



Energy Matters

Achieving Secure and Clean Energy
in Latin America and the Caribbean

IBRD Results

SYNOPSIS

Successful economic and social development in Latin America and the Caribbean, as in other regions, hinges upon the availability of reliable and affordable energy supplies. IBRD is working with governments and the private sector throughout Latin America and the Caribbean to help connect more people and businesses to modern energy supplies that are supplied and consumed efficiently and are increasingly environmentally-friendly.

Challenge

Economic growth requires adequate provision of modern energy for homes, businesses and transport. High and volatile oil prices coupled with increasing demand and a decline in private sector energy investments have led to greater concern over energy security in Latin America and the Caribbean and to new urgency in energy investments in the region by the International Bank for Reconstruction and Development (IBRD). A recent forecast of electricity demand in the region shows a doubling in electricity demand between 2008 and 2030, and a similar doubling in CO₂ emissions. Although the financial crisis has temporarily slowed economic growth and growth in energy demand, it has also increased the challenge of obtaining infrastructure financing. Insufficient investments today can result in insufficient capacity to meet the energy demand of tomorrow for Latin American and Caribbean economies and hamper their recovery from the financial crisis. In addition, growing uncertainty in oil markets has led to deep concerns over energy security.

Critical energy issues in the Latin American and Caribbean region include: development of domestic energy resources in oil importing countries, notably renewable resources, such as hydro, wind and solar power; improved efficiency

of energy supply and use, including reduction of losses in energy supply as well as reducing demand; increased access to modern energy, especially to electricity in countries with low rates of rural access such as Peru, Bolivia, Nicaragua, and Honduras; and mitigation of climate change and establishment of sustainable future energy supply, including reducing carbon emissions by moving toward low carbon growth scenarios, especially in larger countries such as Mexico and Brazil. An additional challenge is to adapt institutional and regulatory frameworks in the energy sector to meet these new challenges.

Results

IBRD projects are contributing to achievement of the following results:

- [1] **Four hundred MegaWatts (MW) of clean energy investments installed and operating by end 2009**, with an additional 200 MW by end 2013 and **introduction of renewable energy promotion policies** in Mexico and Peru;
- [2] **Provision of electricity service to an additional 1.2 million poor rural people** in Latin America and the Caribbean, most by the end of 2011;

- [3] Reduction of electricity losses of public sector distribution companies by more than 15 percent in Brazil and the Dominican Republic; and
- [4] Identification of low carbon pathways for economic development in Mexico and Brazil, to mitigate climate change.

Details are provided on these results below.

Clean Energy Promotion. More than 600 MW of renewable energy capacity (210 MW from wind, 320 MW in small hydropower, and 70 MW through other technologies), are being installed with financing by Global Energy Fund (GEF) grants, Carbon Finance, and IBRD loans (see Annex 1). In addition, IBRD Development Policy Lending in Mexico is supporting a government initiative to install over 3,000 MW of renewable energy. IBRD support in Mexico combines development policy lending, investment lending and in-depth analytic work to help develop the country's substantial renewable energy potential. Results coming from Bank-assisted activities in Mexico include: the 83 MW and 101 MW La Venta 2 and 3 wind farms; the 12–15 MW solar component of the Agua Prieta solar/thermal generation plant; provision of electricity service with solar home systems to 250,000 rural people in the poorest regions of the country; regulations to implement the Renewable Energy Law passed in 2008; and the development of data on small hydropower development sites in two river basins.

New electricity access is being provided to an estimated 1.2 million people in rural and peri-urban areas of Peru, Bolivia, Argentina, Mexico, Nicaragua, and Honduras. In Peru, the Rural Electrification Project had connected more than 100,000 people to electricity service by end 2009 and will provide electricity service to almost 500,000 rural people by end 2011. Subprojects are under construction to serve another 250,000 people and subprojects for 150,000 more are being evaluated. Solar Photo Voltaic (PV) systems will be used to serve approximately 39,000 people through distribution companies to provide sustainable and regulated electricity service under this project. It is also assisting in the introduction of a regulated tariff for PV service together with ensuring access to existing cross-subsidies that will help the Government expand PV service to the estimated

300,000 rural families living in isolated areas that cannot be reached by grid extension.

The Peru Project has also assisted more than 1,400 families in rural areas near Cuzco to improve their incomes by adopting electricity using equipment to process cereals, coffee, cocoa, baked goods, meat products, milk, wood and metal products and handicrafts. It aims to broaden its reach to benefit a total of 10,000 families and further increase the number of beneficiaries with funds from the National Rural Electrification Fund. Similarly, IBRD is financing the expansion of electricity access in Bolivia, Argentina, Mexico, Nicaragua and Honduras, in great part through the use of off-grid renewable technologies, but also through grid extension.

