concluded that getting electricity from Bombay Electricity Supply and Transport Undertaking (BEST) directly was the best solution for affordable, legal, reliable, and safe connections.

Overcoming Barriers to Energy Access

Until 1995, households of pavement dwellers were not recognized by the city. Pavement dwellers had few options in accessing electricity and were paying high rates for illegal and unsafe connections. Many resorted to acquiring night-time electricity illegally from middle men, which proved to be expensive, inadequate, and unreliable. BEST officials were concerned about the demolition threats of pavement dwellers, which would have led to losses of cables and other infrastructure. They were also concerned about violating their own rule that households without proof of tenure should not be supplied with electricity. The Municipal Corporation refused to grant “No Objection Certificates” to the pavement dwellers on the grounds that the certificates would be used to attain other services,

Objective	To obtain legal, affordable, reliable, and safe electricity connections for pavement dwellers in the Byculla area of central Mumbai	
	To establish a model for other pavement dwellers in the city to gain electricity access, and build relations between the pavement dwellers and the authorities	
Urban Poor Details	More than 25,000 households in Mumbai live on pavements in the Byculla area of central Mumbai	
Service Provider	BEST	
Energy Service Access Provision	The process to get legal electricity supply from BEST started in 1997, initiated by members of Mahila Milan, a womens’ self help group. The senior management from BEST, the Society for the Promotion of Area Resource Centres (SPARC), Mahila Milan, and the National Slum Dwellers Federation (NSDF) agreed that access to legal electricity would be an initial symbolic gesture to the spirit of 50 years of Indian independence.	
Stakeholders + Roles	FINANCING	Community and CBO savings
	BENEFICIARIES	Pavement dwellers of Byculla area in Central Mumbai
	IMPLEMENTER	BEST, SPARC, and Mahila Milan
	LEADER	Mahila Milan
Duration	1997 to present	
Status	Ongoing, expanding, and being replicated. Most of the pavement dwellers in Byculla area obtained legal electricity connections by early 2000.	

such as water and sanitation.

Amending the Slums Act removed the lack of recognition barrier preventing access to basic services. Once this was overcome, the pavement dwellers could work to establish the many prerequisites necessary for safe, affordable, and reliable electrical connections with the service provider.

Results and Impact

Almost all households in the area were able to get electrical connections over time. Pavement dwellers in areas near Byculla were also able to access these services following a similar process. As a result of the initiative, BEST changed its policy for electricity supply to urban poor populations, specifically pavement dwellers. They recognized their entitlement to electricity, in the same way that the pavement dwellers recognized a need to organize themselves as a group and comply with the preconditions set out by the service provider.

As a result of this initiative, theft of electricity in the area has been curbed. This approach is now being replicated in other slum areas within the city as well as amongst pavement dwellers in cities outside of Mumbai. An innovative concept of “community metering,” with a number of households sharing one meter, was introduced to sustain costs of meter installation.

As a result of this case, a new initiative has been introduced in Mumbai to overcome the requirement for “No Objection Certificates” from the municipal corporation.

Best Practices

This case demonstrated the importance of communities organizing to demand and negotiate energy access requirements with authorities. Many other pavement dwellers in and near the city learned from the Byculla experience and followed a similar approach to successfully obtain electricity access.

LPG Mobile Retail Dealers | Bangladesh

Background

TOTALGAZ conducted an extensive market survey in 2004 to inform a market expansion strategy in areas where piped gas connection was either not available or inadequate. The survey found that a substantial number of small- and medium-enterprises (SMEs), including restaurants, bakeries, and tea stalls in poor urban areas were either using firewood or kerosene. Either the owners were unaware of the availability of liquefied petroleum gas (LPG) as an alternative or found carrying LPG refill bottles too difficult. As a result, the sales team devised a way of delivering LPG door to door. The SMEs agreed to use LPG if home delivery and reliable supply were ensured. Household LPG supply was a natural addition to their business.

