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Maximizing Access to Energy for the Poor in Developing Asia

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Contents

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6 ADB Avenue, Mandaluyong City
1550 Metro Manila, Philippines
Tel +63 2 632 4444
Fax +63 2 636 2444
www.adb.org

For orders, please contact:
Public Information Center
Fax +63 2 636 2584
adbpub@adb.org

Introduction

Supporting Access to Energy in Developing Asia and the Pacific

For decades, the Asian Development Bank (ADB) has supported increased access to energy through the most cost-effective method—by expanding the electricity grid. Yet in this second decade of the 21st century, when the grid in many countries has reached its feasible limits, hundreds of millions are still not connected to modern energy.

Despite years of sustained economic growth and enormous technological progress, energy poverty in the Asia and Pacific region remains at unacceptably high levels. According to the International Energy Agency, more than 600 million people in the region have no access to electricity, and around 1.8 billion still use wood or charcoal for cooking and for heating their homes. Just as modern energy empowers human development, reduces workloads, and frees up time for more productive activities, the lack of access to energy perpetuates the vicious cycle of poverty.

Breaking this cycle is an ADB priority. This publication highlights projects which contribute towards that goal. ADB has repeatedly stated that it will take focused and innovative solutions to bring access to modern energy to the billions who need it. The recent and ongoing ADB financed projects in this publication are examples of focused efforts for maximum benefit and innovative approaches.

In picking these projects, it was important to highlight their diversity—both of technologies and approaches used, and the countries these projects are implemented in. There are many, effective ways of providing access to energy, but no single, easy fix. A variety of technologies and approaches must be considered and applied. For a country like Afghanistan, large investments in the grid can yield a greatly improved electrification rate. But for a country in the Pacific region, where geography and low population density work against the idea of centralized energy, new technologies must step in. The growth of renewable energy and the maturation of renewable technologies have made these much more feasible as an access solution. Providing access through renewable energy is a win–win solution for low-carbon, human development. Through this publication, we hope to provide a brief guide to what ADB, in partnership with governments, development partners, other multilaterals, and the private sector, has done to fight energy poverty.

Maximizing access to energy for the poor is a pillar of ADB's work in the energy sector, under its current Energy Policy. The Energy for All Initiative works to expand ADB's investment in projects that improve energy access. Many of the projects summarized here were made possible through the support offered by Energy for All to ADB's operations departments.

This support has produced a remarkable surge in ADB investment in energy access projects. Between 2008, when the Energy for All Initiative began, and 2012, ADB invested a total of $3.7 billion in setting up or improving connections to electricity or modern fuel supplies, benefiting more than 13 million households.

ADB will take advantage of new opportunities to maximize access to energy across developing Asia and the Pacific. Thankfully, ADB is far from alone in this work. In 2009, ADB started the Energy for All Partnership, a regional partnership that brings together governments, the private sector, and other stakeholders to replicate and scale up the best models for energy access. The partnership is working to bring modern energy to 100 million households by 2015. This is a substantial goal, but it is within reach. It is also appropriate for the scale of the energy poverty challenge. ADB has likewise partnered with the global Sustainable Energy for All Initiative, the Government of Norway's Energy+ Partnership, and the Global Alliance for Clean Cookstoves to make universal access to energy for all a reality, sooner rather than later.

Gil-Hong Kim
Director
Sustainable Infrastructure Division
Asian Development Bank

ADB's Energy for All

Empowering the Poor through Increasing Access to Energy

www.adb.org/projects/43385-022/main

Details at a Glance	
Project Number	43385-022
Financing	Public sector (sovereign), $11.673 million
Funding sources	Asian Clean Energy Fund (grant), $2 million (Technical Assistance/ [TA] 7512) Danish Cooperation Fund for Renewable Energy and Energy Efficiency in Rural Areas $150,000 (TA 7512) Swiss Cooperation Fund for Consulting Services, $133,000 (TA 7512) Government of Austria (grant), $2.75 million (TA7512) Government of Australia (grant), $2.07 million (TA 7512) Government of Norway (grant), $3.57 million (TA 7512) Multidonor Clean Energy Fund $1 million (TA 7512)
Project Type/ Modality of Assistance	Technical assistance
Date approved	9 April 2010
Responsible ADB Officer	Jiwan Acharya
Innovative elements	Represents ADB's policy priority to maximize energy access for the poor Project development: works to identify, replicate and up scale working energy access models across developing Asia

ADB is committed to maximizing access to energy for all, especially the rural poor, as a pillar of its energy policy, and as a key part of its fight against poverty, and for inclusive, environmentally sustainable development in Asia and the Pacific region.

The Energy for All Initiative, launched by ADB in 2008, supports ADB's efforts to increase investment in projects that improve access to modern energy. Energy for All is currently supported by technical assistance 7512 (Empowering the Poor through Increasing Access to Modern Energy).

Within ADB, Energy for All works with the operations departments to make ADB better able to support projects that bring modern energy within the reach of the poor. Since 2008, it has worked to develop and mainstream approaches to scaling up access to affordable, modern, and clean energy among the region's poor, using renewable energy technologies such as microhydro, solar, biomass, and small wind power, as well as clean cooking fuels, such as liquefied petroleum gas and biogas from livestock manure.

An impressive number of donors have contributed to the technical assistance. This level of interest matches the rising profile of energy access for the poor as a key development issue, and shows donors' trust in ADB's ability to lead action for greater access to energy in Asia and the Pacific.

Energy for All offers a wide range of support, drawing on the expertise and knowledge of specialists in energy access. It conducts due diligence on technical aspects, develops project concepts, does research on developments in energy access, and maintains important contacts with organizations and entrepreneurs working to provide access in developing Asia.

From 2008 to 2012, ADB's investments in access to energy totaled $3.8 billion. Since 2010, the investments have not gone below $900 million each year.

Energy for All also represents ADB in its partnerships with global campaigns for access to energy, such as the Global Campaign for Clean Cookstoves, the Government of Norway's Energy+ Partnership, and the United Nations' Sustainable Energy for All Initiative.

Energy for All—Project Development Facility

One of Energy for All's goals is to catalyze long-term and sustainable positive impacts for the energy poor in Asia and the Pacific. To do so, Energy for All created a framework where organizations seeking to the support the energy access sector can come together and collaborate in making energy access enterprises bankable. This framework supports and mentors young businesses that are focused on creating viable business models for energy access.

In recent years, social enterprises have slowly emerged as the new champions in delivering social impact. Energy for All is focusing on supporting the subset of these social enterprises that provide clean energy to poor.

But energy access enterprises face many barriers and challenges to deliver power to the poor. One of the most persistent barriers is termed the "missing middle" which limits their ability to access finance.

The "Missing Middle" is a term used to describe the gap between financiers looking for bankable investments and bankable companies that are looking for funding. The Missing Middle describes an access to finance problem which has held back the growth of small and medium enterprises (SMEs) in developing countries. While this concept is not limited to energy access enterprises, it remains a major barrier to private sector led solutions to energy poverty.

The Energy for All Project Development Facility (PDF) is meant to fill the role of a third party that bridges the missing middle and does matchmaking between project proponents and financiers.

The PDF is a platform that offers a full menu of services to project proponents for project development and especially investment facilitation. The PDF works on knowledge management, capacity building, project development, and investment facilitation—unlocking financing from ADB and other sources. In particular, it steps into the "missing middle" and connects Proponents with Financiers, and pulls together different stakeholders that share Energy for All's objectives, and offers them a platform where they can apply their expertise in coordination with one another.

The Simpa Networks project (full details on page 11) is one project supported by the PDF, and its work on Simpa's behalf resulted in an equity investment from ADB's Private Sector Operation's Department based on Simpa's early successes and promising business model.

With more projects still in the pipeline of the Energy for All Project Development Facility, it will continue to support business solutions for energy access.

Afghanistan

Multitranche Financing Facility for the Energy Sector Development Investment Program in Afghanistan (Tranches 1–4)

http://www.adb.org/projects/42094-012/main

Details at a Glance	
Project Number	42094-012
Financing	Public sector (sovereign), $602.4 million
Funding sources	Asian Development Fund, $570.0 million (Grant 0026) Department for International Development of the United Kingdom, $20.0 million (Grant 0281, with letter of agreement) Danida of Denmark, $12.4 million (Grant 0282, with letter of agreement)
Project Type/ Modality of Assistance	Grant
Date approved	Facility Concept approved on 28 Nov 2008
Responsible ADB Officer	Asad Aleem (tranches 1 and 2) Bouadokpheng Chansavat (tranche 3)
Beneficiaries	Grid supply available to an additional six cities by 2015 (Taloqan, Kunduz, Baghlan, Logar, Gardez, and Kabul)
Innovative elements	Multitranche financing facility that can channel enormous sums to improve energy infrastructure.

Afghanistan will require an enormous amount of multilateral and bilateral investment to repair the damage suffered by the country's infrastructure. The current investment program put together by international development and aid organizations will cost about $4 billion up to 2015. ADB has been asked to finance a slice of this program, and the multitranche financing facility is an example of the programmatic approach ADB is taking to the provision of financing support to Afghanistan.

A multitranche financing facility is provided to finance projects, subprojects, or components within a larger program. In this case, the facility finances the various components of the Energy Sector Development Investment Program of the Government of Afghanistan. The government requested ADB for focused financial assistance to help its energy sector overcome its tremendous physical and nonphysical challenges.

These challenges include low generation capacity, widening gaps in transmission and distribution, rising technical losses, poor energy and electrification coverage of the rural areas, and inadequate gas and hydropower resource units. The sector also faces legal and regulatory shortcomings, as well as gaps in financial and management operations, poor financial management, high commercial losses, and ineffective and inefficient planning and project execution.

In terms of energy access, the facility is set to support the construction of hundreds of kilometers of transmission and distribution infrastructure, which will connect households to power across Afghanistan. It will also assist in the rehabilitation and expansion of power transmission and power distribution lines, to provide more reliable services in areas with electricity connections.

Though the later tranches of the facility are still being implemented, the project has already shown strong results and extensive benefits. Connection rates in Afghanistan have increased from less than 200,000 in 2002 to around 1 million in 2013, for a growth in electrification rate from less than 10% to nearly 30%.

