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Clean Energy & Climate Change Opportunities Assessment for USAID/Mexico

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Units of Measurement

CO_2	carbon dioxide
CO_2e	Carbon dioxide equivalent. CO_2e is a quantity that describes, for a given Greenhouse Gas, the amount of CO_2 that would have the same global warming potential, when measured over a specified time scale (generally, 100 years).
K	thousand U.S. dollars
KW	kilowatt (1,000 watts) of power
KWh	kilowatt hour, or kilowatt-hour. A unit of energy measured as 1 kilowatt (1,000 watts) of power expended for 1 hour. One kWh is equivalent to 3,412 British thermal units (Btu). www.eia.doe.gov/glossary/glossary_k.htm
M	million U.S. dollars
Mt	megatonne (10^6 tonne)
MW	mega watts
TWh	terawatt hour
Wh	watt hour (unit of energy equivalent to one watt of power expended for one hour of time)

Abbreviations and Acronyms

AALMAC	Association of Local Authorities of Mexico (*Asociación de Autoridades Locales de México A. C.*)
AECID	Spanish Cooperation Agency
AMMAC	Municipal Association of Mexico (*Asociación de Municipios de México*),
ANEAS	National Association of Water and Sanitation Companies (*Asociación Nacional de Empresas de Agua y Saneamiento*)
ASE	Alliance to Save Energy
BANOBRAS	National Development Bank for Public Works and Services (*Banco Nacional de Obras y Servicios Públicos*)
CAISO	California Independent System Operator
CCE	Mexican Business Coordinating Council (*Consejo Coordinador Empresarial*)
CDI	National Commission for the Development of Indigenous Peoples (*Comisión Nacional para el Desarrollo de los Pueblos Indígenas*)
CDM	Clean Development Mechanism
CESPEDES	The Private Sector Studies Center for Sustainable Development (*Centro de Estudios del Sector Privado para el Desarrollo Sustentable*)
CFE	Federal Electricity Commission (*Comisión Federal de Electricidad*)
CFL	compact fluorescent lamps
CLASP	Collaborative Labeling and Appliance Standards Program
CNA	National Water Commission (*Comisión Nacional del Agua*)

CONAE	National Energy Efficiency Commission (*Comisión Nacional para el Ahorro de Energía*)
CONAGO	National Governors Conference (*Conferencia Nacional de Gobernadores - CONAGO*)
CONAMM	National Conference of Mexican Municipalities (*Conferencia Nacional de Municipios de México*)
CONUEE	National Commission for the Efficient Use of Energy (*Comisión Nacional pare el Uso Eficiente de la Energia*)
COP	Conference of the Parties
CP/RE	USAID/Mexico Clean Production and Renewable Energy Program (2005-2009)
CRE	Energy Regulatory Commission (*Comisión Reguladora de Energía*)
CREZ	competitive renewable energy zones
CTF	Clean Technology Fund
DBJ	Japanese Development Bank
DOE	U.S. Department of Energy
DOF	Diario Oficial de la Federación, Mexico's Federal Register
DUIS	Integrated Sustainable Urban Developments (*Desarrollos Urbanos Integrales Sustentables*)
ECPA	Energy and Climate Partnership of the Americas
EE	energy efficiency
EECI	Energy Efficient Cities Initiative
EECI	World Bank's ESMAP global Energy Efficient Cities Initiative
EMA	Mexico's Accreditation entity (*Entidad Mexicana de Acreditación*)
EMS	environmental management systems
ESCO	energy services company
EU	European Union
FIDE	Trust for Electrical Energy Efficiency (*Fideicomiso para el Ahorro de Energía Eléctrica*)
FIRA	The Trust Funds for Rural Development
FIRCO	Shared-Risk Trust-Fund (*Fideicomiso de Riesgo Compartido*)
FY	fiscal year
GCC	global climate change
GDF	Government of Mexico City
GEF	Global Environment Facility
GEI	Spanish abbreviation for GHG inventory
GEI-México	Mexico's voluntary Greenhouse Gas Inventory Program (*Programa Gases de Efecto Invernadero*) www.geimexico.org
GHG	greenhouse gas
GoM	Government of Mexico
GTZ	German Cooperation Agency
HEM	high efficiency electric motors
IADB	Inter-American Development Bank

ICLEI	International Council for Local Environmental Initiatives
IEE	Institute of Electrical Investigation (*Instituto de Investigaciones Eléctricas*)
IID	Imperial Irrigation District
IIEC	International Institute for Energy Conservation
INAFED	National Institute for Federalism and Municipal Development (*Instituto Nacional para el Federalismo y el Desarrollo Municipal*)
INE	National Institute of Ecology
INFONAVIT	The National Workers Housing Fund Institute (*Instituto del Fondo Nacional de la Vivienda para los Trabajadores*), the housing credit agency of the GoM
IPCC	Intergovernmental Panel on Climate Change
IPN	National Polytechnic Institute (*Instituto Politécnico Nacional*)
IPP	Independent Power Production
ITAM	National Autonomous Technological Institute of Mexico (*Instituto Tecnológico Autónomo de México*)
ITESM	Monterrey Institute of Technology and Higher Education (*Instituto Tecnológico y de Estudios Superiores de Monterrey*)
JBIC	Japan Bank for International Cooperation
JICA	Japanese Cooperation Agency
KfW	Kreditanstalt für Wiederaufbau
LAERFTE	The Law for the Use of Renewable Energy and Financing the Energy Transition (*Ley para el Aprovechamiento de Energías Renovables y el Financiamiento de la Transición Energética*),
LCDS	Low-Carbon Development Strategies
LEDS	Low Emission Development Strategies
LEED	Leadership in Energy and Environmental Design
LFG	Landfill Gas
M	Million US dollars
MCP	USAID/Mexico Competitiveness Program
MEDEC	México: Estudio sobre la Disminución de Emisiones de Carbono
Mexico GBC	Mexico Green Building Council (*El Consejo Mexicano de Edificación Sustentable*)
MREP	USAID Mexico Renewable Energy Program (1992-2004)
MRV	emissions monitoring, reporting and verification
MUNEE	Alliance to Save Energy's Municipal Network for Energy Efficiency
MuniAPP	IADB Public-Private Partnership Development program
NAFIN	National Development Bank (*Nacional Financiera*)
NGO	nongovernmental organization
NREL	DOE's National Renewable Energy Laboratory
PAC	National Network of Ports of Attention (*Red Nacional de Puertos de Atención*) established by CONAE

PEACC	Mexican state climate change action plans and strategies (*Programa Estatal de Acción ante el Cambio Climático*)
PECC	Special Program for Climate Change (2009-2012) (*Programa Especial de Cambio Climático*)
PEMEX	Mexican National Oil Company (*Petróleos Mexicanos*)
PEPs	Energy Efficient Management in the Public Sector program (funded by USAID/EGAT)
RE	renewable energy
RETC	Mexico's pollutant release and transfer registry (PRTR), known as the *Registro de Emisiones y Transferencia de Contaminantes* in Spanish
RETI	California Renewable Energy Transmission Initiative (RETI)
RPS	Renewable Portfolio Standard
SAGARPA	Mexican Secretariat of Agriculture (*Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación*).
SECTUR	Mexican Secretariat of Tourism (*Secretaría de Turismo*)
SEDESOL	Mexican Secretariat for Social Development (*Secretaría de Desarrollo Social*)
SEMARNAT	Mexican Secretariat of Environment and Natural Resources (*Secretaría de Medio Ambiente y Recursos Naturales*)
SENER	Mexican Secretariat of Energy (*Secretaría de Energía*)
SHCP	Mexican Secretariat of Treasury and Public Credit (*Secretaría de Hacienda y Crédito Público*)
SICES	National Green Building Rating Tool being developed by The Mexican Green Building Council
SIEPAC	Central American Electrical Interconnection System (*Sistema de Interconexión Eléctrica para América Central*)
SRE	Mexican Secretariat of Foreign Relations (*Secretaría de Relaciones Exteriores*)
TIES	USAID/Mexico's Training, Internships, Exchanges, and Scholarships program
U3Es	CONAE's 14 liaison offices for energy efficiency (*Unidades Regionales de Eficiencia Energética*)
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UPAEP	Universidad Popular Autónoma del Estado de Puebla
USAID	United States Agency for International Development
USG	U.S. Government
WB	World Bank
WBCSD	World Business Council for Sustainable Development
WECC	Western Electricity Coordinating Council
WREZ	Western Renewable Energy Zones
WRI	World Resources Institute

Executive Summary

In Fiscal Year 2010, the U.S. Congress responded to the President's request for additional climate change funding by appropriating $305 million for USAID climate change programs in three pillar areas: Adaptation, Clean Energy and Sustainable Landscapes. This assessment seeks to identify opportunities for the USAID/Mexico Mission to address high-priority clean energy and climate change challenges in Mexico and provide the Mission with recommendations for the design of a new Mission clean energy and climate change program.

Mexico is the second largest economy in Latin America, behind Brazil, with some 107.6 million inhabitants. It contributes about 1.6% of the global emissions of the greenhouse gases (GHG) that are responsible for global climate change, and ranks 13th among the largest emitting countries of the world.[1] Between 1990 and 2006, Mexico's GHG emissions grew by 40%, amounting to an annual increase of 2.4%.[2] Under President Calderon, Mexico has made climate change a top national priority and has integrated climate change into the country's development strategy. In addition to having signed the United Nations Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol, Mexico is the only developing country to submit a Third and Fourth National Communication to the UNFCCC with a detailed updated inventory of its GHG emissions and long term emissions trajectories.

Substantial efforts are being made by the GoM to increase the generation and use of renewable energy, improve energy efficiency and reduce GHG emissions. In 2007 the GoM published its National Climate Change Strategy and in 2008, Mexico made important advancements towards removing long standing barriers to renewable energy and energy efficiency when it passed new legislation on renewable energy, and on sustainable energy use and efficiency. In response to the two laws, the GoM developed a Special Program for the Use of Renewable Energy and a National Program for the Sustainable Use of Energy. In 2009 it also adopted a Special Program for Climate Change (2009-2012) in which the GoM pledged to reduce the country's yearly greenhouse gas emissions by 50 million tons of CO_2 equivalent by 2012+ and reduce its GHG emissions by 50 percent in relation to 2000 levels by 2050.[3]

[1] Johnson, Todd, et. al., *Low-Carbon Development for Mexico, Conference Edition*, 2009, p. 15. World Bank.
[2] Mexico's Fourth Communication to the UNFCCC, p. 21.
[3] *Ibid*, at p. 23.

1. Introduction

This assessment builds on an initial opportunities assessment prepared by Luis Velazquez and this author, John Garrison, in January, 2010 to help guide USAID/Mexico in the design of a new Clean Energy and Climate Change program in response to Congressionally earmarked funds. This follow-on assessment, conducted from March 3 to April 30, seeks to provide USAID/Mexico with a more detailed set of opportunities and specific actions that the mission might include in the design, funding, and implementation of a new Clean Energy and Climate Change program that (1) supports the Government of Mexico's (GoM) efforts to reduce and mitigate net greenhouse gas emissions (GHG) from the energy sector, industry, and urban areas through "the sustainable use of renewable energy technologies, energy efficient end-use technologies, carbon sequestration and carbon accounting," [4] and (2) addresses the Administration's priorities under its global climate change (GCC) initiative to help developing countries achieve climate resilient and low emissions development.[5] Specifically, this assessment seeks to answer the following three questions:

What specific actions can USAID/Mexico take to support the GoM's efforts in clean energy and climate change, making the best use of available resources and without duplicating the efforts of other donors?

How can existing USAID/Mexico activities be adjusted to better address priorities in clean energy and climate change?

What additional approaches or activities are recommended for future USAID programs to address the major issues identified?

The assessment is based on the review of energy and climate change policy documents and source materials for Mexico, documentation on former and existing U.S.-Mexico energy cooperation programs, funding and policy guidance from USAID Washington and the U.S. Department of State, and interviews and meetings with key government, NGO, and private sector representatives held in Mexico City from November 30 to December 18, 2009 during the initial assessment, and from March 15-19, 2010 during the second phase. Meetings and phone interviews were also conducted from Washington, D.C. with U.S. Government (USG) agencies and multilateral development agencies. See Appendix 2 for a list of people interviewed and consulted.

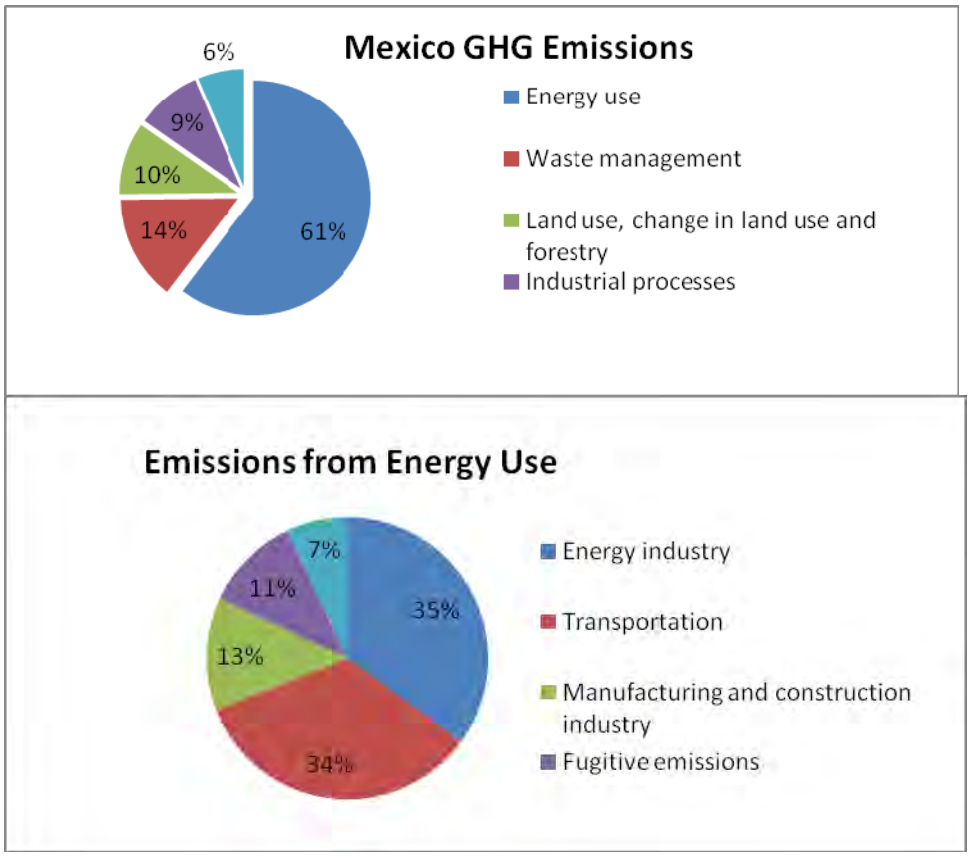
[4] The Conference Committee report for the FY2010 Foreign Appropriations.