Innovative Approaches

The concept of using mobile retail dealers (MRDs) for delivery of LPG evolved from the findings of a market survey and was officially launched in January 2005. TOTALGAZ distributors selected MRDs whom they perceived to be trustworthy, and provided financial support and rickshaw vans or bicycles for carrying the LPG bottles to the consumers. By supplying LPG bottles and accessories, along with providing technical support, an MRD could earn as much as US\$130/

month. Over 100 jobs were generated within the TOTALGAZ distribution system, enabling hard working, but less-educated populations to earn a decent living.

The project demonstrates the successful and effective role of simple, innovative technological solutions. Although an old concept, the application of home service for LPG bottle supply was first used in Bangladesh by TOTALGAZ. The project also empowered poor people with only junior school education to earn a decent living and even become entrepreneurs. Eventually, one MRD obtained distributorship from TOTALGAZ and now employs six to seven MRDs himself.

Overcoming Barriers to Energy Access

Although, the SMEs could afford to pay for LPG, the lack of an efficient distribution system prevented access to using LPG. Consumers had difficulty transporting bottles to filling stations that were often a distance away. Also, many SMEs were not aware of the benefits of using LPG and the availability of LPG in the country.

Results and Impact

This initiative has been a commercial success for TOTALGAZ. The response to the MRD program has been so successful that the company is

Objectives	To increase the use of LPG amongst small- and medium-sized enterprises by making reliable home delivery of refill bottles	
Urban Poor Details	The target group was people using biomass or kerosene for either household cooking or commercial restaurants/bakeries, living either in major city suburbs or relatively underdeveloped areas where infrastructure support is poor, with a reasonable level of monthly income.	
Service Provider	TOTALGAZ Bangladesh	
Energy Service Access Provision	The initiative was a business development strategy by TOTALGAZ. Local MRDs were personally selected by the owner of the distributorship. The distributor explained the terms and conditions of the business. Financial support came from TOTALGAZ. They also provided training at the early stage of the program.	
Stakeholders + Roles	FINANCIER	TOTALGAZ
	BENEFICIARIES	Urban poor and SMEs as users and providers of LPG
	IMPLEMENTER	LPG distributors through MRDs
	PRINCIPAL	TOTALGAZ, Bangladesh
Duration	2005–to date	
Status	Ongoing and growing with support from TOTALGAZ	

still supporting the project. The MRDs are making at least US\$80 per month from the direct commission for bottles sales, plus tips from customers. They also sell regulators and connecting pipes for the stoves. Because of its success, TOTALGAZ's MRP program is being imitated by other LPG marketing companies, generating more employment opportunities.

The project achieved the primary objective of expanding the LPG market among urban SMEs without piped gas connection. It also generated employment for the poor. Now, the model is being replicated (informally) by other LPG marketing companies.

Best Practices

The existing SME operators were using kerosene and biomass stoves and this initiative provided a solution to their needs. Additionally, the project was implemented by people who understood the business environment very well. Communication and synergy among the training, marketing, and management departments of the company was important in formulating a winning strategy for the program. Selection of MRDs by local distributors was very important as they knew the local problems and issues that could be handled by the MRDs. The model not only grew within the TOTALGAZ distribution network, it is now being imitated by other LPG companies.

Natural Gas Distribution for Low-Income Families | Colombia

Background

Despite abundant natural gas resources, poorer communities in Colombia continually used polluting forms of energy for cooking and heating requirements. The barrier to cleaner energy access was the relatively high initial cost of securing a natural gas stove and connection. In 2006, the largest natural gas holding and distribution company in Colombia, Promigas, approached Global Partnership on Output-Based Aid (GPOBA) to fund an initiative that would subsidize the initial cost of a gas stove and connection over a period of six years.

Innovative Approaches

The project sought to subsidize the one-time connection cost for natural gas access. Several stakeholders were involved in the project at various stages to ensure success. Local municipalities helped to identify eligible recipient households, the poorest households. Fundación Promigas coordinated the project. They worked with the regional distribution companies to install new stoves and connections, and appointed

international verification agencies to perform technical and financial audits to provide evidence of new connections to the funding institution. The funding for subsidizing the connection costs was provided by the UK Department for International Development and International Finance Corporation, and administered by the GPOBA of the World Bank.

Overcoming Barriers to Energy Access

The main obstacle identified in this case was the high cost of the service connection. Additionally, the inability of households to pay meant that the minimum level of demand might not be met for distributors to supply natural gas to the communities. To address this issue, the costs of connection were subsidized by grant funding from the World Bank.

Community buy-in for the project was addressed through pilot study. Outreach and awareness programs were used to educate the community on the benefits of consistently using natural gas.

Objective	To provide 35,000 of the poorest households along the Caribbean coast and in the southwest of Colombia with natural gas service connections	
Urban Poor Details	Over half of Colombia's total population lives below the poverty line. ¹ Approximately 85 percent of natural gas users come from households that are classified as among the lowest socioeconomic groups; the Caribbean coast and southwest region have some of Colombia's poorest households.	
Service Provider	Promigas and its subcompanies: Gases de la Guajura, Gases del Caribe, Surtigas, and Gases de Occidente	
Energy Service Access Provision	The Global Partnership for Output Based Aid (GPOBA) gave a grant to Promigas and Fundación Promigas to implement and monitor the provision of new gas stoves and connections amongst the poorest qualifying households in four separate areas. The money subsidized the one-time connection fee and the connection over a period of 6 years.	
Stakeholders + Roles	FINANCIER	GPOBA
	BENEFICIARIES	The poorest households, classified as strata 1 and 2 as per the socioeconomic stratification rating system
	IMPLEMENTER	Fundacion Promigas, the charitable arm of the private distribution holdings and distribution company, Promigas
	PRINCIPAL	Promigas
Duration	2006–2014	
Status	Phase 2 – Ongoing; may be replicated across Colombia and other countries	

The output-based grant financing was contingent on verification by independent evaluators of household connections and three months of usage. Fundación Promigas hired Deloitte and another private firm to conduct technical and financial audits.

Results and Impact

Of the 35,000 targeted new service connections, 34,138 new connections were verified—over 98 percent. Before the project, 40 percent of households suffered respiratory illnesses.¹ After installing the new stoves, respiratory illness fell by 75 percent due to decreased exposure to indoor air pollutants from the burning of fuels. The project saw improved health outcomes, and was more effective, both in terms of costs and outcomes, than other targeted health interventions with an estimated economic rate of return of 62 percent over 10 years.¹

Apart from the individual health impacts, environmental health impacts were a concern. As a direct result of using natural gas to replace firewood, an estimated 34 hectares of forest and swamp land has been preserved.¹

¹ Mandri-Perrott, Cledan & Dominic Patella. 2007. "Output-based aid in Colombia: Connecting poor households to natural gas service." *OBA Approaches 17* (November).

Best Practices

There were several inherent project design elements that enabled project success, such as the output-based aid mechanism, independent verification, and certifications. The output-based aid mechanism was suited to the provision of basic services and the independent verification agents were effective for evidence-based resource allocation. Working in collaboration with partners and implementers meant rapid connection installation while a partial subsidy allowed impact on a greater number of households. By addressing health issues, the project achieved an overall standard of living improvement. This is particularly important because it used an output- and results-based aid mechanism, rather than distributing money into projects without stringent guidelines. Good accountability, monitoring and evaluation mechanisms, and guidelines for responsibility were the key factors. Evidence-based financial and resource allocation was also crucial to the project's success.

Safe and Legal Electricity Connections in Slum Communities | New Delhi, India

Background

The Delhi-based nongovernmental organization (NGO), Integrated National Development Centre for Advancement Reforms and Education (INDCARE Trust), researched barriers to securing electricity among slum dwellers by conducting several surveys and workshops. The research revealed a high proportion of slum households with illegal connections, amounting to electricity theft. In 2003, the organization was approached by USAID and North Delhi Power Limited (NDPL) to build upon this research and assist with implementing an energy access project in the Bhalla Factory slum of New Delhi. Through community outreach, awareness, education, and microcredit, the organization facilitated the legal recognition and electrical connections in two slum communities in North West Delhi.