Bangladesh

Natural Gas Access Improvement Project in Bangladesh

http://www.adb.org/projects/38164-013/main

The objective of the project is to increase access to a reliable supply of natural gas in Bangladesh by expanding capacity and improving the efficiency of natural gas production, transmission, and distribution systems. In purely technical terms, about 845 kilometers of gas distribution pipelines will be laid in Bangladesh's southwestern region.

Natural gas contributes 70% of primary energy supply in Bangladesh. It has dominated the power sector, fueling 85% of power generation. As the country is highly dependent on natural gas for its economic development, the sustainability of gas supplies is critical. The existing transmission and distribution network is inadequate to meet the needs of industry, commerce, and especially households. More than 140 million people, or 91% of Bangladesh's population does not have access to clean cooking facilities.

This new infrastructure aims to improve and will give an estimated 200,000 households access to a steady supply of natural gas, which they can use instead of polluting fuels like traditional biomass and fuelwood. The project will thus have a positive impact on the environment and on health, particularly of women and the poor, who are the most vulnerable to indoor air pollution from the use of these fuels.

About 1,400 industrial and commercial establishments and 35 compressed natural gas filling stations in the region will also gain access to gas for their energy needs. In the process, significant employment will be generated in the region and poverty will be reduced.

The funding support for this project was sourced through a blend of ADB's ordinary capital resources and the Asian Development Fund (ADF), which means it has access to a blend of funding support. ADF is a major instrument of concessional financing that has supported equitable and sustainable development in the region since 1973. Funded by ADB's member countries, it offers loans at very low interest rates as well as grants to help reduce poverty in ADB's poorest member countries.

Details at a Glance	
Project Number	38164-013
Financing	Public sector (sovereign), $266 million
Funding sources	Asian Development Fund, $5,000,000 (Loan 2623) Ordinary capital resources, $261,000,000 (Loan 2622)
Project Type/ Modality of Assistance	Loan
Date approved	26 March 2010
Responsible ADB Officer	Zhang Lei
Beneficiaries	Natural gas supply for: 200,000 households 1,400 industrial and commercial establishments 35 compressed natural gas filling stations
Innovative elements	Provides gas for cooking, and improves distribution, supply and management using meters. Provides energy for economic development by supplying gas to businesses and distribution stations, generating new opportunities for employment.

Bangladesh

Power System Efficiency Improvement Project in Bangladesh

http://www.adb.org/projects/37113-013/main

Details at a Glance	
Project Number	37113-013
Financing	Public sector (sovereign), $300 million
Funding sources	Ordinary capital resources, $300 million (Loan 2769)
Project Type/ Modality of Assistance	Loan
Date approved	11 Aug 2011
Responsible ADB Officer	Zhang Lei
Beneficiaries	Households on Hatiya Island Training program for 1,000 women to teach them the safe and efficient use of modern energy.
Innovative elements	Has a strong focus on empowering women with access to energy and skills training to take advantage of this new opportunity.

The project supports the installation or retrofitting of energy infrastructure to make new or improved energy connections available to many households, but its direct energy access component focuses on expanding renewable energy access in rural areas. Its components include the installation of a 5 MW solar photovoltaic system connected to the national grid at Kaptai, and the installation of a hybrid wind (1 MW)—solar photovoltaic (1 MW)—diesel (5.5 MW) generating system in Hatiya Island.

A user education program is part of this project. This pilot program targets the households on Hatiya Island, who will be benefiting from the new off-grid systems, and aims to educate households on the safe and efficient use of electricity in the household.

As women are usually primarily responsible for the household's energy needs—often burdened by the need to travel far and spend time acquiring the day's fuel—the pilot program targets women especially, and seeks to train at least 1,000 women from the communities on Hatiya.

By lessening their daily burdens, energy access is particularly empowering for women, and frees them to pursue more productive activities. An improved cookstoves component is also a part of this project.

Bhutan

Rural Renewable Energy Development Project in Bhutan

http://www.adb.org/projects/42252-022/details

Though Bhutan is the only South Asian country with an electricity surplus (which it exports to India), energy poverty in the country remains high because of the challenges involved in bringing power to remote communities. Providing electricity to all by 2013 through conventional grid extension and renewable energy technology is a national goal. This project aims to help further that goal by expanding rural electrification for all households, particularly for households in remote areas of the country.

The project has four components, all providing access to energy: (i) on-grid rural electrification reaching more than 5,000 households, (ii) off-grid electrification of 1,896 households through the installation of solar home systems and the rehabilitation of 2,500 existing solar home systems, (iii) establishment and grid connection of pilot wind power generation mills, and (iv) a pilot program to promote biogas plants.

These subprojects will be implemented throughout the country, and help Bhutan to expand rural electrification for all households, and sustain its operations and energy security, through a mix of clean energy supply sourced from hydropower, solar, wind, and biogas.

For the project's electrification components, there is a target that at least 30% of the households that shall benefit are those headed by women. The project also supports the training of 120 village technicians to oversee operation and maintenance of the off-grid solar and the on-grid components. At least 40% (48) of these technicians will be women.