[5] USAID 2010 Operational Plan Guidance for global climate change programs or activities.

2. Overview of Mexico's Greenhouse Gas Profile and Power Sector

2.1 GHG Emissions

Mexico is the second largest economy in Latin America, behind Brazil, with some 107.6 million inhabitants; it contributes about 1.6% of the global emissions of the greenhouse gases (GHG) responsible for global climate change, and ranks 13th among the largest emitting countries of the world.[6] On the basis of emissions per capita, however, Mexico ranks (with 6.44 tons of CO_2e per person) 93th in the world, below the global average (6.55 tons of CO_2e per person) and well below the levels in highly developed countries such as the European Union (10.4 tons of CO_2e per person) and the United States (22.9 tons of CO_2e per person). Nevertheless, according to Mexico's Fourth National Communication to the United Nations Framework Convention on Climate Change (UNFCCC), greenhouse gas emissions grew by 40% from 1990 to 2006, amounting to an annual increase of 2.4% and from 1990 to 2009, emissions from the generation of electricity grew by 68%.[7] The primary sources of Mexico's greenhouse gas emissions in CO_2 equivalent, based on 2006 data,[8] are:



[6] *Low-Carbon Development for Mexico*, p. 15.
[7] Mexico's Fourth Communication to the UNFCCC, p. 21.
[8] *Ibid,* p. 21. PEMEX alone accounts for nearly 8.2% of the country's total GHG emissions.

2.2 Mexico Energy Supply and Demand

In 2007, approximately 58.8% of Mexico's installed electric generation capacity came from thermal power plants; 19.2 % from hydro, 13.5% from natural gas, 4.4% from coal, 2.3 % from nuclear, 1.6% from geothermal, and 0.1% from wind.[9] In 2009, 20.4% of the installed capacity of the National Electrical System came from renewable energy, the majority of which comes from large hydro. Mexico's Special Program for Climate Change 2009-2012 (commonly referred to as the *PECC* – *Programa Especial de Cambio Climático*) seeks to increase the electricity generation from renewable energy to between 4.5 and 6.6% (excluding large hydro) with wind power accounting for 1.74-2.91%, mini hydro 0.36-0.61%, geothermal 2.19-2.74% and biomass and biogas 0.19-0.32%.[10]

At the end of 2009, however, Mexico had a gross reserve margin of approximately 26 GW, almost half the total installed capacity, and a net operating reserve margin of approximately 12 GW, or approximately 20% of the total installed capacity. These reserves are significantly high for industry standards. Nevertheless, current per capita electricity consumption in Mexico is one-tenth of what it is in the United Sates.[11] As Mexican incomes increase so will its level of electricity consumption. With a population of 107.6 million people (in 2009) growing at a rate of 0.80% per year (the fastest growing population among OECD countries) and approximately 47.2 million people (44.2% of the total population) living in poverty, national electricity consumption in Mexico is expected to grow 3.8% annually from 2008-2017.[12] By 2030, electricity demand in Mexico is projected to more than double.[13] In order to achieve its development goals, Mexico will need to diversify its energy sources, increase access to energy and per capita energy use, while improving energy efficiency.

2.3 Mexican Electricity Market Structure

The GoM owned and vertically integrated electric utility monopoly, the Federal Electricity Commission (*Comisión Federal de Electricidad or CFE*), is the predominant electricity service provider, responsible for the generation, transmission, and distribution of electricity in Mexico for "public good." The Mexican Constitution states that the government is responsible for the control and development of the national electric industry and CFE carries out this task, with an installed power generating capacity of approximately 58 GW (roughly 70 percent of the installed generation capacity), and an extensive electricity transmission and distribution infrastructure that serves approximately 27 million customers throughout the country. The private sector does not participate in transmission or distribution operations.

[9] Mexico's Fourth Communication to the UNFCCC, p. 52.
[10] *Ibid,* p. 182, SENER, *Programa Especial para el Aprovechamiento de Energías Renovables*, p. 94.
[11] *Low-Carbon Development for Mexico*, p. 49.
[12] Mexico's Fourth Communication to the UNFCCC, p. 53.
[13] *Low-Carbon Development for Mexico*, p. 59.

In 1992, amendments to the Public Service Electricity Law (*Ley de Servicio Público de la Energía Eléctrica*) established five activities that were excluded from the definition of "public service" that allowed the private sector to participate in electricity generation:

1. Self-supply (*Autoabastecimiento*)
2. Cogeneration
3. Independent Power Production
4. Small Energy Producers and
5. Import and Export

Most private generation is done under Mexico's self-supply rule which allows a producer to generate power for its own consumption. This is true for most renewable energy projects. Normally, a production company is established made up by partners that will use the electricity generated. Under a self-supply agreement, generators are prohibited from selling excess power to third parties although they are allowed to sell their power to CFE. The electricity rate they receive, however, is low. CFE is also free to charge a network fee.[14] Cogeneration is allowed under the same conditions as self-supply projects. The requirement that self-supply producers must identify users for all of their power output and the absence of a competitive wholesale market in which to sell excess power limits the number of projects developed.[15]

Independent Power Production (IPPs) is contracted by CFE for a fixed price under long-term (normally 20-25 years) power purchase agreements. While this has been successful for natural gas-fired power plants, it has proven more difficult for renewable projects (mainly wind energy) due to CFE's mandate to provide electricity at the lowest cost. IPPs account for approximately 23 percent of Mexico's total installed capacity and 31 percent of total electricity generated.[16]

Private power plants that are smaller than 30 Mega Watts (MW) located in certain areas of the country determined by the Secretariat of Energy (*Secretaría de Energia – SENER*) may also sell power to CFE but at prices based on the short-term marginal cost of generation for the entire grid (normally based on natural gas-fired plants) which is usually not competitive for renewables. The 30 MW limit for commercial energy applications reduces the potential for large-scale renewable energy projects. The law also allows for the sale of up to 1 MW of electricity for self use by rural communities.

Finally, private power producers can sell their electricity to other countries, mainly the United States, Belize and Guatemala. Mexico is a member of the Central American Electrical Interconnection System (*Sistema de Interconexión Eléctrica para América Central - SIEPAC*) which began operations in

[14] Rothkopf, Garten, *A Blueprint for Green Energy in the Americas, Volume II*, Strategic Analysis of Opportunities prepared for the Inter-American Development Bank, 2009, Chapter 5.4.2, p. 338.
[15] *Ibid*, at p. 350.
[16] *Low-Carbon Development for Mexico*, p. 23.

June 2009. Mexico has the potential to export up to 200 MW to Guatemala. The transmission system in northern Baja California forms part of the Western Electricity Coordinating Council (WECC).[17]

As of the end of 2009, private generators held about 23 GW of generation capacity, mostly consisting of combined-cycle, gas-fired turbines, but a number of private, wind energy projects in the State of Oaxaca are currently under construction. Other private sector, wind energy projects are concentrated in the State of Baja California, mostly for interconnection with the US market, and electricity exports.

2.4 Climate Change Policies and Cooperation

2.4.1 Mexico's Climate Change Commitment

Mexico's has made climate change a top national priority and has integrated climate change into the country's development strategy. Mexico is signatory to the United Nations Framework Convention on Climate Change (UNFCCC) and in 2000 became the 28th country to sign the Kyoto Protocol. Mexico is the only developing country to submit a Third and Fourth National Communication to the UNFCCC with a detailed, updated inventory of its greenhouse gas emissions and long term emissions trajectories.

In 2005 Mexico established the Inter-Secretarial Commission on Climate Change (*Comisión Intersecretarial de Cambio Climático*) to formulate and coordinate national climate change strategies and incorporate them into sectoral programs developed by each of the ministries. Two years later, in 2007, the GoM published a National Climate Change Strategy (*Estrategia Nacional de Cambio Climático*) aimed at identifying opportunities to mitigate GHG emissions from the generation and use of energy and vegetation and soil use, and assess the country's vulnerabilities and options for responding and adapting to the impacts of climate change.

For the first time Mexico's National Development Plan (*Plan Nacional de Desarrollo*) (2007-2012) included actions to mitigate and adapt to climate change as did the sectoral programs for the Ministries of Energy, Communications and Transport, Agriculture, and Social Development. In November of 2008 the Mexican Congress also adopted two new laws directed at promoting renewable energy and energy efficiency:

1. The Law for the Use of Renewable Energy and Financing the Energy Transition (*Ley para el Aprovechamiento de Energías Renovables y el Financiamiento de la Transición Energética* – hereafter LAERFTE or the "Renewable Energy Law"), and
2. The Law on the Sustainable Use of Energy (*Ley para el Aprovechamiento Sustentable de la Energía*).

[17] The WECC region comprises the states of Washington, Oregon, California, Idaho, Nevada, Utah, Arizona, Colorado, Wyoming, portions of Montana, South Dakota, New Mexico and Texas in the United States, the Provinces of British Columbia and Alberta in Canada, and a portion of CFE's system in Baja California in Mexico.

These new regulatory reforms are discussed in greater detail in Section 3 below.

Mexico's National Climate Change Strategy served as the basis for the development of a Special Program for Climate Change 2009-2012 (the PECC) which was published in final form in August of 2009. The PECC is a first step towards the formulation of a low carbon development strategy. The PECC sets out a series of broad GHG mitigation actions by the federal government and emission reduction targets through 2012 in electricity generation, agriculture, deforestation and land-use change, and waste management. In the PECC, the GoM pledges to reduce the country's yearly greenhouse gas emissions by 50 million tons of CO_2 equivalent by 2012 and reduce its GHG emissions by 50 percent in relation to 2000 levels by 2050.[18] Under its Special Program for the Use of Renewable Energy (*Programa Especial para el Aprovechamiento de Energías Renovables*), SENER proposes to increase the percentage of electricity generation from renewable sources from 3.9% in 2008 to 4.5-6.6% by 2012 (not including hydroelectric projects over 30 MW) and provide electricity to 2,500 communities through its Integrated Energy Service Projects (*Proyectos de Servicios Integrales de Energía*) that use renewable energy. In December 2010, Mexico will host the 16th UNFCCC Conference of the Parties.

2.4.2 U.S.-Mexico Bilateral Framework on Clean Energy and Climate Change

In early 2009, Mexican President Calderón and President Obama announced plans to strengthen and deepen bilateral cooperation by establishing the US-Mexico Bilateral Framework on Clean Energy and Climate Change. The Bilateral Framework will focus on renewable energy, energy efficiency, adaptation, market mechanisms, forestry and land use, green jobs, low carbon energy technology development and capacity building. The framework seeks to build upon cooperation in the border region promoting efforts to reduce greenhouse gas emissions, to adapt to the local impacts of climate change in the region, as well as to strengthen the reliability and flow of cross border electricity grids and by facilitating the ability of neighboring border states to work together to strengthen energy trade.

Initial discussions between the Department of State, the U.S. Department of Energy, the U.S. Environmental Protection Agency, SENER, Institute of Electrical Investigation (*Instituto de Investigaciones Eléctricas - IEE*) and the Ministry of Foreign Affairs have identified the following cooperation priorities under the US-Mexico Bilateral Framework:

a. Renewable Energy

- Promoting the development of a regional renewable energy market between California and Baja California.
- Establishing a special joint U.S.-Mexico commission to address transmission issues between the two countries.
- Increasing public support for renewable energy.
- Promoting the adoption of clean energy technologies at scale.

[18] Fourth Communication to the UNFCCC, at p. 23.

b. Energy Efficiency

- Sharing experiences on EPA's Energy Star Program.
- Developing a joint lighting standard.
- Harmonizing North American energy performance standards (freezers and refrigerators, three-phase motors, and room air conditioners).
- Exchanging information on smart grid technologies and undertake the Smart Grid Maturity Model exercise to determine where opportunities for smart grid applications lie.
- Helping Mexico implement its first smart grid pilot project.

c. Climate Change & GHG Monitoring

- Technological support and capacity building to implement mandatory GHG emissions reporting under Mexico's emissions registry program, RETC (*Registro de Emisiones y Transferencia de Contaminantes*), the equivalent to the USG's pollutant release and transfer registry (commonly known as PRTR).
- Continuing to work with the U.S. and Mexican Border states to develop GHG emissions inventories that meet international and U.S. standards.
- Assisting INE in supporting the development of state climate change action plans and strategies to reduce GHG emissions.
- Collaborating to strengthen GoM monitoring, reporting, and verification (MRV) capacity.

2.4.3 North American Leaders Summit Declaration

At the 2009 North American Leaders Summit, the U.S., Canada and Mexico issued the *North American Leaders' Declaration on Climate Change and Clean Energy* pledging to take aggressive action to achieve a low-carbon development path in North America. The following are the actions agreed to by the three governments related to greenhouse gas emissions and clean energy:

- Set and implement ambitious mid-term and long-term goals to reduce national and North American emissions;
- Develop low-carbon growth plans;
- Develop comparable approaches to measuring, reporting, and verifying emissions reductions, including cooperating in implementing facility-level greenhouse gas reporting throughout the region;
- Build capacity and infrastructure with a view to facilitate future cooperation in emissions trading systems, building on our current respective work in this area;
    a. Collaborate on climate friendly and low-carbon technologies, including building a smart grid in North America for more efficient and reliable electricity inter-connections, as well as regional cooperation on carbon capture and storage; and
    b. Pursue a framework to align energy efficiency standards in the three countries in support of improved national energy efficiency and environmental objectives.

2.4.4 Energy and Climate Partnership of the Americas (ECPA)

Mexico is an important partner and contributor to the Energy and Climate Partnership of the Americas (ECPA) that President Obama helped launch at the Fifth Summit of the Americas in Port of Spain, in Trinidad and Tobago, in June 2009 to forge progress to a more secure and sustainable future. The partnership serves to coordinate and strengthen existing efforts on clean energy cooperation and initiate new work to engage additional countries to transition to a clean energy economy. The United States has identified energy efficiency, renewable energy and energy poverty as areas where the partnership might focus with the following being of strategic interest to the U.S.:

- Public Policy: Work with country partners to develop energy policies that will promote energy security, reduce energy demand, and promote the deployment of renewable energy.
- Capacity Building: Enable developing countries in the region to become self-sufficient over time in the design, evaluation, and implementation of clean energy policies.
- Clean Energy Private Sector: Promote job creation in clean energy sectors through training programs that focus on developing regional technology expertise.

3. Clean Energy and Climate Change in Mexico

This section provides a detailed overview of clean energy and climate change in Mexico and is divided into four sections. The first section looks at Mexico's clean energy potential, barriers to its development, and the new renewable energy and energy efficiency laws. Section two summarizes the current policies and programs that the GoM has designed to promote clean energy and climate change. Section three summarizes the work of international organizations, donors and multilateral funding agencies on the subject; first starting with USAID's past and current work on clean energy and climate change to date, followed by that of the World Bank (WB), the Inter-American Development Bank (IADB), the Global Environment Facility (GEF), the German Cooperation Agency (GTZ) and its financial arm the Kreditanstalt für Wiederaufbau (KfW), the British Embassy, the Spanish Cooperation Agency (AECID), the Japanese Cooperation Agency (JICA) and Development Bank (DBJ), as well as the United Nations Environment (UNEP) and Development (UNDP) Programmes. Finally, the fourth section looks at clean energy and climate change financing mechanisms in Mexico.

3.1 Potential for and Barriers to Clean Energy in Mexico

3.1.1 Renewable Energy and Energy Efficiency Potential in Mexico

Mexico is blessed with tremendous renewable energy resources which include geothermal energy, wind energy, hydroelectric (large and small), solar power and biogas. In the following paragraphs an account is made of the country´s renewable energy potential as estimated by SENER in its Special Program for the Use of Renewable Energy.

a. Wind Energy

Mexican wind power potential is estimated at 40 GW, mostly located in the Tehuantepec Isthmus in the State of Oaxaca and in the peninsulas of Yucatan and Baja California (in the Rumorosa and San Pedro Martir mountain ranges) which have Class 6 and 7 winds. According to SENER, total wind generation capacity in the state of Oaxaca is expected to reach 2,564 MW by 2012 as shown in Table 1 below. In Baja California, U.S. based Sempra Energy and San Diego's Cannon Power are teaming up to develop a 400 MW wind farm to sell power to Southern California Edison. The Spanish company Unión Fenosa is also exploring the development of a 400 MW wind farm in Baja California.[19]

Table 1. Mexico Wind Energy Projects 2007-2012

Project	Developer	Location	Modality	Capacity (MW)
La Venta	CFE	Oaxaca	Public Service	1.35
Guerrero Negro	CFE	Baja California Sur	Public Service	0.6
La Venta II	CFE	Oaxaca	Public Service	83.3
La Venta III	CFE	Oaxaca	PIE	101.4
Oaxaca I	CFE	Oaxaca	PIE	101.4
Oaxaca II-IV	CFE	Oaxaca	PIE	304.2
			Subtotal:	**592.5**
Eurus	Acciona	Oaxaca	Self-use	250.0
Parques Ecológicos de México	Iberdrola	Oaxaca	Self-use	79.9
Fuerza Eólica del Istmo	Fuerza Eólica-Peñoles	Oaxaca	Self-use	30.0
Eléctrica del Valle de México	Edf Energias Nouvelles-Mitsui	Oaxaca	Self-use	67.5
Eoliatec del Istmo	Eoliatec	Oaxaca	Self-use	21.2
Bii Nee Stipa Energía Eólica	CISA-Gamesa	Oaxaca	Self-use	26.3
Desarollos Eólicos Mexicanos	Demex	Oaxaca	Self-use	227.5
Eoliatec del Pacifico	Eoliatec	Oaxaca	Self-use	160.5
Eoliatec del Istmo (2nd Phase)	Eoliatec	Oaxaca	Self-use	142.2
Gamesa Energia	Gamesa	Oaxaca	Self-use	288.0
Vientos del Istmo	Preneal	Oaxaca	Self-use	180.0
Energía Alterna Istmeña	Preneal	Oaxaca	Self-use	215.9
Unión Fenosa Generación Mexico	Unión Fenosa	Oaxaca	Self-use	227.5
Fuerza Eólica del Istmo (2nd Phase)	Fuerza Eólica	Oaxaca	Self-use	50.0
Centro Regional de Technología Eólica	IIE	Oaxaca	Small Production	5.0
			Sub-Total:	**1,971.5**
			*** TOTAL:**	**2,564.0**

Source: SENER, *Programa Especial para el Aprovechamiento de Energías Renovables*, p. 51.

* Rounded.

[19] *A Blueprint for Green Energy in the Americas*, p. 354.

b. Small Hydro

To date, only 52 MW of small hydropower have been developed by the Mexican firm Comexhidro using existing irrigation channels. CONUEE estimates the small hydropower potential in Mexico to be as high as 3,250 MW.[20] Nevertheless, the Fundación Para El Desarrollo del Corredor Eólico del Istmo y Las Energías Renovables deems the potential to be even greater and is seeking to promote the development of 4.88 GW of small hydro generation capacity in the State of Oaxaca by 2020.

c. Geothermal Energy

Apart from large hydro, the renewable energy with the second greatest installed capacity is geothermal with 960 MW (see Table 2) and the potential for an additional 2.4 GW. CFE, which has the exclusive right to develop hot water and steam resources under the ground, plans to develop additional 388 MW of capacity by 2010 by expanding the existing facilities at Cerro Prieto (107 MW) in Baja California, Los Humeros (81 MW) in Puebla, Los Azufres (150 MW) in Michoacán and building a new geothermal facility at the Cerritos Colorados site (80 MW) in the state of Jalisco.[21]

Table 2. Geothermal Installed Capacity in Mexico

Plant Name	Municipality	Sate	Number of Units	Effective Capacity(MW)
Cerro Prieto	Mexicali	Baja California	12	720.0
Tres Vírgenes	Mulegé	Baja California Sur	2	10.0
Los Azufres	Cd. Hidalgo	Michoacán	15	194.5
Humeros	Chignautla	Puebla	8	40.0
		Total:	**38**	**964.5**

Source: SENER, *Programa Especial para el Aprovechamiento de Energías Renovables*, p. 79.

d. Solar Energy

Mexico has excellent solar resources particularly in the northern and western areas of the country in the states of Baja California, Sonora and Chihuahua that have insolation values of 7 kWh per square meter. Solar is not included among the World Bank's low-carbon interventions due to the current pay-back period which, for a 10 kW solar system, is estimated at approximately 67 years for residential users and 42 years for commercial users.[22] Mexico currently has 840,000 m^2 of solar water heaters and 19.4 MW of photovoltaic capacity comprised primarily of off-grid uses in rural areas (lighting, refrigeration, water pumping and communications).[23] While Mexico has the highest penetration of solar water heaters in the Americas, its potential development remains high with an

[20] SENER, *Programa Especial para el Aprovechamiento de Energías Renovables*, p. 70.
[21] *Ibid*, p. 79.
[22] *A Blueprint for Green Energy in the Americas*, p. 355.
[23] *Ibid*, p. 355-7.

estimated total demand of 70 million square meters, more than 70 times the current installed capacity.[24]

e. Biomass and Biogas

Mexico currently has 49 bagasse generation facilities that produce approximately 473.7 MW of electricity.[25] The GoM estimates the potential for electricity generation from bagasse is 3,000 MW. In 2009, Mexico's second landfill biogas electric generation facility came on line in the state of Aguascalientes. The first plant was built in Monterrey, Nuevo León with a generation capacity of 12.7 MW. Additional landfill biogas electric generation facilities are being explored in Zapopan in the state of Jalisco, Naucalpan in the State of Mexico and in the city of Mérida, in the State of Yucatán. There are 20 to 30 cities in Mexico that have the potential to generate electricity from landfill gas.

f. Energy Efficiency

The potential for energy savings in Mexico is great in the industrial, residential and commercial and public service sectors. As Table 3 indicates, over half the electricity in Mexico is consumed by the industrial sector, followed by residential and commercial/public services sectors which account for roughly 20% of the nation's electricity consumption. Of that, lighting accounts for over 50% with air conditioning and refrigeration each amounting to 18%.

Table 3. Mexico Electricity Consumption

Sector	%
Industrial Sector	58%
Residential Sector	22%
Commercial and Public Services Sector	21%
Lighting	55%
Air Conditioning	18%
Refrigeration	18%
Water supply and Sanitation	9%

Source: Low-Carbon Development for Mexico, 2009.

Industrial Sector. According to the World Bank, one of the primary opportunities for energy savings in the industrial sector in Mexico is through improvements in motor systems which account for 70 percent of the total industrial electricity consumption. The adoption of more efficient motors could lead to 20 percent in energy savings. More efficient steam systems and kilns and furnaces would also reap energy savings.[26] It is estimated that 80 percent of Mexico's industrial cogeneration potential remains untapped.

[24] *A Blueprint for Green Energy in the Americas*, at p. 357.
[25] SENER, *Programa Especial para el Aprovechamiento de Energías Renovables*, 87-88.
[26] *Low-Carbon Development for Mexico*, p. 48.

Residential Sector. In the residential sector, demand for electricity is expected to increase substantially, with a potential 10-fold increase in air conditioner electricity use by 2030. Opportunities for residential energy savings lie in the use of more efficient air conditioning, refrigeration, home appliances and electronics. Eighty-five percent of residences in Mexico to date still use incandescent light bulbs. The World Bank recommends further expansion of existing GoM and the Trust for Electrical Energy Efficiency (*Fideicomiso para el Ahorro de Energía Eléctrica - FIDE*) programs to increase the use of compact fluorescent lamps and solar water heaters and retire old and inefficient air conditioners and refrigerators (see Section 3.3.4, below). A big concern for the GoM is preventing the purchase of less efficient used air conditioners and refrigerators from the United States. Increased enforcement of more stringent minimum energy performance standards for new electrical products, and adoption of energy efficiency codes for residential buildings are also needed.

Commercial and Public Service Sectors. Similarly, electricity use in the commercial and public service sectors is also expected to grow as urban areas expand. Improving energy efficiency standards and enforcement will also be important steps to take.[27] According to the World Bank, developing federal, state and municipal government procurement and retrofit programs have the potential to provide economies of scale and achieve significant energy savings as well.

3.1.2 Barriers to Renewable Energy and Energy Efficiency in Mexico

a. Renewable Energy Barriers

Low Energy Rates Based on Short-Term Marginal Costs. There is significant renewable energy and energy efficiency potential in Mexico. Nevertheless, both sectors in Mexico have been slow to grow. By far the greatest barrier to renewable energy in Mexico lies in the price of electricity paid by CFE to electricity producers. At present, CFE is required to produce power at the lowest cost. The rate paid for power from small producers or for surplus power from self-supply projects is established by the short term marginal cost of gas-fired plants.[28] As environmental externalities are not taken into account, even with the rise in natural gas prices the rate remains too low to cover the costs of current renewable energy technologies. CFE's first concession attempt for the 101 MW La Venta III wind project, for example, failed despite a grant from the World Bank to provide financial incentives.[29]

Electricity rates are based on generation, transmission and distribution costs provided by CFE. Rates are set by the Secretary of Treasury and Public Credit (*Secretaría de Hacienda y Crédito Público – SHCP*) with input from CFE and SENER. At present, such rates do not take into account environmental externalities of fossil fuels, which puts renewable energy at a disadvantage. Fortunately, the new renewable energy law requires that SENER develops a methodology for determining environmental externalities for electric power generation to be considered in setting the price of electricity. In

[27] *Low-Carbon Development for Mexico*, pp. 50-51.
[28] *A Blueprint for Green Energy in the Americas*, p. 332.
[29] *Ibid*, pp. 229-340.

addition, according to a World Bank study, electricity subsidies in Mexico are among the highest in the world costing the country approximately $9 billion, roughly equal to one-third of electricity sector revenues in 2006.[30] Two thirds of the subsidies go to residential users. Agricultural electricity use receives the highest rate of subsidy.[31] The residential and agricultural electricity use subsidies are a disincentive to improving efficiency. Tariffs for the commercial sector and for public services, on the other hand are high, [32] and large users are increasingly turning to independent power generation (in many cases from wind) through self-supply agreements to protect themselves against the potential rise in electricity costs.[33] High prices in theory make energy conservation and efficiency projects more attractive.

Other Barriers to Renewable Energy. While price is the main barrier to renewable energy development in Mexico, the following is a list of additional renewable energy barriers identified by the Inter-American Development Bank's "A Blueprint for Green Energy in the Americas" and the Bank's "Mexico Public-Private Sector Renewable Energy Program" Clean Technology Fund (CTF) Proposal:

Regulatory Barriers: There is a lack of transparency and uncertainty in CFE's independent power producer tendering process including the definition of ceiling prices and the selection criteria. For auto-generation projects, there is a lack of legal clarity in terms of CFE's purchase of excess electricity.[34]

Lack of Incentives: Even under the new regulatory framework, it remains to be seen whether new measures to promote renewables will be sufficient to enable renewable energy to compete with combined-cycle natural gas fired plants. CFE renewable energy projects have also been hampered by the expectation that such investments must obtain a minimum 12% return.[35]

Transmission Access, Capacity and Fees: Many viable small scale hydro projects that take advantage of existing irrigation channels are far from existing transmission lines. This is also true for wind energy projects. Transmission capacity in areas with large renewable energy potential is also an issue. For example, additional transmission capacity will be required to expand the cross-border sale of renewable energy to the State of California. In the state of Oaxaca, 13 private auto-generation developers on the Isthmus of Tehuantepec were required to build the interconnection infrastructure to bring the wind generated power to the main transmission network at a cost of $200 million.[36] Furthermore, grid interconnection charges are set on a case-by-case basis with no clear methodology for calculating the charges.[37]

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30 K Komivs, et al., *Residential Electricity Subsidies in Mexico*, World Bank Working Paper No. 160, January 2009, p. viii.

31 *Innovative Financial Mechanism to Implement Energy Efficiency Projects in Mexico*, World Bank Energy Sector Management Assistance Program (ESMAP) Report 338, June 2009, p. 18.

32 *Ibid*, pp. 18-20.

33 *A Blueprint for Green Energy in the Americas*, p. 349.

34 Amin, Amal-Lee and Tully, Carla, *IDB Public-Private Sector CTF Proposal: Mexico Public-Private Sector Renewable Energy Program*, 2009, paragraphs 34-60. (Hereinafter: Amin, *IDB Public-Private Sector CTF Proposal*)

35 *Ibid*, at paragraph 46.

36 *Ibid*, at paragraph 44.

37 This is addressed under the new clean energy law.

Permitting Time: Small hydro projects, in particular, require extensive permits including water-use and land-use concessions, and project approval from the National Water Commission (*Comisión Nacional del Agua - CNA*).[38] CFE approval procedures for renewable energy projects lead to high up-front and transaction costs.[39]

Limited Access to Finance: Rural communities are often unable to pay the cost of off-grid renewable electricity without some form of outside assistance. Mexico's national development banks have not developed financial instruments that adequately address the renewable energy sector's risks and liquidity needs.[40]

Environmental Concerns: Apart from the environmental concerns associated with large hydroelectric dams, potential geothermal sites are located near or in ecological reserves. Wind and large solar projects also have potentially negative environmental and social impacts.

Class Seven Winds: High winds in the States of Oaxaca and Baja California limit the types of wind turbines available for such high wind conditions.

b. Barriers to a Cross-Border California-Baja California Renewable Energy Market

A key issue for renewable energy power development is access to electricity grid infrastructure. A specific priority under the U.S.-Mexico Bilateral Agreement is to promote the development of a regional renewable energy market between California and Baja California and to help facilitate the construction of new power lines in a sustainable manner.

In response to the adoption of California's Renewables Portfolio Standard (RPS), the California Electricity Commission launched the California Renewable Energy Transmission Initiative (RETI) in the summer of 2007 to identify competitive renewable energy zones (CREZ) and possible transmission corridors and siting options to serve those zones. A year later, in May of 2008, the Western Governors' Association and U.S. Department of Energy (DOE) launched the Western Renewable Energy Zones (WREZ) initiative, which includes representatives from 11 states, two Canadian provinces and areas in northern Mexico, to develop a framework for consensus among states and provinces within the Western Interconnection on how to best develop cost-effective and environmentally sensitive renewable energy zones and transmission plans.[41] Under Phase 2 of its renewable energy resource assessment, RETI completed a conceptual plan for expanding the California's transmission grid to access the CREZ with the lowest costs and impacts needed to reach 33% electric power from renewables. Using National Renewable Energy Laboratory (NREL) data, the RETI assessment identified approximately 9,000 MW of wind potential in La Rumorosa resource area of which 2,400 MW was deemed to be highly competitive

[38] *A Blueprint for Green Energy in the Americas*, Section 5, p. 343.
[39] Amin, *IDB Public-Private Sector CTF Proposal*, at paragraph 45.
[40] *Ibid*, at paragraph 58.
[41] *See,* Western Renewable Energy Zones Phase 1 Report, June 2009.

developable wind potential.[42] The USAID CP/RE program also conducted a study on the export potential for wind energy to California and Texas.[43]

Existing cross-border transmission is limited with only 800 MW of transmission capacity through two 230-kV lines. At present, Sempra is seeking a permit from DOE to build a cross-border transmission line to carry electricity from its wind turbines at La Rumorosa to the Southwest Powerlink in Imperial County, California with a potential for 1,250 MW. The California Independent System Operator (CAISO) has reportedly submitted interconnection applications for both La Rumorosa and Santa Catarina. Nevertheless, four additional transmission lines will be needed if Baja California's wind potential is to be fully met.

For future cross border renewable energy trade to grow, however, a number of barriers must be overcome. For one, power exported from Mexico and sold to California under its RPS must show that it meets California's environmental quality standards and that it protects the environment to the same extent as if it were located in California.[44] The RPS environmental requirements are not clear and need to be better defined. Also of concern is the potential impact that intermittent wind energy might have on CFE's and Imperial Irrigation District (IID) electrical grids even if not directly connected to them. Such impacts must be identified and addressed to CFE's satisfaction prior to its concurrence of the CRE's issuance of an energy export permit. The integration of 5,000 MW of wind from Baja California, for example, may require CFE's 230-kV East-West corridor to be significantly reinforced raising the question, who will pay. CAISO is in contact with CFE and IID to study the impact that the region's renewable energy cluster might have on their respective systems. Nevertheless, remediation of potential impacts will need to be addressed between the developer and CFE and/or IID.[45]

Another barrier to cross-border renewable energy trade is the biennial re-certification requirement. The designation of Baja California border area as an Energy Resource Area under the RETI process will also be important for future renewable energy development as will the expansion and strengthening of the transmission grid on the California side to reach highly populated areas. Given the current economic climate, the transmission expansion envisioned by RETI may not materialize.

c. Financial, Market and Institutional Barriers to Energy Efficiency

Financial, market and institutional barriers continue to inhibit energy efficiency advancements in Mexico. In the public sector, the Federal Law of Procurements requires public sector offices to seek the lowest price option within the required technical specifications. As energy savings are not accounted

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[42] Puga, Nicolás and Nabavi, Faramarz, *Baja Wind Energy Generation and Transmission: Potential for Development*, power point presentation given at the Institute of the Americas, Cross Border Climate & Renewable Energy: Opportunity for Trade & Investment conference, La Jolla, CA, August 12-13, 2009.

[43] See, PA Government Services, Inc., *Estudio del Potencial de Exportación de Energía Eólica de México a los Estados Unidos*, March 2009 for USAID/Mexico.

[44] Markey, D. "Cross-Border Renewables – Baja to California," *Project Finance Newswire*, February 2010, at 41-42.

[45] Puga, Nicolás *Baja Wind Energy Generation and Transmission: Potential for Development*.

for, the more energy efficient supplies/appliances usually appear as more expensive. Federal procurement rules are also cumbersome and make it difficult for government agencies to enter into long-term contracts for goods and services for more than a year which limits the development of energy efficiency projects. The World Bank also cites a disconnect between procurement departments and facility managers and the fear that operational savings through energy efficiency measures will result in reduced budgets because energy costs are counted by procurement departments as operational expenses. Most facility managers also lack technical expertise regarding energy efficiency and have limited knowledge of its "costs, benefits, risks and service options."[46]

In the residential sector, there is a lack of public awareness of energy efficiency and its costs, benefits and risks. The public is wary of the high upfront and transaction costs. There are also concerns about actual savings and quality. Residential electricity subsidies -although have been reduced in recent years- provide little incentive to purchase energy efficient appliances, equipment and lighting.[47] Table 4. below provides a list of energy efficiency barriers in Mexico in the industrial and commercial sectors developed by the World Bank.

Table 4. End-Use Efficiency Barriers
Industrial and Commercial Sectors

- Limited awareness of energy efficiency, including costs, benefits, and risks of new technologies and actions
- Few examples presenting the business case for energy efficiency, limited market data, and few identified opportunities to encourage private sector participation
- Lack of expertise to conduct quality audits and identify energy efficiency opportunities,
- Lack of market expertise to package investments into bankable project proposals
- High import tariffs for energy efficient equipment
- Low or questionable quality of energy efficient equipment
- High project development costs (audits) and transaction costs
- Limited private sector investment in energy efficiency (for audits, advisory services, leasing, energy service companies - ESCOs) due to limited equity and available financing
- Limited banking expertise to assess energy efficiency proposals, low-quality loan applications,
- High perceived risks for energy efficiency projects
- Unclear responsibilities and incentives among building developers, owners, and tenants (principal-agent problem)
- Poor customer creditworthiness or limited debt capacity among borrowers

Source: Low-Carbon Development for Mexico, p. 55.

[46] World Bank, *Innovative Financial Mechanism to Implement Energy Efficiency Projects in Mexico*, Energy Sector Management Assistance Program (ESMAP) Report 338, June 2009, p. 29. (Hereinafter: World Bank, *Innovative Financial Mechanism*). *See also, Low-Carbon Development for Mexico*, p. 56.
[47] *Low-Carbon Development for Mexico*, p. 56.

Notably absent from the Mexican market are energy service companies, commonly referred to as ESCOs, that provide services that reduce energy use in return for payment over time from the energy savings.[48] According to a recent 2009 World Bank study, only 14 energy efficiency companies are operative in all of Mexico. The primary obstacle they face is a lack of access to capital. Most ESCOs in Mexico are small and not well capitalized. Banks in Mexico are conservative[49] and only finance on a balance sheet basis with collateral requirements at times as high as 200 percent of the loan amount. When ESCOs pledge equipment for energy efficiency projects as collateral, banks will only value it at 20 percent of its purchase price due to the retrofit nature of the project.[50] Interest rates are also higher for companies with limited credit history. Unlike other countries, banks in Mexico do not accept energy efficiency savings guarantees from ESCOs as collateral even though most are foreign owned. For the most part, Mexican commercial banks have a poor understanding of energy efficiency project structures and technologies and deem their project size to be too small to justify the due diligence and other project approval expenses. [51] Even with a substantial line of credit and a guarantee for qualified projects from the National Development Bank (*Nacional Financiera - NAFIN*) and the Japan Bank for International Cooperation (JBIC), local banks have been reluctant to lend to ESCOs.[52] ESCOs that have been successful have focused on specialty markets such as the tourism sector in Cancun, or self-generation or cogeneration.

3.1.3 Mexico's New Renewable Energy and Energy Efficiency Laws and Policy Reforms

In recent years the Mexican government and public have begun to recognize the importance of renewable energy and energy efficiency. In 2005, the Federal Tax law was amended to allow for a 100% depreciation of the capital expenses for renewable energy investments in its first year. Two years later, in 2007, a model interconnection agreement was developed for renewable energy projects to facilitate their connection to the electricity grid. Nevertheless, the agreement did not have much impact due to the low price paid by CFE for the purchase of surplus power.

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[48] According to the National Association of Energy Service Companies, an ESCO is a business that develops, installs, and arranges financing for projects designed to improve the energy efficiency and maintenance costs for facilities over a seven to twenty year time period. ESCOs generally act as project developers for a wide range of tasks and assume the technical and performance risks associated with the project. Typically, they offer the following services: develop, design, and arrange financing for energy efficiency projects; install and maintain the energy efficient equipment involved; measure, monitor, and verify the project's energy savings; and assume the risk that the project will save the amount of energy guaranteed. These services are bundled into the project's cost and are repaid through the dollar savings generated. See: http://www.naesco.org/resources/esco.htm

[49] Innovative Financial Mechanism, p. 30. Commercial bank lending in Mexico as a share of GDP was half the Latin American average in 2005. Banks lack a "mature credit rating system."

[50] World Bank, *Innovative Financial Mechanism*, p. 32.

[51] *Ibid*, pp. 1, 25.

[52] *Ibid*, p. 25. The study notes that banks complained of NAFIN's "extensive paperwork and inflexibility" and that ESCOs collateral requirements of the banks were too restrictive.

In 2008, Mexico adopted the Law for the Use of Renewable Energy and Financing the Energy Transition (LAERFTE). Unlike the proposed Renewable Energy Utilization Law, which passed the lower chamber of Congress in 2005 but which was never adopted by the Mexican Senate, LAERFTE stops short of changing CFE's procurement rules for electric power and creating incentives for renewables. Rather, the LAERFTE expands the powers of SENER and the Energy Regulatory Commission (CRE) to promote and regulate renewable energy and cogeneration and establishes the types of new regulations and incentives to be developed, leaving the details up to the responsible government bodies.

Under the LAERFTE, authority for developing a tariff system for renewable energy shifts from CFE to the CRE. The CRE is now responsible for establishing the administrative regulations for renewable and cogeneration power projects, including ceilings for independent power producer tenders and tariffs paid by CFE to small renewable generators.[53] In addition, the CRE is responsible for developing model renewable and cogeneration contracts to be used by CFE (Art. 15), and working with the National Center for the Control of Energy (*Centro Nacional de Control de Energía*) to amend dispatch rules for renewable energy generators. Finally, LAERFTE calls for the creation of a new Fund for the Energy Transition and the Sustainable Use of Energy to support the Strategy. The fund will be managed by a technical committee led by SENER and will have an annual budget of roughly $220 million dollars (3 billion Mexican pesos) for 2009, 2010 and 2011. The fund will be used to provide guarantees and other forms of financial support (possibly loans, grants or other incentives) to promote energy efficiency, clean technologies and renewable energy. Under LAERFTE, SENER is charged with:

- Entering into agreements with state and municipal governments to facilitate access to areas with high potential for renewable energy including establishing new land use and construction regulations and simplifying the administrative procedures for obtaining permits and licenses for renewable energy. (Art. 8o)
- Developing with the Secretariats of Treasury (*SHCP*), Health, and Environment (SEMARNAT) methodologies to account for the externalities associated with renewable power development; (Art. 11)
- Setting specific goals for the use of renewable energy with minimum percentages of renewable energy and levels of installed capacity and diversity of renewable energy sources; (Art. 11.II, III and IV)
- Promoting the necessary transmission capacity to allow renewable power to connect to the National Electric System; (Art. 11. IV)
- Developing strategies to promote the use of renewable energy for rural communities currently without electric power. (Art. 11.VI)
- Establishing and updating a National Inventory of Renewable Energy
- Developing a Special Program for the Use of Renewable Energy (*Programa Especial para el Aprovechamiento de Energías Renovables*), (Art. 60.VI)

[53] Amin, *IDB Public-Private Sector CTF Proposal*, paragraph 49.

- Preparing a National Strategy for the Transition of Energy and the Sustainable Use of Energy (*Estrategia Nacional para la Transición Energética y el Aprovechamiento Sostenible de la Energía*) which it must update annually. (Art. 22 and 26)

At the same time that the Mexican Congress passed the renewable energy law, LAERFTE, it also passed the Law on the Sustainable Use of Energy which establishes the National Commission for the Efficient Use of Energy (*Comisión Nacional pare el Uso Eficiente de la Energia - CONUEE*) to replace the National Commission for Energy Conservation (*Comisión Nacional para el Ahorro de Energía - CONAE*), which dated back to 1999. The Law creates the framework for new energy efficiency labeling requirements and a voluntary energy efficiency product certification program similar to EPA's Energy Star initiative, and mandates that SENER develop a National Program for the Sustainable Use of Energy (*Programa Especial para el Aprovechamiento Sustentable de la Energía*) described in greater detail in section 3.2.4.

3.2 GoM Renewable Energy, Energy Efficiency and GHG Programs and Initiatives

3.2.1 GoM Renewable Energy Policies and Programs

Special Program for the Use of Renewable Energy. In 2009, SENER published its Special Program for the Use of Renewable Energy which includes six strategies listed in Table 5. A central component of the program is to increase the availability of information on renewable energy, develop a national inventory and a catalogue of pilot and demonstration alternative energy projects for rural communities. A second, in line with the new Renewable Energy Law (LAERFTE), is to develop policy, regulatory and financing mechanisms to better take advantage of the nation's renewable energy sources.

Rural Electrification Using Renewable Energy. The GoM has several programs working toward the target of increasing renewable energy capacity in Mexico from 23% in 2006, to 26% en 2012. FIDES's rural renewable energy program and SENER's rural electrification program, once supported by USAID, continue to operate. In the first half of 2008, SENER with the support of the World Bank began a new $100 million Energy Poverty and Rural Electrification program (*Proyecto de Servicios Integrales de Energía para Pequeñas Comunidades Rurales en el Sureste de Mexico*) that aims to use renewable energy to bring power to remote communities in the states of Oaxaca, Veracruz, Guerrero, and Chiapas. The GoM has set a target of providing electrical power using renewable energy to some 2,500 communities by 2012. The program also involves other federal organizations, which include the Secretariat for Social Development (*Secretaría de Desarrollo Social – SEDESOL*), the National Commission for the Development of Indigenous Peoples (*Comisión Nacional para el Desarrollo de los Pueblos Indígenas - CDI*), the Shared-Risk Trust-Fund (*Fideicomiso de Riesgo Compartido - FIRCO*), Electrical Research Institute (*IIE - Instituto de Investigaciones Eléctricas*), CFE, National Development Bank (*NAFIN*) and state and municipal governments.

Table 5
Summary of Mexico's Special Program for the Use of Renewable Energy

1. **Promote information**
2. **Develop mechanisms to take advantage of renewable energy sources**
   - Prepare a National Renewable Energy Inventory
   - Adopt administrative norms, directives, and methodologies governing the generation of electricity from renewables (CRE)
   - Develop a methodology for valuing the externalities of electricity generation based on renewables (CRE).
3. **Electrification using renewables**
   - Create mechanisms to facilitate access to energy for remote, rural and indigenous communities
   - Create a catalogue of pilot and demonstration alternative energy projects for rural communities that can be replicated.
   - Promote the technical capacity of communities that benefit from renewable energy programs to ensure the basic maintenance of such technologies.
   - Promote a process for community management to ensure the sustainability of projects.
4. **Development and promotion**
   - Support the establishment and strengthening of organizations dedicated to promoting energy efficiency and renewable energy.
   - Create the Renewable Energy Advisory Council
   - Develop national and regional catalogues of producers and suppliers of different clean energy technologies
   - Develop financing schemes for different levels of energy generation, including small scale energy producers
   - Provide micro-financing and other support mechanisms to increase the participation of small renewable energy producers
   - Propose guarantee and shared risk systems and other risk management mechanisms to drive greater investment in new renewable energy technologies
   - Review with the Economy Secretariat the different support mechanisms for the manufacturers of renewable energy technologies and their components
5. **Infrastructure and regulation**
   - Promote the use of renewable energy in public sector installations
   - Incorporate the transmission and interconnection infrastructure necessary to take advantage of national renewable energy sources
   - Analyze and evaluate the transmission fees and simplify the methodologies applied
   - Explore regulatory instruments to promote efficient cogeneration
   - Promote the installation of renewable energy in federal housing programs
   - Support the development of technical and legal instruments to promote the use of renewable energy
   - Establish mechanisms that permit the use of net-metering in the electricity grid so that users can make use of renewable energy in their homes and small businesses
6. **Research and technical development**

The State of Oaxaca and the Foundation for the Development of the Istmo Wind Corridor and Renewable Energy (*Fundación para el desarrollo del corredor eólico del Istmo y las energías renovables*) in 2008 also unveiled a development plan to establish by 2020 over 4.88 GW of small hydro capacity ranging from cooperative projects of up to 1 MW for off-grid communities to grid-connected self-supply projects for local businesses and municipalities. The foundation is seeking financial support to develop technical- and financial-feasibility studies for some 75 projects throughout the state. In addition, the IADB and the Japanese Trust Fund for Consultancy Services are developing solar photovoltaic panels for low- and medium income households in Baja California.

GoM Large Scale Renewable Energy Projects. The GoM is promoting the development of wind power through its Large Scale Renewable Energy Project (*PERGE – Proyecto de Energías Renovables a Gran Escala*) with $25 million in funding from the World Bank Global Environmental Facility (GEF) to provide economic incentives for the development of the La Venta III 101 MW wind project currently under construction. The La Venta III is one of five CFE large-scale wind parks under development in Oaxaca. CFE recently awarded three new wind parks totaling 306 MW to ACCIONA Energy which beat out rival bidders Iberdrola Renovables, Recursos Eólicos de México (ACS), and Enerfin Sociedad de Energía (part of the Elecnor group). In addition to CFE, there are 14 private self supply wind projects in Oaxaca under development. In Oaxaca alone, approximately 2,473 MW of wind generation will be developed between 2009 and 2012. To support the increase in power generation in Oaxaca the GoM is working to strengthen existing transmission lines and build new lines and interconnections. SENER is also collaborating with the Electrical Research Institute (*IIE - Instituto de Investigaciones Eléctricas*) and the United Nations Development Programme (UNDP) with funding from the GEF to develop an Action Plan to Eliminate the Barriers to the Development of Wind Generation in Mexico (*Plan de acción para eliminar barreras para el desarrollo de la generación eoloeléctrica en México*). In addition, CFE is developing a combined-cycle solar powered facility in the State of Sonora, known as Agua Prieta II and four geothermal projects: Cerro Prieto-V in the State of Baja California, Los Humeros II in Puebla, Los Azufres in Michoacán, and Cerritos Colorados in Jalisco.

GoM Renewable Energy Research. The Institute of Electrical Investigation (*Instituto de Investigaciones Eléctricas - IEE*) is working with CFE to evaluate renewable energy resources using high resolution technology and develop a Renewable Energy Geographic Information System (*Sistema de Información Geográfica para las Energías Renovables - SIGER*).[54] In addition, IIE is undertaking research on different small scale renewable energy technologies.[55]

3.2.2 GoM Energy Efficiency Policies and Programs

SENER-CONUEE: National Program for the Sustainable Use of Energy. Mexico's National Program for the Sustainable Use of Energy, which was adopted at the end of 2009, identifies seven

[54] *See,* http://evaluarer.iie.org.mx/genc/evaluarer/siger/index.htm
[55] *See,* http://vmwl1.iie.org.mx/sitioIIE/sitio/control/07/index.php?tipo=02

priority areas for energy savings: automotive transportation, lighting, household and building equipment/materials, cogeneration, buildings, industrial motors, and water pumps. Table 6 sets out the different lines of action for each of the seven interventions, with the exception of transportation which falls outside of the definition for Clean Energy (see Section 4), and Table 7 provides their estimated potential energy savings through 2012 and 2030.

Table 6
Priority areas and lines of action of the National Program for the Sustainable Use of Energy[56]

Lighting (Expected Impacts: 520 TWh of accumulated savings by 2030 reducing energy demand by up to 52%)

- Accelerate the implementation of efficient lighting in the Public Administration
- Accelerate the implementation of efficient lighting in street lighting
- Publish an energy consumption norm for lighting
- Support marginal populations in the purchase of efficient lighting

Household and Buidling equipment/materials
(Expected Impacts: 6.6 TWh savings by 2012 and 134 TWh of accumulated savings by 2030.)

- Implement a certification program and campaign and efficient building equipment/materials (distintivo de equipos) (CONUEE)
- Update the norms for the efficiency standards for refrigerators and water heaters (CONUEE)
- Continue the updating of existing norms (CONUEE)
- Continue the promotion of solar water heaters (*PROCALSOL*) (SENER, INFONAVIT, CONAVI, Banca de Desarollo, CONUEE)
- Continue supporting marginal groups through the substitution of refrigerators and air conditioning equipment (*Programa de Sustitución de Electrodomésticos*)
- Publish a norm to promote the moderate use of air conditioners

Cogeneration

- Develop a strategy to promote the benefits of cogeneration
- Identify regulatory barriers to the use of cogeneration

Buildings (Expected Impacts: 1.4 TWh savings by 2012 and 93.24 TWh of accumulated savings by 2030)

- Promote the incorporation of insulation standards in construction regulations as well as ensure compliance with applicable norms required for licenses (SENER, CONAVI, CONUEE)
- Incorporate insulation standards for new federal public administration buildings (SENER, Secretaría de la Función Pública, CONUEE)
- Promote increased coverage of the Green Mortgage (*Hipotecas Verdes*) program. (SENER, CONAVI, INFONAVIT, CONUEE)
- Promote better insulation practices and the use of air conditioners
- Develop a certification for estimating the electricity consumption of new buildings (SENER, CONAVI, INFONAVIT, CONUEE)

Industrial Motors (Expected Impacts: 3.5 TWh savings by 2012 and 29.5 TWh of accumulated savings by 2030)

- Update the norm for three-phase motors (SENER, CONUEE)
- Promote the substitution of existing inefficient three-phased motors with a goal of 414,000 motors over ten years old between 2011 and 2012.

[56] The table does not include Transport which falls outside the USAID Clean Energy definition.

Water Pumps (Expected Impacts: 0.2 TWh savings by 2012 and 21.6 TWh of accumulated savings by 2030)

- Strengthen the program to support the rehabilitation of agricultural water pumping systems (SENER, SEMARNAT, SAGARPA, CONAGUA, CONUEE)
- Develop a support program for the rehabilitation of municipal water pumping systems (SENER< SEMARNAT, CONAGUA, CONUEE)

Table 7. Estimated potential energy savings for the priority areas of the National Program for the Sustainable Use of Energy

Areas of Intervention	TWh of Savings by 2012	TWh of Accumulated Savings by 2030	% Reduction in Demand in the Sector
1. Transportation		2,736	26%
2. Lighting		520	52%
3. Household and Bld. Equipment	6.6	134	10%
4. Cogeneration	2.1	482.6	
5. Buildings	1.4	93.24	16%
6. Industrial Motors	3.5	29.5	2%
7. Water Pumps	0.2	21.6	12%

Under the Program, the National Commission for the Efficient Use of Energy (CONUEE, formerly CONAE) under SENER is charged with developing a series of new technical energy efficiency norms or standards, which include an energy consumption norm for lighting, revised efficiency standards for refrigerators, water heaters and three-phase motors, a norm to promote the moderate use of air conditioners, insulation standards for new federal public administration buildings, and a certification system for estimating the electricity consumption of new buildings. In addition, CONUEE is charged with developing a voluntary energy efficiency product certification program, a catalogue of equipment and electrical appliances that must include information on energy consumption, and procedures for sanctions. CONUEE must also maintain a system of information on energy consumption, disseminate information on government energy efficiency funds and trusts, develop a strategy for issuing recommendations to states and municipalities on energy efficiency, and promoting the inclusion of energy efficiency in school programs and specialization programs in higher education.

Additional SENER – CONUEE Programs. In addition to actions laid out in the National Program for the Sustainable Use of Energy, SENER and CONUEE also have the following energy efficiency programs:

1. ***Appliances and Compact Florescent Lighting.*** The Program to Live Better (*Programa Ahorra Energía para Vivir Mejor*) provides energy savings through the substitution of electrical household appliances and the use of compact florescent light bulbs.

2. ***PROCALSOL.*** The Program for the Promotion of Solar Water Heaters (*PROCALSOL - Programa de Calentadores Solares*) which is implemented in collaboration with the German Federal Ministry

for Economic Cooperation and Development (BMZ) (2005 – 2009) and the National Association of Solar Energy (*ANES – Asociación Nacional de Energía Solar, A.C.*) seeks to increase the total area of solar water heaters installed in the country to 1.8 million m^2 by 2012. CONUEE is currently developing official standards and certification processes for solar water heaters, providing training to technicians and installers, and providing funding for preferential mortgage rates for new homes built with solar water heaters under the Green Mortgage Program (see below) with The National Workers Housing Fund Institute (*INFONAVIT – Instituto Nacional para el Fomento de la Vivienda de los Trabajadores*), the housing credit agency of the Mexican government, and other financing tools and initiatives.

3. ***Sustainable Housing.*** SENER and CONUEE together with other GoM entities, have a number of programs directed towards improving building efficiency and promoting sustainable housing developments. These include:

   - ***This is Your House - Green Mortgage Programs.*** Mexico's "This is Your House" (*Programa "Ésta es Tu Casa"*) program, implemented by the National Housing Commission (*CONAVI – Comisión Nacional de Vivienda*), and the "Green Mortgage" (*Hipoteca Verde*) program, operated by INFONAVIT, provide subsidies and financing to low income buyers to purchase energy efficient homes equipped with solar water heaters, extra thermal insulation, compact florescent bulbs, and efficient faucets and regulators depending on the region. It is estimated that the energy efficient homes save families between 280 to 400 pesos per month (approximately $28 to 32) on their lighting, water and gas bills. In 2009 the Alliance to Save Energy awarded Mexico with its International Energy Efficiency Award for these two programs. The USAID/Mexico Competitiveness Program is currently supporting the *Hipoteca Verde* initiative.

   - ***Baja California Clean Energy Residential Pilot Project.*** In 2008, CONUEE with technical assistance from the IADB-Japanese Trust Fund for Consultancy Services launched a pilot project in the State of Baja California that incorporated energy efficiency measures and solar energy technologies for low income residents connected to the electric grid. The program will monitor these measures and seek to replicate them in other communities. It will also use the information obtained to help prepare guidelines for energy efficiency standards and norms that are applicable to the conditions in Baja California.[57]

   - ***Integrated Sustainable Urban Developments (DUIS).*** In 2008 the GoM launched an ambitious Integrated Sustainable Urban Developments (*Desarrollos Urbanos Integrales Sustentables – DUIS*) program led by an inter-secretarial commission. The goal of the DUIS program is to construct roughly 700,000 new housing units per year that are energy efficient and incorporate options for self electricity generation, such as renewables. A total of 21 potential DUIS projects, ten of which are located in the border states of Baja California (3), Sonora (3), Chihuahua (1), and Nuevo León (3), have been identified.

[57] IADB, ME-T1023: Residential Use of Renewable Energy and Energy Efficiency in Baja California – Plan of Operations, September 2008.

FIDE (*Fideicomiso para el Ahorro de Energía Eléctrica*). FIDE is undertaking two main energy efficiency programs and two pilot initiatives:

- **Energy Efficient Lamp Program** (*Programa Lámparas Ahorradoras en el Sector Doméstico*). FIDE and CFE have implemented a national energy efficient lamp program which has substituted 26.3 million incandescent bulbs for compact florescent lamps.
- **My Tortilla Program** (*Programa Mi Tortilla*). FIDE is providing technical assistance to the Economy Secretariat to help modernize the country's tortilla industry and lower its operational costs through the adoption of energy, gas and water efficiency measures. To date, FIDE has developed a FIDE energy efficiency label for tortilla machines and certified eight companies. It has also undertaken a pilot program in the states of Chiapas, Guanajuato, Michoacán, Tabasco and Sinaloa.[58]
- **The Sustainable Housing Pilot Program** (*El Programa de Vivienda Sustentable*). CONAVI, PROMÉXICO and FIDE are implementing a pilot program to construct sustainable energy efficient housing for low income residents with solar photovoltaic panels in as many as 50,000 homes.
- **LED Lighting Pilot Program.** FIDE is undertaking a pilot LED lighting program which has developed 17 projects in the industrial sector.

In addition to providing financing, FIDE also provides energy efficiency services and technical support to industry, municipalities and state energy commissions and helps them develop and implement projects. FIDE works with micro, small, medium and large companies to improve energy efficiency through the substitution of equipment, improving processes, identification of new technologies, adopting atomization and controlling demand. With municipalities it provides support to improve energy efficiency in public street lighting, stoplights, potable water and wastewater pumping, municipal buildings and air conditioning. FIDE also publishes an energy efficiency magazine which comes out every three months and provides capacity building courses and trainings for industrial, commercial and service organizations (1,201 in 2008). FIDE also supports the Federal Program for Energy Savings in the Electricity Sector (PAESE – *Programa de Ahorro de Energía del Sector Eléctrico*) and the Federal Program for Energy Savings in the Public Administration. (See below for a description of FIDE's financing program)

Secretariat of Tourism (SECTUR). One of the goals of the PECC is to reduce the demand for energy and water in the tourism sector. To achieve this, SECTUR and SENER-CONUEE have teamed up to develop a new initiative to promote the use of energy efficiency and renewable energy in the tourism sector and to recognize and certify best environmental practices by service providers. SECTUR will also study the GHG impacts from the tourism sector and undertake a climate change and GHG mitigation for the design of a "*Green Tourism*" policy effort.[59]

[58] *See,* http://celoriomexico.com.mx/programa-de-apoyo-a-la-industria-de-la-masa-y-la-tortilla
[59] *See*: http://www.sectur.gob.mx/wb/sectur/sect_cambio_climatico_y_turismo

3.2.3 GoM Climate Change and GHG Emissions Monitoring Programs

Secretary of Environment and Natural Resources (*SEMARNAT – Secretaría de Medio Ambiente y Recursos Naturales*). SEMARNAT is the Technical Secretariat for the GoM's Intersecretariat Commission on Climate Change (*Secretariado Técnico de la Comisión Intersecretarial de Cambio Climático*) which includes all the federal government ministries (or Secretariats) tasked with the implementation of the PECC's components. In addition, the PECC established a new General Office of Climate Change Policy (*Dirección General de Políticas para el Cambio Climático*) within SEMARNAT to develop climate change programs, strategies, criteria and political instruments with other GoM agencies and propose as need be legal reforms to help bring them about. This includes preparing a compendium of federal political instruments for those sectors that have significant GHG emissions. SEMARNAT is also responsible for evaluating the implementation of the PECC and its policies and instruments and monitoring and reporting on its achievements annually.

State Climate Change Action Plans. Through the National Institute of Ecology (INE), SEMARNAT is responsible for updating the national GHG inventory for the UNFCCC and providing technical assistance to Mexican states to undertake their own GHG inventories, strengthening their climate change programs and policies and develop climate change action plans (*Programa Estatal de Acción ante el Cambio Climático - PEACC*).[60] Under the PECC, SEMARNAT and INE are responsible for helping to develop at least eight PEACCs by 2012. Out of 32 states, only Veracruz and the Federal District and the municipality of Chihuahua have completed PEACCs, 18 additional PEACCs are either planned or under development, and an additional 11 states are seeking funding as shown in Table 8. The British Embassy working with INE in 2009 helped develop a tool for guiding states in the development of their PEACCs. According to the USAID/Mexico Competitiveness Program, the ITESM's Center for Dialogue and Analysis on North America (*Centro de Diálogo y Análisis sobre América del Norte - CEDAN*) has also developed a course on developing PEACCs.

Table 8. Mexico State, Municipal and City PEACCs

State / Funding Source	PEACC Completed	PEACC Under Development	PEACC Planned	Seeking Funding
Federal District	X			
Municipality of Chihuahua	X			
Veracruz (UK)	X			
Baja California (IADB)		X		
Estado de México		X		
Guanajuato		X		
Michoacán (Spain & WB)		X		
Nuevo León (UK and BECC)		X		
Nayarit		X		
Puebla		X		
Sonora (BECC)		X		

[60] See: http://www.presidencia.gob.mx/programas/?contenido=35007 and

Coahuila (BECC)			X	
Chihuahua (BECC)			X	
Chiapas (UK)			X	
Guerrero (IADB)			X	
Oaxaca (IADB)			X	
Tabasco (IADB)			X	
Quintana Roo (Spain)			X	
Tamaulipas (Funding Request from BECC)			X	
Tlaxcala (Spain)			X	
Zacatecas			X	
Aguascalientes				X
Baja California Sur				X
Campeche				X
Durango				X
Guanajuato,				X
Jalisco				X
Morelos				X
Nayarit				X
Querétaro				X
San Luis Potosí				X
Sinaloa				X

Source: http://www2.ine.gob.mx/sistemas/peacc/ and INE Bilateral Cooperation Projects.

Mexico Greenhouse Gas Inventory Program (*Programa Gases de Efecto Invernadero, GEI México).* In 1996 GEI Mexico went from a pilot project supported by USAID to a permanent GHG voluntary inventory program with its own independent website, www.geimexico.org. The program is implemented by SEMARNAT, the Mexican Business Coordinating Council (*Consejo Coordinador Empresarial – CCE)* and the Mexican business think tank CESPEDES (*Centro de Estudios del Sector Privado para el Desarrollo Sustentable*), with the support of the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD). In the last three years the program has nearly doubled the number of registered entities with a total of 85 public and private companies participating as of October, 2009. The PECC establishes a series of goals (4.4.7) to be completed by GEI Mexico by 2012 which include:

- Incorporate 50 new companies, organizations and institutions (T.50)
- Incorporate four new sectors (T.51) (such as transport, generation and use of energy, tourism, forestry, and urban services – solid waste and wastewater treatment)
- Report 80% of the national GHG emissions from the generation and use of energy and industrial processes (T52)
- Identify and implement 100 projects eligible to participate in the Clean Development Mechanism or other markets (T.53) and
- Conduct five studies identifying best practices, technologies and actions by sector for select economic activities. (T.54)

Mexico Voluntary Greenhouse Gas Registry. In addition, under Objective 4.3.4 and goals T.19 and T.20 of the PECC, SEMARNAT is charged with establishing a an electronic National Public Registry of GHG Emissions and Reduction Projects which will serve as the basis for a transparent voluntary greenhouse gas market in Mexico and as a means of recognizing the efforts of Mexican companies such as those that participate in the Mexico GEI Program. SEMARNAT is also to implement an emissions reduction validation and certification system (T.20). The National Public Registry will use the same methodologies and procedures validation and electronic registry as the GEI México Program.

Pollution Release and Transfer Registry (RETC). Mexico established its pollutant release and transfer registry (PRTR), known as the *Registro de Emisiones y Transferencia de Contaminantes* (RETC) in Spanish, in 2001 as part of trilateral cooperation with the U.S. and Canada. The regulation to RETC was approved in 2004, and requires industries under federal jurisdiction to measure, record and report emissions of 104 chemical substances going into the air, land or water. These federally regulated industries include the automotive, cement, chemical, electricity, petroleum, iron and steel, and paper sectors. Other sectors such as electronics and factories in the maquiladora (manufacturers operating on the U.S.-Mexican border) are subject to states or municipal RETC reporting requirements. Only Nuevo León and the Federal District published RETCs in 2006. Durango, Michoacán, Colima, Chiapas, Coahuila and Tamaulipas are due to publish their RETCs. According to SEMARNAT, federal, state and municipal RETCs are due to incorporate GHG emissions. SEMARNAT plans to link information in RETC with the new voluntary GHG registry to be developed.

National Emissions Market. In 2004, the Mexican National Oil Company (*Petróleos Mexicanos - PEMEX*) established a virtual GHG emissions market which was expanded in 2007 with the support from the Secretariat of Finance and Public Credit (*SHCP*) to include the price of Carbon. One of the goals of the PECC is to build upon the work and experiences of PEMEX and develop and implement by 2011 a national GHG emissions market among state owned entities in the energy sector, including CFE, and private companies from key sectors. The PECC also calls for the GoM to begin negotiations with the US and Canada to link emissions trading schemes.[61]

GHG Emissions Auditor Certification. In order to better prepare for carbon markets, Mexico's Accreditation entity (*Entidad Mexicana de Acreditación -EMA*) plans to work with SEMARNAT to develop and implement a certification and accreditation system for GHG emissions auditors.

[61] See, *Programa Especial de Cambio Climático 2009-2012* (PECC), Objective 4.3.4 – T.20-22.

3.3 Donor and International Clean Energy and Climate Change Programs in Mexico

Numerous international donors, including the U.S., Germany – GTZ,[62] Spain – AECID, Japan – JICA, the World Bank, the Inter-American Development Bank and the Organization of American States are all actively supporting the GoM (SENER, CONUEE, CRE, CENACE (*Centro Nacional de Control de Energía*), CFE and SEMARNAT) to help develop its clean energy policy and regulatory framework and help implement renewable energy and energy efficiency programs. The following is a detailed overview of USAID past and current work and a summary of what the other major international donors and NGOs are presently doing in Mexico on clean energy and climate change.

3.3.1 USAID Past and Present Work on Clean Energy and Climate Change in Mexico (1992-2010)

For over 18 years, USAID/Mexico has worked to promote the development and use of renewable energy, energy efficiency and cleaner production practices and technologies in Mexico under three different initiatives: the USAID/Mexico Renewable Energy Program (1992-2003), the USAID/Mexico Clean Production and Renewable Energy Program (2005-2009), and the current USAID/Mexico Competitiveness Program (MCP) which runs through 2012. In addition, the USAID Bureau for Economic Growth, Agriculture and Trade (EGAT) Energy Office also supported regional programs with operations in Mexico. The following describes the work of these programs in the area of renewable energy, energy efficiency and GHG monitoring.

a. USAID/Mexico Renewable Energy Program (1992-2004)

Renewable Energy. During the early 1990s USAID and U.S. Department of Energy (DOE) co-sponsored the Mexico Renewable Energy Program (MREP) that worked with different Mexican partner organizations to implement pilot renewable energy systems – primarily stand-alone photovoltaic and wind electric systems and micro/mini hydro systems. The program sought to incorporate other innovative renewable energy applications at the community level focusing on productive use systems in agriculture, education, health, conservation and community level development. USAID's and DOE's main partner was the *Fideicomiso de Riesgo Compartido* (FIRCO), a trust fund for shared risk which operates under the Mexican Secretariat of Agriculture (*Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación - SAGARPA*). Together, USAID and FIRCO implemented more than 200 photovoltaic water pumping projects in 14 Mexican states principally for livestock watering on ranches. USAID provided intensive training to 18 FIRCO engineers in two "Train the Trainers" courses which focused on photovoltaic water pumping systems. FIRCO then replicated these courses in various states and provided hands-on training to over 1,000 participants.

[62] GTZ has long been involved in promoting clean energy in Mexico. From April 2005 through March 2009 it implemented a Promotion of Renewable Energy project in Mexico and recently entered into a new phase to help improve energy efficiency and increase the broad-scale use of renewable energy resources.

USAID also worked with FIRCO to improve the governance component of village level off-grid energy projects and provided renewable energy technical assistance to distance education personnel at both the federal and state levels and to the Mexican Secretariat of Environment and Natural Resources (SEMARNAT) for its use in protected areas. The projects retained a high rate of sustainability and the program was later expanded and incorporated into a much larger $31 million four-year FIRCO Sustainable Rural Development Program to Promote Alternative Energy Sources in Agroindustry (*Proyecto de Desarrollo Rural Sustentable para el Fomento de las Fuentes Alternas de Energia en los Agronegocios*) with financial support from the World Bank and the Global Environment Facility. Other partners included Winrock International, New Mexico State University, Enersol Associates, and Ecoturismo y Nuevas Tecnologias.

Working with the DOE's National Renewable Energy Laboratory, officials from Mexico's energy sector and the state of Oaxaca, USAID also helped develop high-resolution wind resource maps for the State of Oaxaca as well as for the US/Mexico border region. The maps revealed 33,000 MW of wind potential in the Isthmus region alone in the Mexican State of Oaxaca, with over 6,000 MW of usable wind resource. USAID also helped CFE to prepare the feasibility study for its La Venta II, 85 MW wind farm inaugurated in March 2007. By 2012 CFE will have developed 591.9 MW of wind power in Oaxaca and the private sector is expected to have a total of 15 self-supply wind projects completed, amounting to an additional 1,971.5 MW.[63]

Energy Efficiency. From 1992 to 2003 USAID's MREP collaborated with CONAE (now National Commission for the Efficient Use of Energy (*Comisión Nacional pare el Uso Eficiente de la Energia - CONUEE*)), FIDE, BANOBRAS and other institutions in Mexico to promote greater energy efficiency focusing on developing energy service companies, green procurement, energy efficiency standards and labeling (Sello FIDE) and capacity building.

CONAE. USAID and the U.S. Department of Energy's Lawrence Berkeley National Laboratory (LBNL) worked with CONAE, EIC Consultores de México, FIDE, and the National Bank for Public Works (BANOBRAS) to develop and help implement an energy service company (ESCO) market development strategy. The program helped draft model ESCO performance contracts in the hotel and industrial sectors in collaboration with international and Mexican business partners. USAID also worked with CONAE to develop a tool for analyzing the cash flow of energy efficiency projects and develop an audit methodology for industrial steam generation and distribution systems. USAID also helped conduct an assessment of energy efficiency potential in the municipal sector focusing on public lighting and water pumping coordinating closely with CONAE, CFE, and FIDE.

FIDE. In addition, USAID worked closely with FIDE on programs to improve energy efficiency. One such area was a program to substitute high efficiency electric motors (HEM) for standard motors in 20 industries and to implement a national incentive program to promote the manufacture of HEM and compact fluorescent lamps (CFL) in Mexico. By 2003, all HEM and 86% of CFLs sold in Mexico were

[63] SENER, *Programa Especial para el Aprovechamiento de Energías Renovables,* p. 51.

produced locally. USAID also worked with FIDE to help expand the equipment and appliances covered under its high efficiency labeling program, Sello FIDE, modeled after the U.S. Environmental Protection Agency's (EPA) Energy Star program and expand the range of energy efficiency technologies supported by its various programs.

Another area in which USAID supported FIDE was the development of protocols for the implementation and monitoring of its chiller retrofit program. USAID also helped develop software programs to support energy efficiency analysis and decision-making for end-users and energy consultants and helped FIDE undertake studies on energy consumption in three energy intensive sectors (cement, steel and pulp/paper), and the analysis of three residential lighting programs in Valladolid, Aguascalientes and Ciudad Juárez, Chihuahua.

Outreach and Training. USAID/Washington provided funding to the Alliance to Save Energy to conduct energy efficiency and business seminars, policy roundtables and compile an energy efficiency company directory in Mexico. USAID/Mexico, under its Resource Management Systems Initiative, provided support to PEMEX in the design and implementation of four six-week train-the-trainer energy efficiency courses in which participants were taught to carry out energy audits and energy efficiency analyses, and were prepared to teach further energy audit courses to the technical staff within their subsidiary companies. Training courses were held in each of the four PEMEX subsidiaries, working closely with corporate environmental staff. USAID also supported the Association of Energy Conservation Technicians and Professionals, a professional association offering information, training courses and conferences. While USAID helped the association to increase membership, develop local chapters, and start an energy manager's certification program, once USAID assistance ended, the association was not sustainable and had to close.

GHG and Climate Change. Dating back to 2003, USAID together with EPA and several Mexican government ministries developed the first Mexico Landfill Gas (LFG) Model to help evaluate the feasibility and potential benefits of collecting and using LFG for energy recovery in Mexico. EPA has since collected additional field data and applied advanced modeling techniques to update and refine the first version of the model incorporating the structure of the Intergovernmental Panel on Climate Change (IPCC) Model with revised input assumptions to better reflect local climate and conditions at disposal sites in Mexico. In March 2009 EPA held a workshop in Guadalajara, Mexico to train potential users on the model.

USAID also worked with the World Resources Institute (WRI), SEMARNAT, and the World Business Council for Sustainable Development (WBCSD) (in conjunction with its local counterpart CESPEDES – *Centro de Estudios del Sector Privado para el Desarrollo Sustentable*) to launch a voluntary greenhouse gas reporting platform for Mexican private and public corporate entities. The program, which followed the internationally accepted Greenhouse Gas Protocol developed by WRI and WBCSD, provides private and public corporate entities with the tools to quantify, register and monitor their GHG emissions. The program also helps participants identify GHG reduction opportunities, attract new technologies and investments while reduce GHG emissions and local air pollutants.

After USAID funding ended, the program eventually transitioned in late 2006 into a permanent Greenhouse Gas Inventory Program (*Programa Gases de Efecto Invernadero*) commonly referred to as GEI-México. The program has its own website, www.geimexico.org and continues to operate independently with the support of SEMARNAT, the Mexican Business Coordinating Council (*Consejo Coordinador Empresarial* – CCE), CESPEDES, WRI, and WBCSD.

b. USAID/EGAT Energy Efficiency Programs in Mexico

CLASP (2000-2004). USAID, together with the United Nations Foundation, supported the Collaborative Labeling and Appliance Standards Program (CLASP)[64] working with the LBNL, ASE and the International Institute for Energy Conservation (IIEC) to evaluate the impact of energy efficiency standards for motors, refrigerators, clothes washers and room air conditioners. In 2010 CLASP plans to assist CONUEE in developing minimum energy performance standards with funding from ClimateWorks Foundation and UNDP-GEF.[65]

Energy-Efficient Public Sector (PEPS) Program (2004-2007). The Lawrence Berkeley National Laboratory, along with the Alliance to Save Energy (ASE) and the International Council for Local Environmental Initiatives - ICLEI worked with CONAE and FIDE on an Energy Efficient Management in the Public Sector (PEPs) program to design a national procurement initiative and to stimulate the private sector through mass purchases. The program worked with over 30 Mexican cities to use energy more efficiently and educate government personnel on the concept of energy-efficient purchasing.

c. USAID/Mexico Clean Production and Renewable Energy (CP/RE) Program (2005-2009)

Renewable Energy. From 2005 to 2009, USAID/Mexico launched a new Clean Production and Renewable Energy (CP/RE) program that sought to build off the work previously done with the MREP. USAID/Mexico continued to work with FIRCO, SENER, CONAE, and other GOM federal agencies involved in this field (CONANP, CONAFOR, CNA, etc.).[66] While MREP worked primarily with farmers and ranchers in various parts of Mexico to use renewable energy for agricultural purposes, USAID/Mexico's 2005-2009 Clean Production and Renewable Energy program focused on supporting Mexican government agencies to use renewable energy as a tool for overall rural development as part of its Environment Program and FIRCO's National Micro-Watershed Plan. Work under the program focused on two main areas: (1) clean production in select watersheds; and (2) linking poverty reduction with watershed protection through targeted energy based interventions. The program supported SENER and state and

[64] CLASP was established as a partnership in the U.S. in 1999 and operated for the five years 2000 through 2004, supported by $9.4 million from 12 different donors. In 2005, CLASP completed its originally intended transformation into an independent global organization open to all willing and able participants. It now operates as a global non-profit corporation governed by 12 directors from eight countries in four continents. See: http://webapps01.un.org/dsd/partnerships/public/partnerships/179.html.

[65] See the CLASP Web Site: http://www.clasponline.org/clasp.online.programs.php?po=16#latin

[66] *See,* PA Government Services, Inc., *Cleaner Production and Renewable Energy Program, Final Report,* June 2009.

municipal governments in the development and implementation of clean production and renewable energy plans and programs under the Global Village Energy Partnership (GVEP) framework.

It also worked closely with SENER to design and develop a rural electrification program using off grid renewable energy technologies. A key part of the program was the installation of a pilot project in the state of Guerrero, where 140 homes covering 900 inhabitants were connected to a series of solar photovoltaic mini grids. CP/RE undertook a comprehensive assessment of water resources, micro-hydro potential, existing hydro-power infrastructure, solar and wind resources in southern Mexico and helped develop a database for participating GoM agencies and local stakeholders to identify specific sites where renewable energy resources are available (i.e. solar, wind, micro-biomass, etc.). Under its "wind extension" initiative, the CP/RE program prepared a series of reports on the comparative analysis of wind energy in the U.S. and Mexico, the wind energy export potential from Mexico to the U.S. and considerations of what is needed for the potential to be realized, and the elements of promoting wind energy in Mexico which included an analysis of the environmental effects of wind energy in Mexico, the interest of municipal governments in potential wind energy projects and the issue of land rights and their importance and complications in Mexico.[67] This project helped provide a basis for the design of a large scale rural renewable energy program with the World Bank which seeks to reach some 50,000 homes. In addition, the CP/RE initiative also supported universities and technical institutes to strengthen research, teaching and technological development programs on clean production and renewable energy and its benefits.

Under CP/RE, from 2006 to 2008, USAID, EPA, and SEMARNAT worked together with state and local governments, the private sector, and government agencies to implement the Methane to Markets (M2M) Initiative in Mexico, sharing and expanding the use of state-of-the-art technologies to recover and use methane gas that is usually released into the atmosphere. The partnership focused on three key areas: improving efficiency in oil and gas plants, recovering methane gas from landfills, and reusing methane from agriculture and animal waste. With USAID technical assistance, Petróleos Mexicanos (PEMEX) began investing in new technologies to reduce methane emissions. In municipalities of Tamaulipas and Morelos, USAID helped staff develop international bidding documents for landfill gas recovery systems that will serve other municipalities and help to ensure greater competition and a private-sector role in implementation of landfill gas recovery projects. With USAID and EPA support, SEMARNAT completed the installation of five anaerobic digesters that allow recovery of methane from pig farms in Guanajuato, Michoacán and Veracruz. The gas is reused for gas lighting, hot water for facility sterilization and electricity generation. The model installations and the lessons learned from their construction will help pig farmers and other producers to reduce emissions while improving their operations.

Energy Efficiency. From 2005 to 2009, USAID/Mexico's CP/RE program continued to work with the National Commission for Energy Savings (now CONUEE), National Water Commission (CNA), and the Mexican Center for Cleaner Production (CMP+L), states, municipalities and the Government of Mexico

[67] Ibid

City (GDF) on energy efficiency measures in three areas: (1) water utility energy efficiency under the ASE's Watergy Program, (2) the adoption of environmental management systems (EMS), and (3) cleaner production.

Watergy (2003-2008). USAID worked with ASE's Watergy Program (http://www.watergymex.org/) to improve water and energy efficiency in nine local water utilities. Watergy programs span the entire border, including Baja California (Tijuana), Chihuahua (Hidalgo del Parral), Coahuila (Monclova), Nuevo León (Monterrey), Tamaulipas (Matamoros and Tampico), and Sonora (Guaymas and Nogales) as well as in the states of Veracruz, Oaxaca, and Querétaro. Watergy worked with CNA , ANEAS (*Asociación Nacional de Empresas de Agua y Saneamiento*), and FIDE delivering over 70 trainings and seminars and established public-private partnerships with more than 12 private companies. The program helped design and implement energy and water funding mechanisms that included user fee structures to pay back loans and insure long term maintenance. In Monclova, Coahuila Watergy's work led to a $6 million investment by NadBank recommended water infrastructure projects. Over the life of the program, Watergy partnerships resulted in a total of 55.3 GWh in energy savings and approximately $7.1 million in monetary savings.

Mexico City Government. Working with the Mexico City Government (GDF), the CP/RE program helped to implement a city-government wide Environmental Management System (EMS) that resulted in ongoing water, energy and cost savings for the government. CP/RE also worked with the GDF to implement its solar energy standard, obligating the use of solar energy for water heating in new commercial facilities and helped develop a manual on low-temperature solar insulation to complement the GDF standard. CP/RE also helped launch other initiatives including green purchasing guidelines, ESCO applications for energy efficiency implementation in buildings and the development of sustainable housing. USAID/Mexico's Competitiveness Program continues to work with the GDF to implement and expand the coverage of its EMS initiative.

Cleaner Production Centers. The CP/RE program worked with the IADB-Multilateral Investment Fund to provide support to the Mexican Center for Cleaner Production at the Instituto Politécnico Nacional (IPN) and its regional centers in Tabasco and Chihuahua. CP/RE helped IPN to develop a Masters Degree program in cleaner production.

d. USAID/Mexico Competitiveness Program (2008-2012)

Following the end of the Clean Production/Renewable Energy program, USAID/Mexico incorporated environment and energy into the design of its 2008 – 2012 Mexico Competitiveness Program (MCP). Although the primary focus of the Program is on governance and finance, it is also undertaking a number of activities in the area of renewable energy. In fact, while Environmental Management is one of three main components listed in Table 9, renewable energy promotion is but one of ten different sub-components under the heading More Efficient Factor and Precursor Markets.

Table 9

USAID/Mexico Competitiveness Program (2008 – 2012)

1. **Environmental Management:** Public Policy, Value Chains for Sustainably Produced Goods, Payment for Environmental Services, and Ecotourism.
2. **More Efficient and Effective Government:** Public Policies and Programs for Competitiveness and Innovation and Competition Policy.
3. **More Efficient Precursor Markets:** Greater Access to Microfinance; Improved Urban Water Management; Renewable Energy Promotion; and Labor Force Productivity. [Emphasis added]

The strategy of the renewable energy sub-component is to support ongoing government renewable energy efforts by helping: (1) remove obstacles to renewable energy projects; (2) develop microfinance opportunities for small-scale rural renewable energy projects; (3) inform legislators and the public about the shortcomings of the existing legal framework; and (4) present best practices for renewable energy promotion to municipal and state governments. To date, the program has funded research on the renewable energy sector through Mexico's National Autonomous Technological Institute (ITAM) and on municipal bottlenecks to renewable energy investment.

The MCP is supporting the government of Mexico City (GDF) to adopt and implement environmental management systems and green procurements and promote more efficient energy and water use. It is also assisting the GDF develop an auditing strategy for solar water heating equipment standards, a process for certifying solar equipment, validating sustainable building indicators and conducting cost benefit analyses of green construction. In addition, the MCP is editing a book on renewable energy, focusing on municipal governance, and is also developing guidelines for local governments to enter into public-private-partnerships for renewable energy and energy efficiency projects to be included in the IADB's new Promotion of Public Private Partnerships in Municipalities (MuniAPP) initiative. The MCP is also developing manuals and providing technical assistance to micro-finance institutions on the evaluation of projects involving renewable energy, including productive applications for renewable energy in off-grid rural communities. USAID plans to provide technical assistance for U.S.-Mexico cross border city-to-city renewable energy projects, through the MCP, as well as public financing of open-access transmission.

With respect to climate change and GHG monitoring, the USAID/Mexico Competitiveness Program is providing technical assistance to SEMARNAT's Climate Change office to develop a monitoring and reporting system to track each federal government entity's GHG emissions reductions under the PECC and to develop a mid-term climate strategy in time for the UNFCCC COP16 in Cancun, Mexico in December 2010. It is also helping develop one PEACC.

e. USAID/Mexico University and Capacity Building Programs (2001-Present)

USAID has long incorporated capacity building and university strengthening into its programs. Under the CP/RE program, USAID provided capacity building to the Mexico's Clean Production Centers in the states of Tabasco and Chihuahua and helped strengthen research, teaching and technological development programs on clean production and renewable energy at different universities and technical institutes. It also worked with the Association of Technicians and Professionals for the Application of Energy (*Asociación de Técnicos y Profesionistas en Aplicación Energética, AC - ATPAE*) to develop a methodology for recognizing specialists in energy efficiency.[68]

USAID/Mexico's best known capacity building program, however, is its Training, Internships, Exchanges, and Scholarships (TIES) Partnership Initiative, that has been in existence since 2001 and which has supported a number of clean energy initiatives. In 2007, TIES funded a partnership between the University of Georgia, Universidad Autónoma de Coahuila, Universidad Autónoma de Nuevo León and Universidad Autónoma Agraria Antonio Narro to integrate waste management with energy production to increase the competitiveness of the livestock industry in northeast Mexico. In August 2009, TIES announced the award of three new energy partnerships to promote public-private partnerships in energy efficiency (*Universidad de las Américas Puebla*), improve student, faculty and professional understanding of renewable energy and energy efficiency (*Universidad Autonóma de Nuevo León*), and develop expertise in energy efficiency and renewables as they relate to buildings (*Universidad de Guanajuato*).

3.3.2 Clean Technology Fund (CTF) Investment Plan for Mexico

The CTF Investment Plan is a business plan agreed between the Government of Mexico, the IADB, the International Bank for Reconstruction and Development (IBRD), and the International Finance Corporation (IFC) to support the low-carbon objectives contained in Mexico's 2007-2012 National Development Program (PND), its National Strategy for Climate Change (ENACC) and the PECC (Special Climate Change Program).[69] The Plan seeks to work in three main areas: sustainable urban transport, renewable energy and energy efficiency. Table 10 summarizes the investment needs and proposed allocations across various sources of financing for five projects that make up the investment plan. These projects are described below in greater detail under the respective institution's heading.

[68] See: http://www.teorema.com.mx/energia/reconciliar-eficiencia-energetica-cuidado-ambiental-y-consumo/

[69] *See*, Climate Investment Funds, *Clean Technology Fund Investment Plan for Mexico*, Meeting of the CTF Trust Fund Committee January 29-30, 2009, Report No. 48221. (Hereinafter: *Clean Technology Fund Investment Plan for Mexico*) at: http://www.iadb.org/intal/intalcdi/PE/2009/03479.pdf

Table 10. Clean Technology Fund Investment Plan for Mexico

Financing Source	Urban Transport (IBRD)	Renewable Energy (IADB)	Energy Efficiency (IADB)	Lighting and Appliances Efficiency (IBRD)	Private Sector Energy (IFC)	TOTAL ($ Million)
GoM	750	600	25	50		1,425
CTF	200	125	75	50	50	500
GEF	6					6
CCIG	1					1
IBRD Loans	600			400		1,000
IADB Loans	150	300	50			500
IADB Grant		10	1.5			11.5
IFC					135	135
Other		300	10		365	675
Carbon Finance	50		100	150		300
Other Private Sector	643	850	150			1,643
Total ($ Million):	**$2,400**	**$2,185**	**$412**	**$650**	**$550**	**$6,197**

Source: Clean Technology Fund Investment Plan for Mexico.

3.3.3 Inter-American Development Bank (IADB)

a. Sustainable Energy and Climate Change Initiative (SECCI)

The IADB has committed more than $5 million in technical cooperation grants to Mexico's climate change programs from its Sustainable Energy and Climate Change Initiative (SECCI). The SECCI is a multi-donor fund (Spain, Germany, Italy, Finland, United Kingdom and Japan) aimed at expanding investment in renewable energy and energy efficiency technologies, increasing access to international carbon finance, and the mainstreaming of adaptation to climate change into the policies and programs across sectors in Latin America and the Caribbean.

b. Climate Change and Clean Energy Policy-Based Loans

In addition, the IADB has approved two programmatic policy-based loans (PBL) to Mexico for $200 million in November 2008 and an additional $400 million in September 2009 that provide the Mexican Treasury with flexible resources to finance priority programs, including activities under Mexico's National Climate Change Strategy and the PECC. Funds will support the new Climate Change Policy General Directorate within SEMARNAT and a series of financial mechanisms to jump-start investments in renewable energy and energy efficiency, including the creation of a new energy transition fund (*Fondo de Transición Energética*) established under the renewable energy law (LAERFTE) and new programs to finance renewable energy and energy efficiency projects through Mexico's national development banks (such as NAFIN).[70]

[70] News Releases, IDB supports second stage of Mexico's climate change agenda, September 17, 2009.

c. Clean Technology Fund – IADB Mexico Renewable Energy Proposal

In May 2009, the CTF Trust Fund allocated $15 million for the joint IFC/IADB Private Sector Wind Development project which is providing senior debt financing for the development of a 67.5 MW wind farm in the La Ventosa region of the State of Oaxaca, Mexico which is being developed by Eléctrica del Valle de México, S. de R.L. de C.V. (EVM) an affiliate of Électricité de France. In 2009 the IADB submitted a second CTF proposal, entitled "Mexico Public-Private Sector Renewable Energy Program," which seeks an additional $50 million in funding for an envelope of private sector renewable energy projects, and $1.54 million for public and private sector technical assistance activities. Included in the proposal is $2.25 million from the bank's CECCI to develop a National Climate Change Financing Facility and conduct additional studies, and $5 million in GEF funding to support renewable energy technology development, both of which are summarized below:

Clean Energy and Climate Change Financing. Under its proposal, the IADB is preparing a $2 million SECCI technological cooperation as part of a request to support the design of a new National Climate Change Financing Facility for Mexico or a National *Fondo Verde*. This facility would seek to leverage and attract financial resources from Mexico's domestic budget, donors, multilateral and bilateral development banks, CTF, and carbon finance and strategically direct them to Mexico's national development banks and/or commercial banks for delivery of low carbon investments in climate change projects, including renewable energy. In addition, the IADB proposal seeks a $300,000 non-reimbursable grant to strengthen the capacity of NAFIN in the area of renewable energy financing, including support of project preparation for renewable energy, that will enable NAFIN to reduce the upfront development costs for developers, for example through feasibility studies. The IADB will invite NAFIN to co-finance renewable energy projects in Mexico, particularly those benefiting from CTF funds under the IDB Private Sector Envelope, which it hopes will help to develop hands-on experience building a portfolio of well-structured renewable energy projects. Finally, the proposal also requests $800,000 in non-reimbursable funding to undertake a comprehensive assessment of opportunities for attracting carbon finance for the renewable energy and energy efficiency sectors and to develop a programmatic approach towards attracting carbon finance in relevant sectors. The IADB proposes to provide training and build the capacity of public and private sector financing agencies and intermediaries on opportunities presented by a future carbon market. It also plans to work with the Energy Regulator (the CRE) on ways to facilitate the implementation of programmatic Clean Development Mechanism (CDM) projects.

Support for Implementation of the New Renewable Energy Law. Under its proposal, the IADB plans to undertake a series of studies to help the GoM implement its obligations under the new renewable energy law. These include:

- ***Pricing mechanism studies*** to help establish (1) the necessary regulatory tools for calculating service fees between generators and distributors in the electricity system in the case of renewable energy and cogeneration, and the maximum prices to be paid to IPPs for electricity sold to CFE, based on a range of economic, environmental and financial considerations; (2) the

methodologies for calculating the price paid to renewable energy and cogeneration self-supply and small producer projects for their excess electricity and capacity; and (3) the adequate pricing methodologies and conditions for use of the electricity transmission and distribution system and associated services required by renewable energy generators.

- ***Biomass potential study*** to define the potential for electricity production by sugar cane producers that fit within the small producers (<30MW) category.
- ***Geothermal potential study*** to assess and map the geothermal potential for energy production.
- ***Cogeneration efficiency study*** to help define the efficiency criteria and tools by which the regulator will issue permits to cogeneration projects on the basis of appropriate technical standards.

Wind Energy Competitive Supply-Chain and Services Industry. In addition, the IADB is poised to launch a new $5 million GEF funded Technical Assistance program to support the creation of a competitive supply-chain and services industry in the wind energy sector in Mexico. The new program will:

- Structure a value chain for the production of goods and services at the national level in the wind energy sector;
- Consolidate the human talent required for the design of state of the art wind turbines;
- Consolidate the technical capabilities for the manufacturing, testing and certification of wind turbines
- Establish the necessary industrial capabilities for the production of wind turbines with a high component of national technology; and
- Support the development and provide capacity building to promote wind power application through distributed generation by small power producers.

Environmental and Social Impacts of Wind Projects. Finally, under its CTF proposal, the IADB plans to prepare with SECCI funds a cumulative impact assessment for endemic and migratory birds and bats for current and future wind projects on the Isthmus of Tehuantepec in Oaxaca, and seeks additional moneys to help create a long term and sustainable Development Plan for Local Communities on the Isthmus of Tehuantepec in Oaxaca that are impacted by wind projects, and conduct a study of the economic benefits of developing a wind power industry within Mexico.

d. CTF – IADB Energy Efficiency Funding to Support FIDE Programs

Although no formal proposal has been submitted by the IADB to the CTF for funding, the CTF Investment Plan for Mexico contemplates supporting the development of a phase II of the FIDE-IADB Energy Efficiency Market Transformation Program. The PECC calls for a five-fold increase in energy savings through FIDE programs focusing on the residential (sustainable housing program, efficient air conditioning, thermal insulation) and industrial sectors and municipalities (replacing old electric motors).

As far as the author was able to ascertain, a formal funding request for such an initiative has not yet been submitted or approved.

e. Other Clean Energy IADB Programs

MuniAPP. The IADB is also about to begin a new program for the Promotion of Public Private Partnerships in Municipalities (MuniAPP) through the Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM). The program seeks to expand and improve the delivery of public services and infrastructure through the development of public-private partnerships (PPP) which could also include energy efficiency and renewable measures.

Solar Energy and Energy Efficiency in Low Income Residences in Baja California. In 2008 the IADB-Japanese Trust Fund for Consultancy Services (JFC) awarded $749,000 in technical assistance over a 12 to 15 month period to work with CONUEE to develop a pilot project in the State of Baja California that adopts solar energy technologies and energy efficiency measures for low income residents connected to the electric grid. The program will evaluate measures taken and seek replicate them in other communities. The project will also prepare guidelines for energy efficiency standards and norms that are applicable to the conditions in Baja California.[71]

3.3.4 World Bank Clean Energy and Climate Change Programs in Mexico

The World Bank along with the IADB is actively engaged in supporting renewable energy and climate change activities in Mexico. Its assistance can be broken down into three main areas: policy activities, analysis and technical activities, and investment and financing activities, each described below. A more detailed description of these activities can be found in Annex 2 of the Word Bank's ESMAP, *Project Concept Note: Mexico Renewable Energy Assistance Program*.

a. Clean Energy and Climate Change Policy

The World Bank funded the *Mexico Low Carbon Study (MEDEC) (P108304)* which highlights Mexico's potential for reducing carbon emissions from a range of sectors, including transport, power generation, end-use energy efficiency, and land-use and provided essential information for the development of the PECC. In addition, the Bank issued two policy loans to support the GoM's efforts to develop and approve the National Climate Change Strategy and integrate climate change considerations in sectoral programs.

b. SEMARNAT Climate Change Support

Under *Memorandum of Understanding P112959* the Bank is providing support to SEMARNAT to implement Mexico's climate change policy dialogue, mainstream environmental considerations into

[71] IADB ME-T1023 : Residential Use of Renewable Energy and Energy Efficiency in Baja California – Plan of Operations, September 2008.

productive sectors and implement its National Climate Change Strategy and Special Climate Change Program (PECC). Specifically the Bank is supporting:

- The design and implementation of environmental regulations,
- The mainstreaming of environmental considerations in the housing and the energy sectors,
- The design of a Cap and Trade System,
- The preparation of sub-national climate change action plans (PEACCs), and
- Adaptation on the Gulf Coast.[72]

c. SENER Clean Energy Policy and Regulatory Support

The World Bank is also providing support to the GoM implement the PECC through green sectoral policies, incentives and an appropriate regulatory framework for renewable energy and energy efficiency. Table 11 provides an illustrative list of clean energy analysis and regulatory assistance activities that the World Bank Energy Sector Management Assistance (ESMAP) program plans to provide to the GoM. The chart also includes technical assistance being provided by GTZ and the IADB.

Table 11

World Bank Energy Sector Management Assistance (ESMAP)
Mexico Renewable Energy Technical Assistance Program - Indicative Plan of Activities

Renewable Generation Target	Agency	Support
1. 1. Resource Analysis		
1.1.1. Potential sites for projects including technical characteristics & costs and transmission requirements (1)	SENER	WB
1.1.2. Database available to potential developers; definition of work to prepare national inventory	SENER	WB
1.2. Economic and Financial Analysis		
1.2.1. Methodology to determine the extent to which RE may contribute to total electricity generation, prepare cost curves by technology, estimation of appropriate target based on avoided cost plus externality value, estimation of regional impact of RE development at target level.	SENER	WB (w/ GTZ)
1.2.2. Development of methodology to determine the cost of externalities associated with electricity generation based on renewable energy	SENER	IDB
1.2.3. Analysis of financial viability of projects with and without carbon benefits, estimation of financial cost curves by technology, impact of different financial mechanisms for meeting targets, effectiveness of alternative financial incentive mechanisms, sharing of costs, impacts of proposed pricing/regulatory arrangements with respect to tariff received by project development.	SENER	WB
Regulatory Framework		
2.1. Policy & Regulatory Analysis		
2.1.1. Identify regulatory arrangements and develop policy approach (e.g. feed-in laws, portfolio standards, auctions, financial incentives, etc) to meet RE targets	SENER/ CRE	CRE
2.1.2. