Promoting Clean and Efficient Energy Technologies in Developing Countries FY 2011 Report

Title IX, Section 911 of the Energy Independence and Security Act of 2007 states that the U.S. Agency for International Development (USAID) "shall support policies and programs in developing countries that promote clean and efficient energy technologies." This report, covering USAID clean energy activities in FY 2011, responds to the requirement that USAID submit an annual report on the implementation of this section for each of the fiscal years 2008 through 2012.

USAID currently supports clean and efficient energy technologies, policies, and practices in 38 countries around the world. In FY 2011, the Agency provided $120 million for clean energy activities. Major recipients of assistance included Bangladesh, the Philippines, Kenya and Mexico. USAID also supported large regional and sub-regional programs in Africa, Asia, Europe and Eurasia. The table attached to this report summarizes USAID's FY 2011 clean energy funding by country and region.

The U.S. whole-of -government Enhancing Capacity for Low Emission Development Strategies (EC-LEDS) program, launched in 2010, guides USAID clean energy planning in partner countries. EC-LEDS is working to build partner countries' capacity to pursue long-term, transformative development and accelerate sustainable, climate-resilient economic growth, while slowing the growth of greenhouse gas (GHG) emissions. Indeed, the Agency is working to accelerate countries' transition to low emission development by building capacity to use indigenous or regional clean energy resources and supporting improvements in efficiency of buildings, appliances, and industrial applications, all of which can reduce GHG emissions from the energy sector.

Highlights from FY 2011

Africa: Promoting Private Investment in Clean Energy Supply

Fewer than one in four people have access to reliable and affordable electricity in Sub-Saharan Africa (SSA). Demand far outweighs total public investment in new energy supply, making the need to attract private financing to electricity projects essential. A recent World Bank study indicates that an annual investment of approximately $40 billion in electrical power assets, operations and maintenance costs is required to support current rates of growth in SSA. This figure includes electricity from all technology sources. However, a range of country- specific barriers prevent new private sector investment in clean energy projects. Typical barriers often include the lack of regulations, policies, laws, and cost-recovering tariffs, as well as weak institutional capacity. Government officials in many countries lack skills in due diligence, project structuring, and negotiation of private sector projects and knowledge of how to apply them.

USAID's Africa Infrastructure Program (AIP) was created to provide SSA governments with the necessary skills to attract, develop, evaluate, and support the financial closure of clean and cost-efficient power generation projects to their countries. AIP provides governments with a range of technical and capacity building assistance. Select AIP project accomplishments in FY 2011 include:

- *Kenya*: Through AIP, USAID is facilitating the development and closure of the $870 million, 300MW Lake Turkana Wind Power Project which will meet up to 20 percent of Kenya's electricity needs with renewable energy. USAID is providing critical capacity building assistance to the newly-formed, government-owned Kenya Electricity Transmission Company Limited, strengthening its ability to negotiate commercial arrangements for the new 470 km transmission line needed to bring electricity from the project in northwestern Kenya to the central grid serving its main population centers. Completion of the new transmission line will stimulate additional renewable energy development along the Great Rift Valley, which is also rich in geothermal energy. The project has the potential to displace 650,000 tons of CO2e emissions per year.

- *Rwanda*: Less than 10 percent of the population in Rwanda has access to electricity, one of the lowest electrification rates in Africa. The public utility, Energy, Water and Sanitation Authority (EWSA), owns and operates the country's transmission and distribution networks. To reduce energy poverty, EWSA is encouraging independent power producers to generate renewable power that feeds into the grid. However, Rwanda's current tariff structure is not attractive to private investors. As a result, EWSA asked AIP to help rationalize and develop a Renewable Energy tariff program that would attract private investment. AIP reviewed the major renewable energy resources in Rwanda (solar, hydro, wind, and geothermal) and broke down the current single tariff system into a customized range of tariffs by resource type and plant size. USAID has also helped Rwanda to draft national laws and regulations supporting the new tariff and private investment.
- *Nigeria*: Nigerian offshore platforms emit considerable amounts of associated flared gas which is a byproduct of crude oil extraction. Nigeria is the second largest producer of flared gas in the world, discharging an estimated 45 million tons of carbon dioxide annually. USAID is helping the Nigerian government to reduce gas flaring through the channeling of re-processed gas to domestic power plants. It is providing the Bureau of Public Enterprises, National Bulk Electricity Trading Company, Ministry of Power, and the Ministry of Petroleum Resources with assistance to develop the necessary policy, capacity, and tariffs to attract private investment and encourage oil companies to capture currently flared gas and turn it into a usable, profitable clean source of power.