Details at a Glance

Project Number	42252-022
Financing	Public sector (sovereign), $24.910 million
Funding sources	Asian Development Fund, $21.950 million (Grant 0228) Counterpart funds, $3.320 million
Project Type/ Modality of Assistance	Grant
Date approved	29 Oct 2010
Responsible ADB Officer	Takeshi Shiihara
Beneficiaries	New grid connections for more than 5,000 households Solar home systems for 1,896 off-grid households, and rehabilitation of 2,500 existing solar home systems Piloting of domestic biogas plants for 1,600 new households through microfinance.
Innovative elements	This project has a strong gender equality component wherein at least 30% of the households to benefit will be headed by women, and a quota of women technicians will be trained for operation and maintenance for the new off and on-grid energy infrastructure.

Cambodia

Rural Energy Project in Cambodia

http://www.adb.org/projects/45303-001/main

Details at a Glance	
Project Number	45303-001
Financing	$6.110 million
Funding sources	Australian Agency for International Development (Australian Aid)
Project Type/ Modality of Assistance	Grant
Date approved	15 Jan 2013
Responsible ADB Officer	Rehan Kausar
Beneficiaries	New electrical connections for up to 13,700 households Up to 90,000 households using improved, more efficient cookstoves
Innovative elements	This project supports a partnership between traditional cookstove producers and an NGO to train them in the construction of improved versions, as well as an information campaign to promote the take-up of the improved stoves among women and retailers.

This project will directly support increased energy access in two ways. First, it will electrify up to 13,700 households in Cambodia's Svay Rieng province by extending the medium-voltage subtransmission line and the low-voltage distribution network, and installing meters. By December 2014, up to 8,000 households will be connected. This will help raise Cambodia's electrification rate, currently only 26%, and allow households to stop using automobile batteries for electricity.

Second, the project will promote the use of up to 90,000 improved, more efficient cookstoves in the rural areas of Kampong Cham province. The improved cookstoves will be produced by traditional cookstove producers who will work with an NGO that will train them in the new technology. The project also supports information campaigns to cookstove retailers and end-users, who are typically women, towards self-sustaining use of the cookstoves.

Improved cookstoves are particularly critical for Cambodia which has high fuel poverty: 93% of the population burns traditional biomass for cooking fuel. And as women are responsible for a household's fuel supply, fuel poverty affects them the most. In many parts of the country, women spend hours collecting fuel—hours that could be spent on much more productive tasks. Out of the 90,000 cookstoves going out, the project hopes to ensure that 63,000 of them go to women-led households.

The funding for this project was supported by Australia. Cambodia is also one of Australia's largest bilateral development partners, and the Australian Agency for International Development (Australian Aid) prioritizes Cambodian projects that improve child and maternal health and fight rural poverty. Improved access to modern energy in rural areas helps to addresses both of these issues by allowing for modern healthcare provision in these communities.

People's Republic of China

Integrated Renewable Biomass Energy Development Sector Project in the People's Republic of China

http://www.adb.org/projects/40682-013/main

The project will improve the performance of the biogas subsector by demonstrating an integrated renewable biomass energy system in the poor rural areas of Heilongjiang, Henan, Jiangxi, and Shandong provinces. These provinces are dense with livestock farms, and the pollution problems from these farms and their associated agro-enterprises are severe.

The treatment of about 7.0 million tons of livestock waste will produce around 92 million kilowatt-hours of electricity and an equivalent amount of heat energy each year to replace about 76,000 tons of coal.

Though much of this energy will go to farms and enterprises, part of the supply will be provided to about 41,000 households. Replacing the straw, wood, or coal these households now burn biogas for fuel will improve their use of energy, protect the environment, and reduce the workload and health hazards particularly among women who work mostly at home. Some agro-enterprises also plan to supply low-priced electricity and gas to neighboring villages, thereby giving rural farmers better access to modern energy.

This project is funded through the Global Environment Fund (GEF), first established in 1991, and now the world's largest independent funder of projects to improve the global environment. ADB has been working closely with the GEF since the late-1990s, and since 2002 has served as one of the 10 agencies with direct access to GEF resources. The ADB-GEF partnership is anchored on the recognition of the vital links between environment and sustainable development, and that wise stewardship of natural resources, biodiversity and ecosystems are essential to the long-term development of countries in Asia and the Pacific.

This project also received funding from the multidonor Clean Energy Fund, under ADB's Clean Energy Financing Partnership Facility. The multiple donors in this case are the Governments of Australia, Norway, Spain, Sweden and the United Kingdom. Their combined support finances the deployment of new, more efficient and less polluting supply and end-user technologies, such as biomass energy systems.

Details at a Glance

Project Number	40682-013
Financing	Public sector (sovereign), $147.94 million
Funding sources	Ordinary capital resources, $66.08 million (Loan 2632) Global Environment Facility, $9.2 million (Grant 0203) Clean Energy Fund (multidonor), $3.0 million (Grant 0202)
Project Type/ Modality of Assistance	Loan, grant
Date approved	16 Apr 2010
Responsible ADB Officer	Lanlan Lu
Beneficiaries	Electricity and heat from biogas will be provided to 41,000 households.
Innovative elements	Use of a clean energy solution that sequesters hazardous animal waste to generate biogas, and then uses this to provide combined heat and power to households and enterprises.

India

Off-Grid, Pay-as-You-Go Solar Power in India

http://www.adb.org/projects/46931-014/main

Details at a Glance	
Project Number	46931-014
Financing	Private sector (nonsovereign), up to $2 million
Funding sources	Ordinary capital resources
Project Type/ Modality of Assistance	Equity investment
Date approved	15 Jan 2013
Responsible ADB Officer	Aniruddha V. Patil
Beneficiaries	New solar home systems and microgrids will give 63,125 more households access to energy
Innovative elements	Championing a private sector approach to energy access, this project is noteworthy for being a small scale equity investment, whose worth was decided by development impact.

Simpa Networks in India offers a simple, affordable, and commercially sustainable clean energy solution to the problem of low access to electricity in off-grid, largely rural areas. ADB has made an equity investment in Simpa through this project. While equity investments are not uncommon for ADB, this project marks the first time that ADB has ventured into small-scale equity investments. ADB calculates that despite the project's relatively small scale, the projected development impact of providing energy access will be worth the investment.

The funding support of up to $2 million, in addition to ADB's knowledge and experience, will enable the company to expand its operations and provide wider access to energy.

ADB's support will make possible the sale and installation of 29,000 new solar home systems and 34,125 metering units for solar-powered microgrids by 2014, giving 63,125 more households access to energy by 2015.

Simpa Networks was established in November 2010 and incorporated in the United States. It operates in India through Simpa Energy India, a fully owned subsidiary. The business model of Simpa is attractive for its innovative use of technology and for its potential for further replication and scaling up. Briefly, Simpa makes use of a short message service (SMS)–enabled payment and metering system for solar home systems and microgrids, where customers may buy electricity credits through SMS. They are the only group to apply this combination of technology in the country.

Simpa's platform uses mobile phones to unlock the electricity demand from consumers, while providing risk mitigation for the company that finances the solar equipment. The technology platform is a very-low-cost prepaid meter supported by sophisticated cloud-based software. Currently Simpa embeds this technology in solar home systems and offers it to solar microgrid developers as an extremely flexible metering, customer, and revenue management solution.

Lao PDR

Greater Mekong Subregion Northern Power Transmission Project

http://www.adb.org/projects/38628-022/main

This project in the Lao People's Democratic Republic (Lao PDR) supports the construction of critical transmission and distribution infrastructure in order to expand access to grid electricity to consumers in the western part of Vientiane province and in Xayabouly and Phongsali provinces.

Of the 960,000 households in Lao PDR, about 560,000 (58%) have access to electricity. In Xayabouly province, only 50% of households are supplied with electric power. The percentage of electrified households is lowest in Phongsali province with only 13%.

No-interest credit to poor households in these provinces under the project will help them overcome the high initial cost of connection and gain access to modern electricity. Specifically, the credit offered will help poor households pay for the wiring from the poles to their houses and wiring inside the houses. The district authorities will be responsible for identifying households eligible for receiving no-interest credit. Similar schemes have been implemented by ADB in other countries, and the World Bank implemented a successful "credit for connections" project in Lao PDR, which this project echoes.

The construction of nearly 400 kilometers (km) of 115-kilovolt transmission lines and 1,100 km of low-voltage distribution lines will expand the grid significantly and benefit about 18,800 new households, as well as new businesses, in these remote provinces. The credit component will help more than 6,000 poor households connect to the grid, and will thereby improve living standards and create new income-earning opportunities for the poor in these provinces.

Details at a Glance

Project Number	38628-022
Financing	Public sector (sovereign), $20 million
Funding sources	Asian Development Fund (Grant 0195)
Project Type/ Modality of Assistance	Grant, public sector (sovereign)
Date approved	26 Jan 2010
Responsible ADB Officer	Phoxay Phommachanh
Beneficiaries	Grid extension will reach 18,800 households directly Credit component will help more than 6,000 poor households pay the initial cost of connection
Innovative elements	Offering no interest credit for the poor to overcome the high initial cost of connection is an important component for any grid extension project, and ADB and other multilaterals have begun incorporating it into many similar projects.

Mongolia

Ulaanbaatar Clean Air Program in Mongolia

http://www.adb.org/projects/43177-012/main

Details at a Glance	
Project Number	43177-012
Financing	Public sector (sovereign), $500,000
Funding sources	Asian Clean Energy Fund, Clean Energy Facility (TA 7462)
Project Type/ Modality of Assistance	Technical assistance
Date approved	14 Dec 2009
Responsible ADB Officer	Shane J. Rosenthal
Beneficiaries	Pilot program will replace heating stoves with cleaner burning models in 1,000 households
Innovative elements	The majority of energy access projects focus on rural areas, though urban energy poverty remains common. This project supports access to cleaner energy and has cross cutting benefits in terms of reducing pollution and improving household fuel efficiency.

Air pollution is a serious problem in Ulaanbaatar, the capital and largest city of Mongolia. Particulate matter concentrations are estimated to be several times above the maximum acceptable standards for human health and safety. According to the preliminary results of a World Bank study being done to monitor air pollution and gather baseline data on health impact, primitive heating stoves used by mostly poor peri-urban households contribute an average of 45%–70% of the particulate matter concentrations.