IBRD also helps improve electricity sector performance and efficiency. In Brazil, IBRD is preparing a project to help six distribution companies serving three million people to reduce losses by 15 percent. In the Dominican Republic, a country plagued by serious problems in the electricity sector, IBRD helped reduce electricity losses by 14 percent from 2005–2008, through conditions met as part of a US\$150 million Electricity Sector Reform Loan. A Distribution Rehabilitation Investment Loan of US\$42.5 million in the same country now targets further loss reduction of six percent by 2010 and by four percent more by 2011. The recently-approved Public Finance and Social Sector Development Policy Loan of US\$150 million also supports improved targeting of electricity subsidies to the poor. With the same budget resources, the new subsidy program will reach 829,000 poor families, more than four times the number of poor families covered under the old subsidy scheme, increasing the likelihood of payment and therefore improving sector performance. Additionally, the IBRD team, in coordination with the Inter-American Development Bank (IADB), is helping to improve the governance of the energy sector in the Dominican Republic through regular meetings with Government leaders to support electricity reform including tariffs, subsidies, institutional issues, governance, and transparency.

Two separate studies have strengthened planning for, and awareness of, lower-carbon development in Brazil and Mexico. Both studies raised awareness using highly partici-

pative approaches involving multiple high level consultations with ministries and public agencies. The studies were presented at the 15th Conference of Parties of the United Nation Framework Convention on Climate Change (UNFCCC) in Copenhagen on December 6–19, 2009.

Both studies developed tools to identify and assess high-priority and low-cost interventions to reduce greenhouse gas emissions while continuing to achieve growth objectives. High-priority areas for action found in both countries include energy efficiency, sustainable transport, and low-cost renewable energy technologies (such as hydro, solar hot water, and biomass energy). Both studies also found potential for reducing emissions from land-use change, especially in the case of Brazil where reduction of such emissions could dramatically reduce the overall emissions profile of the country. Under low-carbon scenarios, both countries could keep emissions trajectories flat or declining without affecting economic growth. The methodology, applicable to many other countries, will support the development of the Nationally Appropriate Mitigation Activities (NAMAs) that developing countries have committed to voluntarily implement under the “Copenhagen Accord”.

The Mexican study is being used as the basis for making investments in sustainable transport and energy efficiency. The study provides the key analytical underpinning for the 2008 Climate Change development policy loan of US\$500 million and the 2009 Green Growth DPL of US\$1.5 billion. In Brazil, the study is complemented by a US\$900,000 Japan Policy and Human Resources Development (PHRD)-funded project aimed at identifying hundreds of concrete low-carbon energy projects and at supporting the development of a regulatory framework for the carbon market in Brazil in partnership with the Brazilian Stock Exchange.

Approach

A customized program of investment and technical assistance activities has been developed to meet the energy challenges of each country. IBRD’s strategy in Latin America and the Caribbean has been focused around four major elements:

- [1] Enhancement of energy security through investment in energy efficiency and energy supply as well as consideration of regional energy integration;
- [2] Support for the development of clean energy, especially renewable energy;
- [3] Increased efficiency of energy utilities and support for a sound mix of public and private activities in the energy sector; and,
- [4] Improvement of access to electricity and modern energy services for the poor, especially in rural areas.

In addition to using its own resources to develop these activities, IBRD leverages considerable amounts of financing from other sources including the Global Environmental Facility, Carbon Finance Funds, the Clean Technology Fund and Energy Sector Management Assistance Program (ESMAP) funds for Technical Assistance.

The clean energy promotion program in Mexico highlights IBRD efforts to support renewable energy and energy efficiency through multiple financing instruments. World Bank support began with two GEF-assisted Large Scale Renewable Energy Projects (La Venta 3 wind farm) and the MW Hybrid Solar Thermal Project, as well as carbon finance support to the Wind Umbrella project (La Venta 2 wind farm). ESMAP technical assistance of US\$650,000 was provided to assist Mexico to develop the regulations necessary to implement the Renewable Energy Law passed in 2008 and to develop information on small hydropower resources. The IBRD-financed Mexico Integrated Energy Services Project will provide solar home systems to 50,000 remote households in the poorest regions of the country. Finally, the US\$1.5 billion Green Growth DPL, approved in October 2009, underpins the Government’s ambitious climate change program, which looks to promote the installation of over 3,000 MW of clean renewable energy by 2012.