Mexico: Promoting State and Municipal Clean Energy

Mexico is one of the countries selected for participation in the EC-LEDS program. Work began in 2011 to develop a Mexican LEDS strategy which will include efforts to increase the incorporation of renewable energy into its overall energy supply.

Since 2009, USAID has supported clean energy programs in Mexico under the Mexico Competitiveness Program. Two key components of this program are the promotion of state and municipal clean energy; and the strengthening of clean energy entrepreneurship, innovation and value chains. Specific program activities and accomplishments in FY 2011 included:

- Research and dissemination of best practices and technical assistance for municipal participation in clean energy projects, including the development of a practical manual for municipal leaders on how to implement renewable energy projects through public-private partnerships. The first beneficiary of the Program's technical assistance was Ciudad Juárez, Chihuahua, which is using a public-private partnership for an energy efficient public lighting replacement and operation project. Through dissemination of this model, several states and municipalities are pursuing renewable energy generation projects and Chiapas signed the first public-private partnership for a 30 MW wind energy farm.

- Development of an energy profile and 2010-2020 energy scenarios for Baja California, to help the state government identify policy options and investment opportunities for a cleaner and more reliable energy matrix.

- Support to the CleanTech Challenge Mexico, a competition and open business incubator/accelerator that identifies clean technology and energy projects and firms, provides capacity-building assistance and facilitates the projects' access to financing.

Afghanistan: Clean Energy Fosters Energy Independence and Economic Growth

Years of war destroyed much of Afghanistan's limited energy infrastructure and inhibited needed maintenance. The country's electrical grid still fails to reach many rural areas and some Afghan villages use small diesel-powered generators to meet minimal power needs. However, the cost of diesel fuel is high, supply is unreliable due to security problems, and the burning of diesel fuel produces significant air pollution.

The Afghanistan Clean Energy Program (ACEP) is a USAID-funded, community-driven activity designed to work with communities not served by the nation's grid. The program fosters energy independence and economic development in the communities in the east and south of the country through the use of renewable energy resources and increased energy efficiency. ACEP activities include the construction of small-scale solar, wind, and micro hydro power systems. To ensure sustainability and replicability of projects once donor support has ended, ACEP emphasizes enterprise development services to support new facilities and capacity building and training for Afghan government officials, businesses, community members, and university/technical institute staff.

Project accomplishments in FY 2011 include:

- *The purchase and installation of six 50-meter wind meteorological (MET) towers.* It is estimated that Afghanistan has enough wind potential to meet one-third of the country's energy needs. To begin to plan and design wind farms to meet energy requirements, wind data must be collected and measured. USAID clean energy assistance supported MET towers that are being installed at selected sites in Kabul, Parwan, Herat, and Balkh provinces. USAID trained the Afghan Ministry of Energy and Water to operate the towers and assume data collection and monitoring responsibilities.

- *Provision of solar street lighting***.** The ACEP program supported installation of more than 450 solar streetlights in cities in 12 provinces. Introduction of streetlights has been shown to reduce crime and improve road safety. Streetlights also allow shopkeepers to keep their businesses open after dark.

- *Establishment of the Kabul University Renewable Energy Laboratory***.** The lab serves as a multipurpose

facility for energy efficiency and renewable energy education, research, component testing and evaluation for engineers. The lab was established to ensure long-lasting sustainability of renewable energy projects through hands-on training of cutting edge technologies. As of December 2011, the Faculty of Engineering of Kabul University took over management of the labs.

- *The electrification of health clinics with solar power systems***.** The Ministry of Public Health's comprehensive clinic in Deh Sabz, on the outskirts of Kabul, treats almost 250 patients a day, mostly women and children, from a surrounding population base of 150,000. Until recently, the clinic had no hot water and depended on an unreliable and expensive diesel generator to power lights and essential equipment. Nearly all of its income was spent on dirty fuel to run the generator. With photovoltaic technology funded by USAID, solar power now lights the clinic and powers it computers, microscopes, incubators, autoclave and other equipment. USAID also provided a solar water heater that has improved sanitation and a solar-powered refrigerator that provides safe storage for vaccines. USAID also electrified two comprehensive health clinics with 5 kW solar power systems in Ghazni Province, and provided both solar-powered hot water heaters and refrigerators.

Europe and Eurasia: Increasing Energy Security with Renewable Energy

The Europe and Eurasia region is highly dependent on imported energy, particularly natural gas from Russia and Central Asia. Containing five of the world's twenty most energy-intensive economies, energy use in the region is inefficient, with extensive use of coal and lignite in domestic electricity generation. Aging energy systems suffer from a lack of investment, and regulatory and market barriers continue to limit cross-border energy trade.

USAID's energy programs in the region support regional energy market development to encourage cross border trade of renewable energy; capacity building within government institutions in energy and transmission planning focused on energy supply diversification and increased renewable energy and energy efficiency; and the demonstration and commercialization of clean energy technologies where possible. Successes in FY11 include:

- *Regional Strategic Energy Planning.* Planning teams, in coordination with host governments in Albania, Bosnia and Herzegovina, Georgia, Macedonia, Moldova, Serbia, and Ukraine completed strategic energy planning reports and national policy briefs highlighting the cost and benefits of renewable energy and energy efficiency to provide an analytic basis for countries to prioritize future power sector investments.

- *Regional Energy Market Development.* USAID projects have advanced the cooperation of the Transmission System Operators (TSOs) in Southeast Europe and the Black Sea Region, bringing the TSOs together to determine the transmission constraints and investment requirements to achieve significant renewable energy investment. USAID-supported transmission system planning has led to investment in several new transmission system projects totaling nearly $200 million in FY 2010 and 2011, with more than $2 billion in projects supported since 2000.

- *Municipal Heating Reform in Ukraine.* USAID is assisting the Government of Ukraine and local government entities in creating a financially viable and sustainable municipal heating sector able to deliver quality services to the population, public institutions and local industries. Through this support, an independent regulatory authority has been established for district heating and 25 municipalities have developed municipal energy plans. Since 2009, project efforts have saved 330 million cubic meters of natural gas, leveraged $220 million for energy efficiency projects, and led to 540,000 tons of CO2 emissions reduction.

- *Renewable Energy Competitiveness in Serbia.* USAID support to the renewable energy sector in Serbia increased use of efficient biomass heating systems and led to an improved regulatory environment for wind power development. USAID engaged producers of Serbian boilers, stoves and pellets to promote sales and increase awareness of biomass during Serbian trade fairs. With this support, Serbian companies sold 230 pellet stoves and 346 pellet boilers on the local market. Prior work by USAID to facilitate the establishment of the Serbia Wind Energy Association was leveraged to provide extensive advocacy and technical assistance to work toward an improved regulatory environment for wind. The new Energy Law, adopted in July 2011, was much improved and addressed most of the major obstacles to wind investment.

- *Low Income Residential Energy Efficiency in Macedonia.* A one-year, low-income residential energy efficiency pilot was completed in Macedonia to reduce energy costs and identify the impediments to sustainable investment in low income residential energy efficiency. Three low-income apartment blocks were selected, energy efficiency measures implemented and monitored and detailed household surveys recorded. Energy savings of 30-40 percent eased the payment burden on low-income households. Funding was provided to Habitat for Humanity-Macedonia for an expanded initiative to identify and develop sustainable financing in six municipalities and 28 buildings.

USAID/Washington: Linking Global Clean Energy Projects with Investors

The Climate Technology Initiative's Private Financing Advisory Network (CTI-PFAN) is a multilateral Private Public Partnership that links micro, small and medium sized clean energy project developers with private financiers to achieve economic, social and environmental objectives. In 2008, USAID joined and expanded PFAN from a pilot to a global network. PFAN's recent growth has included the establishment of regional networks of organizations and investors in Asia, Africa, and Latin America and the Caribbean.

CTI-PFAN screens clean energy business plans, selects the most economically viable and environmentally beneficial projects, provides multiple rounds of coaching on the preparation of bankable projects, and connects the projects with investors and financiers from its global and regional investor networks. In 2011, CTI-PFAN raised $55 million for eight clean energy projects. Three of these projects were in Asia, for a combined investment of $42 million, and five were in Africa, for a combined investment of $13.4 million. Examples of projects closed in 2011 include:

- Barefoot Power is a social enterprise that focuses on providing affordable lighting and phone charging products to low income populations that do not have access to electricity. In FY 2011, the company received financing for the commercial distribution of high quality solar powered LED lighting and electrification kits throughout rural off-grid Africa. The company has a robust and comprehensive product offering for sale to the rural poor: basic kits that include a photovoltaic panel, laptop, mobile phone charger, and a LED light.
- SOIL, a joint venture between an Italian biofuels specialty company and a local Ghanaian clean energy development company, obtained financing to produce certified crude jatropha oil and biodiesel for local sale. The principal off-take of the production is guaranteed by local and international mobile phone companies to replace diesel generators that power base stations in off-grid locations in rural Ghana.
- An Indonesian project developer, PT Solo Kencana Energi, secured both debt and equity financing for the total investment cost of the 7.5 MW Lubuk Gadang mini-hydro power project. This project includes a long-term power purchase agreement with the state utility in Indonesia.

As of October 2011, more than 130 clean energy projects were inducted into CTI-PFAN's development pipeline. Twenty-nine projects successfully achieved financial closure with investments of $373 million since program inception in 2008. Combined, these 29 projects mitigate more than 1.7 million tons of CO2 per year and provide more than 300 MW of clean generation capacity.

Going Forward

In FY 2012, USAID will continue efforts to improve the strategic coherence of its clean energy programs, placing a priority on helping countries establish foundations for low carbon energy systems. In particular, the Agency will continue to provide targeted technical assistance for the development and implementation of low emission development strategies to strengthen in-country human and institutional capacity and identify key policies, programs and financing sources. To share knowledge and lessons learned, USAID is building a robust, shared global knowledge base on low emissions development to facilitate the exchange of experience, best practices, data, and results.

In addition, on June 12, 2012, USAID launched the *Powering Agriculture: An Energy Grand Challenge for Development,* a program designed to increase agricultural productivity and value by supporting renewable energy technologies with applications for farmers and agribusinesses in low-income countries. This program will be implemented worldwide, and will provide grant funding to organizations, businesses, financial intermediaries, and academic institutions that propose innovative, viable approaches to boosting agricultural productivity and food security using clean energy. The program will also work closely with local enterprises that design and sell clean energy technologies – to help them reach new markets and grow their businesses.

USAID Obligations for Clean Energy for Fiscal Year 2011

$ in thousands for all items

TOTAL	120,100
Africa	26,000
Kenya	5,000
South Africa	4,000
USAID Africa Regional (AFR)	5,000
USAID East Africa Regional	5,000
USAID Southern Africa Regional	4,000
USAID West Africa Regional	3,000
East Asia and Pacific	20,000
Indonesia	5,000
Philippines	6,000
Vietnam	4,000
USAID Regional Development Mission-Asia (RDM/A)	5,000
Europe and Eurasia	22,000
Armenia	1,500
Georgia	3,500
Ukraine	6,000
Eurasia Regional	10,000
Europe Regional	1,000
South and Central Asia	14,500
Bangladesh	6,000
India	5,000
Central Asia Regional	1,500
USAID South Asia Regional	2,000
Western Hemisphere	11,500
Brazil	2,500
Colombia	4,000
Mexico	5,000
E3 - Economic Growth, Education, and Environment	26,100
USAID Economic Growth, Education and Environment (E3)	26,100