Pollution is particularly severe in the capital of Ulaanbaatar in the wintertime, when around 40% of the city's population turns to rudimentary coal-burning household stoves.

The main energy access component of this technical assistance involves improving domestic heating stoves, as well as establishing laboratory capacity for testing emissions from fuel combustion in these stoves to guide stove manufacturers in developing better stove designs. A subsidy voucher distribution mechanism will also be developed to enable households to replace their heating stoves with cleaner models. This mechanism will be tested through a pilot program reaching up to 1,000 households in one district of Ulaanbaatar.

With billions worldwide still burning coal and other polluting fuels and unlikely to be reached by modern fuels anytime soon, a workable alternative is to improve the current system and provide stoves that burn fuel more efficiently so that fuel supplies last longer, and also burn fuel more cleanly so that both particulate emissions and indoor smoke are reduced.

This project draws it support from the Asian Clean Energy Fund, a single-donor fund supported by the Government of Japan, managed under ADB's Clean Energy Financing Partnership Facility. The Government of Japan, is also a strong supporter of the Energy for All Initiative, having funded it with a $2 million grant.

Papua New Guinea

Improved Energy Access for Rural Communities in Papua New Guinea

http://www.adb.org/projects/41504-024/main

This project aims at connecting 4,500 households (27,000 persons), 20 schools, and 20 medical facilities in rural communities to the power grid by December 2014.

More than 90% of the population of Papua New Guinea (estimated at 6.3 million in 2012) has no electricity, with the majority of the energy poor living in the rural areas. The Government of Papua New Guinea has requested ADB to support trials of energy access models as modern electricity connections are still prohibitively expensive for rural communities, and where infrastructure is built, a lack of community ownership affects the sustainability of the project.

The energy access component of this project will involve the installation of around 4,500 prepaid power meters (not stand-alone) in rural communities in three provinces, connecting 4,500 households, or around 27,000 people, to modern electricity. This new infrastructure will give rural households greater flexibility in managing their power use and power budgets.

The technical assistance will also support training for these communities in maximizing the benefits of modern power connections. The training in household management of power will include lessons in basic health and safety aspects of electricity use, the operation of prepaid meters, the household energy budget, and basic energy efficiency measures. Target groups will receive additional training to raise awareness of income-generating and microfinance options. At least 50% of the trainees will be women.

The trials will take place in three provinces to demonstrate the impact of modern power connections in a range of geographic and cultural settings. The success of these trials will lead to replication in other provinces in the country.

The project is partially supported by the Japan Fund for Poverty Reduction, which provides direct grant assistance to the poorest and most vulnerable groups in ADB's developing member countries, through projects that foster long-term social and economic development.

Details at a Glance

Project Number	41504-024
Financing	Public sector, $5 million
Funding sources	New Zealand, $2.5 million (Grant 0288) Japan Fund for Poverty Reduction, $2.5 million (Grant 9163)
Project Type/ Modality of Assistance	Technical assistance, grant
Date approved	19 April 2012
Responsible ADB Officer	Anthony Maxwell
Beneficiaries	Grid connections for 4,500 households (27,000 persons), 20 schools, and 20 medical facilities
Innovative elements	Training support will help communities - with an emphasis towards women - make the best use of their new electricity, including training on new income-generating opportunities.

Philippines

Rural Community-Based Renewable Energy Development in Mindanao

http://www.adb.org/projects/44132-012/main

Details at a Glance	
Project Number	44132-012
Financing	Public sector (sovereign), $2 million
Funding sources	Clean Energy Facility–Asian Clean Energy Fund (Technical Assistance 7781)
Project Type/ Modality of Assistance	Technical assistance
Date approved	16 Feb 2011
Responsible ADB Officer	Daniela Schmidt
Beneficiaries	Renewable energy sources will provide modern energy to around 1,500 households.
Innovative elements	This project fosters community ownership of the energy infrastructure, leading to greater care for the power systems and better sustainability and also supports a microcredit component to cover the cost of connection for households.

This technical assistance project was funded as part of ADB's Energy for All Initiative, which supports the development of innovative approaches to giving the poor access to affordable, modern energy and scaling up the use of renewable energy. Its funding was drawn from the Government of Japan supported Asian Clean Energy Fund.

In support of the development of renewable business models, the project will pilot-test the use of at least five energy sources, including microhydro, solar photovoltaic, small wind, and other indigenous sources, with a total estimated capacity of 200 kilowatts, to serve the energy needs of about 1,500 households.

Using lessons from an earlier project, this project will also support the community-based organizations to enhance community ownership of the project by allowing the people to take an active role in its enduring implementation and sustainability. The project also supports the establishment of a community revolving fund that will provide microcredit to households to cover the costs of electrical connections and the purchase of appliances, and to fund livelihood enhancement activities, such as supporting small enterprise development, and training for operation and maintenance of the renewable energy systems.

The barriers to sustainability for energy access enterprises, such as the cost of renewable energy and affordability to consumers, will thus be addressed. These key issues will affect the design of future business models and public–private partnerships intended to increase access to energy.