Sectoral work, carried out with IBRD internal resources and ESMAP, has funded studies on topics of importance to the region. For instance, the Central America Energy Sector Programmatic Study analyzed prospects to develop regional projects in electricity generation, especially in hydropower that could help countries become less dependent on oil imports, to encourage a more integrated Central

American Electricity Market, and to respond more efficiently to electricity demand growth.

GEF, carbon finance projects (which purchase emission reduction certificates), and most recently the Clean Technology Fund provide significant opportunities for synergies with IBRD financing in the energy sector. With 18 projects under implementation for US\$56 million and five projects under preparation for US\$58 million, the Latin America and Caribbean region has developed more carbon finance projects than any other region, mainly for investment in renewable energy. The Mexico Clean Technology Fund Investment Plan was the first to be approved by this facility in December 2009.

For innovative projects such as electricity provision using off-grid renewable energy, energy efficiency and loss reduction in electricity distribution, incorporation of lessons learned in previous IBRD projects has helped design and implementation of later projects. For example, the Argentina renewable-based electrification project, started in 1999, was the Latin America and Caribbean region's pioneer in using distribution companies to provide sustainable off-grid services. It served as a model for key aspects of the Peru project that began in 2006. Similarly, the Nicaragua project employing a model that involves sale of solar PV systems to individual users by private companies with micro-credits from local financing institutions was replicated in

Honduras and is being replicated in projects of other donors in Nicaragua.

IBRD Contribution

Costs of various projects, including analytical and advisory activities (AAA), and size/nature of IBRD contribution are summarized in the table below.

Partners

IBRD works closely with other partners, including the Inter-American Development Bank (IADB), International Energy Agency (IEA), GTZ and KfW of Germany and other bilateral donors, in a number of countries. In the Dominican Republic, Haiti and Honduras, IBRD/IDA is working closely with IADB to assure coordination and synergy of efforts to support the energy sector. In Honduras, support for development of the National Rural Electrification strategy is coordinated with IADB, the European Investment Bank, Japan International Cooperation Agency (JICA) and Norway. Coordination with GTZ in Bolivia, Honduras and Mexico aims at maximizing efforts to encourage development of renewable energy applications such as wind in Mexico, small hydro in Honduras and solar PV systems and more efficient cooking stoves in Bolivia.

IBRD/IDA/GEF financed projects, in implementation and under preparation	Number of Projects and Countries	IBRD, IDA, GEF, CTF Financing Amounts
Projects under implementation	15 projects in 10 countries	US\$ 1.5 billion in DPLs US\$410 million in 14 investment projects
Projects under preparation for FY10	4 projects in 3 countries and one regional	US\$485 million IBRD
Projects under preparation for FY11	6 projects in 5 countries and one thematic study	US\$375 million IBRD US\$20 million IDA US\$50 million CTF US\$7 million GEF
Analytical Work and Technical Assistance (TA) to be delivered in FY10 under IBRD BB financing	17 tasks in 7 countries and 10 regional or thematic pieces 7 AAA and 10 TAs	US\$4.2 million various sources

See attached tables for details on GEF and Carbon Finance Programs.

IBRD regularly participates in workshops and high-level meetings with regional energy sector organizations such as the OLADE Energy Ministers' Inter-ministerial Conference, the Regional Energy Integration Commission (CIER), and Central American Electrification Council (CEAC), to exchange ideas and coordinate agendas. In the last two years, the energy sector has made presentations at three OLADE/CIER conferences (including on the potential for regional energy integration in Latin America), at an energy fair in Guatemala (on the challenges facing the Central American sub-region), at the Wind Energy Conference in Panama (on wind power development), and at the Global Renewable Energy Forum in Mexico (on using renewable energy to provide access to electricity).

The low-carbon studies in Brazil and Mexico are examples of studies undertaken by the Bank that have involved a broad coalition of stakeholders, including domestic and international experts and academics across multiple sectors. Both studies have worked closely with the Governments to achieve buy-in of the process and to provide an objective and technically-sound analysis of low-carbon options available in Mexico and Brazil, complementing domestic actions to formulate climate change mitigation plans.

Good Practices Developed/ Replicated

There is significant replication potential of the IBRD-supported approach to off-grid electrification in Nicaragua through the Off Grid Rural Electrification Project (PERZA) Project. The PERZA models have been adopted by the Government in implementing other donor-supported electrification activities, and will be improved and incorporated into the design of the proposed National Electrification Program, which involves multiple donors and a total cost of US\$290 million. Upon the completion of the National Program, the national electricity coverage is expected to increase to 84 percent in 2014 from 67 percent today. To go beyond 84 percent will likely involve mainly "off-grid" solutions given the prohibitive cost of expanding the traditional electricity grid network to remote and dispersed population areas.