Innovative Approaches

INDCARE's community-based research provided the basis for the design of the electrification program. The research was undertaken to understand the needs of the community and explore the

barriers to electricity access. The research used innovative tools, such as Mainstreaming of Urban Poor Women in Design for Resource Assessment (MAURA), to effectively target interventions, such as microfinancing. They focused on supply constraints, payment mechanisms, and the quality of services provided.

INDCARE served as an intermediary between the community and the utility company, NDPL, and helped the community to negotiate agreements with the utility company. They also provided leadership training to community self-help groups to help them articulate their demands and concerns to NDPL. They worked with the community to change attitudes and understand their responsibilities as citizens to pay for services they consume.

INDCARE collaborated with USAID and other microfinance institutions to provide capacity building for the community and to finance the costs of connecting households to the grid. An outreach and advocacy campaign raised awareness in the community about the risks of illegal

Objective	To facilitate safe and legal electrification in two slum communities—Bhalla Factory and Jaipur Golden—through community education and microfinance in order to promote economic benefits for women	
Urban Poor Details	Approximately 45 percent of Delhi's population lives in unauthorized colonies, informal settlements, or slums. There are an estimated 1,040 such settlements in the city. About 39 percent of slum dwellers from the Bhalla Factory slum earn less than US\$1 per day. Jaipur Golden slum is similar.	
Service Provider	NDPL	
Energy Service Access Provision	Slum dwellers' theft of electricity posed a safety risk to themselves and significant revenue loss for the utility company. The illegal status of the slums prevented them from gaining access to electricity.	
Stakeholders + Roles	FINANCIER	USAID funded capacity building for the project, and INDCARE Trust provided a microcredit loan to facilitate the electrical connections
	BENEFICIARIES	Residents of Bhalla Factory and Jaipur Golden slums
	IMPLEMENTER	INDCARE Trust, the NGO who engaged the community and helped build capacity, and MHT
	PRINCIPAL	INDCARE
Duration	8 months in 2004	
Status	Completed in 2004	

electrical access. Community representatives were coached to articulate their demands of their legal right to electricity and take the necessary steps to overcome issues of illegality. Awareness-raising events included street performances and poster campaigns, which were used to help teach the community negotiation skills necessary to demand and attain their rights.

Overcoming Barriers to Energy Access

A high level of mistrust hindered dialogue between the community and utility company, which energy access to the community. The utility did not recognize the legal existence of the community and refused to serve them. The community resorted to illegal connections to obtain electricity.

The community could not afford the high upfront costs of connecting to the grid and they did not have access to financing or loans. Households in the community were perceived to be risky borrowers. As a result, financing institutions required a level of certainty that the community members would be around long enough to finish making payments. INDCARE worked with the Mihila Housing Trust (MHT) to provide microfinancing and to ensure timely repayment of the loans.

Results and Impact

The project resulted in overcoming barriers of

illegality and lack of funding to provide electrical connections in two slum communities. This was accomplished following campaigns to empower the communities in their negotiations with the government and utility, as well as by educating community members on the benefits of legal electrical connections.

In the first few months of implementation, almost 50 percent (400 out of 850 households) in the slum had requested legal electricity connections. By the end of the project, 100 percent connectivity was reached.

The project was successful primarily because of INDCARE's role in securing financing, outreach efforts, and bridging the communication gap between the utility and community. However, the success of the project was not scaled up nor replicated due to failure of the utility and INDCARE Trust to reach agreement on issues surrounding their respective roles. The communities were not able to raise the required funds for replication. However, within the community, the meters and electrical connections remain in use.

Best Practices

Community engagement and participation were key to the project's success. The women's microcredit groups ensured, for instance, that the money borrowed from INDCARE Trust was paid back in a timely manner.