The project will also ensure that at least of half of beneficiaries of modern energy access will be women or households headed by women.

Sri Lanka

Clean Energy and Access Improvement Project in Sri Lanka

http://www.adb.org/projects/39419-013/main

This project will give the poor population of Sri Lanka better access to energy by strengthening the transmission system in the country's Eastern province and increasing electricity connections to rural households in the province.

The project's transmission-strengthening component involves laying improved transmission lines and adding new substation capacity in Sri Lanka's Eastern province, one of the country's poorest provinces following the years of conflict.

This transmission strengthening is the basis for the project's rural household electrification component. Many villages in Sri Lanka are within the distribution range of the national grid, but households in these villages cannot pay the high initial cost of connection. A revolving fund created earlier by ADB and managed by local microfinance institutions will be scaled up through a loan-funded credit support program to provide installment credit to poor households in the province and enable them to pay for their connections.

The project continues to build on an earlier $1.5 million grant under which a revolving fund was created to support grid connections for poor households through microlending. From 2004 to 2009 nearly 15,000 households were connected to the grid. A loan recovery rate of more than 95% was maintained, demonstrating that the poor were fully capable of paying back their loans.

The project is expected to provide electricity connections to at least 60,000 poor households, including those living in areas affected by conflict—or 8% of all poor households in the country. It will therefore significantly help the government in achieving its goal of increasing the household electrification rate through grid connections from 82% in 2008 to 98% by 2016.

Details at a Glance

Project Number	39419-013
Financing	Public sector (sovereign), $165.2 million
Funding sources	Climate Change Fund, $0.8 million (Technical assistance) Asian Development Fund, $25 million (Loan) Climate Change Fund, $2.2 million (Grant) Climate Change Fund, $2 million (Grant) Japan Special Fund, $2 million (Technical assistance) Ordinary capital resources, $135 million
Project Type/ Modality of Assistance	Technical assistance, loan, grant
Date approved	14 Apr 2009
Responsible ADB Officer	Ranishka Yasanga Wimalasena
Beneficiaries	Electricity for at least 60,000 households (8% of the country's total poor households)
Innovative elements	A revolving fund component, to be managed by local microfinance institutions will allow poor households to access credit to pay for grid connections.

Tajikistan

Access to Green Finance Project

http://www.adb.org/projects/45229-001/main

Details at a Glance	
Project Number	45229-001
Financing	Public sector (Sovereign) $10.75 million
Funding sources	Asian Development Fund $10 million (Grant 0346) Japan Fund for Poverty Reduction $750,000 (Technical Assistance 8394)
Project Type/ Modality of Assistance	Grant
Date approved	25 Jun 2013
Responsible ADB Officer	Won Jin Seol
Beneficiaries	More than 20,000 households set to benefit from energy-efficient and clean "smart green energy solutions" that improve their access to energy
Innovative elements	Improves energy access through a number of solutions, including solar home systems, solar water heaters, and through more energy efficient technologies. Works with microfinance institutions to provide credit to households for purchase of energy technologies

Tajikistan is classified as a Group A country under the Asian Development Fund, which allows the country access to the Fund's very low interest loans and grants. This project provides a $10 million grant for an Access to Green Finance project to help Tajik families increase power access and efficiency through financing of "smart" green energy solutions. The project is also being supported by a $750,000 grant from the Japan Fund for Poverty Reduction for capacity building technical assistance.

Tajikistan depends on hydropower for 98% of its electricity needs. In summer, when electricity demand is low but glacial melt is high, there is an electricity surplus. But in winter when rivers freeze, and demand for heating is high, hydropower generation declines resulting in limited lighting and heating for three out of four Tajiks.

The situation is worse for the 24,000 households located in remote off-grid areas. Over 73% of the population lives in rural areas and spends much of the winter with limited electricity, with lighting and heating in short supply.

This project aims to end this seasonal cycle of energy poverty by introducing "smart green energy solutions"—technologies that can boost energy efficiency, and especially, meet energy needs, and displace the dependency on burning biomass during winter months. These technologies include solar home solutions for off-grid households, and solar water heaters which will be useful year-round.

The project will engage the country's microfinance system to provide affordable credit for smart green energy solutions, scaling up previous microfinanced based home energy improvement models. The project will also support nascent green technologies that are being assembled and manufactured locally through local cooperatives and by skilled workers. It is also notable for specifically targeting women borrowers who manage household energy requirements.

Regional

Improving Gender-Inclusive Access to Clean and Renewable Energy in Bhutan, Nepal, and Sri Lanka

http://www.adb.org/projects/44135-012/main

With a grant of $3 million from the Japan Fund for Poverty Reduction (JFPR), ADB will help increase income and livelihood opportunities for women in three clean energy projects in Bhutan, Nepal, and Sri Lanka.

The specific interventions under this project are as follows:

- **Bhutan**: Training female village technicians to operate and manage off-grid solar home systems and maintain grid systems. While village technicians are already being trained to support grid system maintenance, the project will seek to ensure that at least 40% of the trainees are women and that at least 30% of the trained women derive a better livelihood from the maintenance of solar home systems.
- **Nepal**: Strengthening community management of rural electrification by supporting the community rural electrification department (CRED) of the Nepal Electricity Authority in providing electricity access to 10 electric users cooperatives and the 10,000 or so households they serve in 9 districts. Under its community-managed distribution model, the CRED program provides a government subsidy from a revolving fund of soft loans for 80% of the funding needs of on-grid community distribution systems, and the community contributes 20%. Special attention will be paid to ensuring electricity access, including household connections, for households headed by women and by people from socially marginalized castes and ethnic and religious groups.
- **Sri Lanka**: Giving rural women better access to electricity and improving service delivery in Ampara district in the country's Eastern province. Drawing from lessons learned in previous programs in Sri Lanka, including Japan's support for post–Boxing Day tsunami relief efforts, and ADB's Power Fund for the Poor project, dated 2004, and also supported by the Japan Fund for Poverty Reduction, this intervention includes both free electricity connections and microcredit support. About 2,200 households from deprived and vulnerable households will benefit.

Details at a Glance

Project Number	44135-012
Financing	Public sector (sovereign), $3 million
Funding sources	Japan Fund for Poverty Reduction, $3 million (Grant 9158)
Project Type/ Modality of Assistance	Grant
Date approved	18 March 2011
Responsible ADB Officer	Meenakshi Ajmera
Beneficiaries	Bhutan – 120 village (48 women) technicians trained for offgrid solar home systems Nepal – 10,000 households (30% women headed) to be educated on the safe and productive use of electricity. Sri Lanka – 1,500 trained (30% women) on operation and maintenance of community electricity infrastructure.
Innovative elements	This project emphasizes the lead role women need to be taking in terms of energy access. As those most frequently responsible for the home, empowering women with the knowledge to control and manage household energy supply increases gender equality and raises their own quality of life.

Going Forward

The projects featured in this publication are only a thin slice of how ADB has supported increased access to modern energy, but they give a broad impression of the work being done by ADB to fight energy poverty. Further work is done by ADB as a part of strong partnerships and cooperative efforts that address energy poverty on a greater scale.

At the Asia and the Pacific regional level, ADB has taken on the problem by forming the Energy for All Partnership, launched in 2009. Presently, the Partnership works to identify and scale up the best energy access business models, and counts development institutions, social businesses, NGOs and communities as members. The Partnership has a target to reach 100 million people in the region by 2015, and as of this writing, has projects in place that are set to provide around 68 million people with access to modern energy.

ADB's efforts and those of the Partnership further support the global Sustainable Energy for All Initiative, the global Sustainable Energy for All Initiative, whose lead goal is universal energy access. Since its launch in 2012, the initiative has worked to bring together leading organizations and create the broadest possible partnership towards achievement of its goals that support energy for human development. ADB President Takehiko Nakao sits on the initiative's Advisory Board alongside the Presidents of the World Bank, the African Development Bank and the Inter-American Development Bank among others. ADB, through Energy for All, is also partnered with the Global Alliance for Clean Cookstoves and the Energy+ Partnership among others working in the energy access space.

ADB's support for increased access is guaranteed. In the future, ADB is looking to broaden the support it gives, not only financially, but also by identifying innovative solutions, sharing knowledge with partner development institutions, national governments and with the private sector as well. The next phase of the fight against energy poverty will tap into the power of the private sector, ADB aims to help entrepreneurs craft business models that are affordable and appropriate for a market of billions looking for reliable, affordable energy. In light of the increased global focus on energy poverty, ADB will maintain its leadership role in Asia and the Pacific region, and channel this new support into real gains on the ground.

The International Energy Agency has estimated that it will take an investment of $49 billion per year to achieve universal energy access by 2030, the UN Sustainable Energy for All Initiative's target date. Though this is too much for any one organization to provide, in global terms, not only is this achievable, but it is a smart investment with enormous returns. Universal energy access will improve the lives of billions of people, increase the reach of education, and healthcare and greatly improve the daily lives of women and children, especially, with minimal contribution to greenhouse gas emissions. With Asia being home to the majority of the world's energy poor, our region stands to benefit the most by providing energy for all. ADB looks forward to standing in partnership with those organizations working to make this future possible.

Maximizing Access to Energy for the Poor in Developing Asia

Despite years of sustained economic growth and enormous technological progress, energy poverty in the Asia and Pacific region remains at unacceptably high levels. Addressing energy poverty is an ADB priority. This publication highlights recent and ongoing projects which contribute towards that goal, through focused efforts and innovative solutions aim to bring the benefits of access to modern energy to all.

About the Asian Development Bank

ADB's vision is an Asia and Pacific region free of poverty. Its mission is to help its developing member countries reduce poverty and improve the quality of life of their people. Despite the region's many successes, it remains home to two-thirds of the world's poor: 1.7 billion people who live on less than $2 a day, with 828 million struggling on less than $1.25 a day. ADB is committed to reducing poverty through inclusive economic growth, environmentally sustainable growth, and regional integration.

Based in Manila, ADB is owned by 67 members, including 48 from the region. Its main instruments for helping its developing member countries are policy dialogue, loans, equity investments, guarantees, grants, and technical assistance.

Asian Development Bank
6 ADB Avenue, Mandaluyong City
1550 Metro Manila, Philippines
www.adb.org