The promotion of income-generating activities based on electrical equipment in Peru is beginning to show successful results based on Government commitment, strong Non-Governmental Organization partners, a good rural credit availability, and the willingness of distribution companies to participate by upgrading electricity connections where necessary and even offering attractive tariffs for off-peak hours. The availability of a small percentage of funds from the Rural Electrification Fund established in the 2006 Rural Electrification Law provides the opportunity for repeating and expanding efforts within Peru. The approach could be replicated in areas of Latin American and the Caribbean with similar conditions. Dissemination of results is planned through publications and workshops.

The low carbon studies in Mexico and Brazil will be useful to other countries by providing concrete examples of alternative low-carbon development pathways, along with methodologies and tools for carrying out subsequent analyses. The studies in Mexico and Brazil are among six studies that are being completed by the Bank with client countries—other country studies are being undertaken in India, South Africa, Indonesia, and China. The results of the Mexico and Brazil studies are being disseminated in the respective countries as well as in regional and international forums where low-carbon development will take on increasing importance as countries seek to establish their own nationally appropriate action plans, or NAMAs, in response to global climate mitigation challenges and commitments. Results have already been used to design energy efficiency and transport projects in Mexico with IBRD and CTF financing. Tools developed in the Mexico and Brazil studies have been provided to governments and shared with Bank staff working on other countries and regions through training sessions. User-friendly software is being developed to also make them available on the web.

A new report—"Greening the Wind: Addressing Environmental and Social Challenges in Wind Power Development"—discusses the main environmental and social aspects involved in wind power development, and will be useful to both public and private wind power plant developers and policy makers. The report draws upon international experiences in both developed and developing countries, with a particular emphasis on Latin America-specific wind

power development examples. The report is divided into two volumes. Volume one is designed to be a stand-alone report that presents a concise overview of the key social and environmental dimensions of wind power, and offers project advice. The second volume is a more comprehensive document that provides the detailed analysis and supporting information, and presents several case studies from World Bank project experience.

Next Steps

The energy sector in Latin America and the Caribbean is expanding investment activities as well as leveraging off analytic work as the Central American Programmatic Energy Study and the low carbon pathway studies for Brazil and Mexico.

Examples of interventions under development include:

- ✦ **The Mexico Efficient Lighting and Appliances Project (US\$350 million, IBRD US\$300 million, CTF US\$50 million)**, under preparation, aims to enhance the country's energy security by increasing efficient use of energy and to support its efforts to mitigate climate change. The project, one of the first to use Clean Technology Fund financing, will finance the acquisition and distribution of Compact Fluorescent Lamps for low-income urban and rural households and the replacement of old refrigerators and air conditioners, building on the government's recently launched pilot appliance replacement program, with the potential to
- expand energy efficiency investments into other areas such as municipal street lighting and water pumping.
- ✦ **The Electrobras Distribution Rehabilitation Project (US\$699 million, IBRD US\$485 million)**, under preparation, aims to improve the financial and operational performance and the commercial management of six Eletrobrás-managed Distribution Companies (DisCos) by reducing electricity losses, increasing bill collection rate, and increasing quality of service. It also aims to: (i) build capacity in Eletrobrás and the DisCos to move towards a common performance-based management approach; (ii) strengthen the DisCos management of environmental and social processes and impacts; and (iii) provide support to community outreach through the implementation of social action programs and communication campaigns.
- ✦ **In Central America, a Programmatic Study on the Central America Energy Sector** presents the main challenges and opportunities faced at the national and regional level. The aim is to provide support based upon five pillars: (i) Energy Security (with emphasis on renewable sources), (ii) Energy Efficiency, (iii) Integration, (iv) Institutional and Regulatory Strengthening, and (v) Access. Based on this approach, IBRD is exploring how to support Central America in tapping its renewable resources, improving energy efficiency and energy savings; the power integration agenda, in particular financing the construction of the first regional power plant, whether a large hydro or liquefied natural gas (LNG) plant; strengthening the power regulation framework, and providing modern electricity services to poor communities.

LEARN MORE

LINKS TO KEY RELATED SITES:

Mexico low carbon study

<http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/LACEXT/0,,contentMDK:22365603~pagePK:146736~piPK:146830~theSitePK:258554,00.html>

Wind Atlas in Peru

<http://dger.minem.gob.pe/atlaseolico/PeruViento.html>