Slum Electrification Project | Ahmedabad, India

Background

In 1998, the Ahmedabad Municipal Corporation (AMC) initiated a project to provide physical infrastructure to slums in Ahmedabad, including sanitation, road, and water facilities. Following the success of this initiative, the beneficiary slum communities demanded electricity connections. To facilitate this, Saath and Gujarat Mahila Housing Trust (MHT), which were already involved in slum upgrade programs in the city, approached the Ahmedabad Electrical Corporation (AEC) to launch the slum electrification program.

Innovative Approaches

The successful pilot phase of the program was enabled by active engagement and collaboration among the utilities, community-based organizations (CBOs), beneficiary communities, and the Ahmedabad municipality. The CBOs facilitated dialogue and enabled a rapport to grow between the utility and the communities. USAID provided financial assistance in the pilot phase of

the project, and AMC provided certificates of non-eviction to the slum communities, a prerequisite for slum communities to gain access to electricity connections.

Overcoming Barriers to Energy Access

A multistakeholder approach in the pilot phase of the project allowed for the early identification of many barriers to achieving energy access. Provisions to counter these obstacles were made in advance. In the beginning, for instance, the utility company was apprehensive about connecting the slum dwellers to electricity. They were concerned that connecting households to electricity could lead to illegal claims of tenure and non-payment of bills by the community.

The communities' attitude about paying for electricity posed another barrier. Before the program, many slum households had acquired illegal electricity connections, for which they paid only Rs. 50 (approximately US\$1) for each

Objective(s)	To develop a private sector/civil society partnership to extend legal and reliable, modern energy services to slum communities in Ahmedabad	
Urban Poor Details	The project initially targeted 5 slum communities in Ahmedabad, but later expanded to include all 710 slum communities in the city	
Service Provider	Torrent Power / AEC	
Energy Service Access Provision	Saath and MHT, coordinated the provision of electrical services for slum dwellers by the local electrical company.	
Stakeholders + Roles	FINANCING	USAID was the primary funder during the pilot phase of the project. It was associated with the project for 3 years, from 2001–2003
	BENEFICIARIES	5 slums in the pilot project and later all 710 slums in Ahmedabad
	IMPLEMENTER	AEC was the lead project coordinator and supplier of electricity and has been the primary player from the inception of the project in 2001 to the present day
	PRINCIPAL	Saath and MHT were key facilitators of the project. They acted as links and enabled Torrent Power, AMC, and the slum dwellers to work in close coordination. Their role—of prime importance in shaping the project—was restricted to the pilot phase of the project, which ended in 2003.
Duration	2001–2008	
Status	Completed. By 2008, all 710 slums in Ahmedabad were electrified. Over 200,000 households have been legally connected to electricity.	

point in their house, irrespective of consumption. Since most households had become accustomed to receiving relatively free electricity, inefficient energy practices were prevalent in many households. For instance, most houses had lights and fans running throughout the day. When the legal connection was provided and the first bill was delivered at an average of Rs. 200–250 (approximately US\$4.5), the slums dwellers protested the high cost. Their protests were eventually quelled with awareness campaigns and training programs, targeting the risks of illegally connected electricity.

Results and Impact

To date, all slum dwellers in Ahmedabad—a total of over 200,000 households in 710 slum communities—have legal electricity connections. They receive and pay electricity bills on a monthly basis. These bills are routed to regular collection centers throughout the city set up by the utility.

Best Practices

The multistakeholder engagement approach in this case allowed various groups to come together to facilitate the provision of electricity to slum dwellers in an affordable and sustainable manner. It is an example of successful community mobilization and public-private partnership. Other key lessons are that poor communities are willing to bear their share of the cost if good and reliable services are provided, and that government rules sometimes can be relaxed in the service of the common good.

The program has the potential for replication with the involvement of local nongovernmental organizations, which can play a significant role in educating and mobilizing the community to partner with the government for similar projects. Recently, some interest has been expressed in replicating the model in Africa and Mumbai.

Sulabh Community Toilets & Biogas Plants | Patna and New Delhi, India

Background

The lack of basic services, such as sanitation and clean drinking water, is the cause of many life-threatening diseases, including typhoid and cholera. Traditionally, it has been the job of “scavengers” to collect human solid waste from houses and transport it on their heads to dispose of it. A social service organization, Sulabh, decided to develop technologies to provide public toilets linked with a biogas plant and effluent treatment system, for the complete recycling and reuse of human waste.

Innovative Approaches

The program employs a unique combination of simple technological, financing, and management innovations for the disposal of human solid waste. Public toilets are linked to biogas plants, which recycle the wastes into useful energy. The initiative also sought to improve the livelihoods of people who used to collect human solid waste as a source of income. This model has proven to be sustainable, financially sufficient, and highly replicable

in other urban areas. The technology is simple enough to be implemented by locally trained members of the community, and all materials are also locally sourced. The program has sought the support and cooperation of local authorities, who approved the use of land for the project and provided financing for the construction of the community toilets.

Overcoming Barriers to Energy Access

A major barrier was the lack of available technology and funding to provide proper sanitation services. The tradition of using human scavengers to collect and dispose of human solid waste has been established over many years, although there is a law prohibiting the practice of scavenging. The community had to be educated on the health dangers of open defecation, and the benefits of using the ‘pay-per-use’ facilities. One barrier encountered in this case was that not all segments of the population were willing to pay for the service of using public toilets.

OBJECTIVE	<p>To provide clean, hygienic sanitation facilities to slum dwellers</p> <p>To provide cleaner energy to slums to meet their cooking, lighting, heating, and electricity generation needs</p>	
URBAN POOR DETAILS	<p>More than a quarter of the urban population in India does not have access to a lavatory. Traditionally, human “scavengers” have been used for the disposal of solid waste from around 13 percent of India’s urban households.</p>	
SERVICE PROVIDER	<p>The Sulabh International Social Service Organization</p>	
ENERGY SERVICE ACCESS PROVISION	<p>Public toilets linked with a biogas plant and effluent treatment system for the complete recycling and reuse of human wastes</p> <p>Biogas generated from human solid waste has been used to meet energy needs—cooking, space heating, and lighting</p>	
STAKEHOLDERS + ROLES	FINANCIER	Sulabh International Social Service Organization
	BENEFICIARIES	Consumers of biogas and the human solid waste collectors or “scavengers” (now trained to do better jobs)
	IMPLEMENTER	Sulabh International Social Service Organization
	PRINCIPAL	Sulabh International Social Service Organization
DURATION	<p>1982/1990s–to date</p>	
STATUS	<p>Ongoing. There are currently over 100 biogas plants in operation across India, serving approximately 3 million people daily.</p>	

Results and Impact

There are about 6,000 community toilet complexes, which serve about 12 million customers daily. Out of these, 100 have biogas plants linked to them. The public toilets have provided people with hygienic sanitation facilities. The biogas plants have given more people, especially the poor, access to cleaner fuel. Additionally, the use of manure as a by-product has improved the fertility of arable land.

The community has benefited from new skills acquired through training and capacity building to construct and maintain the toilets. With their new skills, former-scavengers now have an opportunity to earn a more dignified living. Additionally, there has been a transfer of knowledge internationally as Sulabh has made their plans freely available and has provided training on sanitation technologies for other developing countries.

Best Practices

This case highlights how simple technological innovations, combined with a financial model and able leadership, can help provide better basic services to the poor. The technology was developed as a practical solution to understanding of the needs of the urban poor. The simplicity of the technology is the innovation that underwrites its successful implementation.

The program has attracted a solid paid workforce and an army of volunteers, about 50,000, who provide technical expertise and oversight. Most of the workforce is recruited from the local communities and are trained in operational and maintenance functions. The program also embodies an element of social consciousness and has changed the lives of the scavengers, freeing them from their plight as human solid waste collectors.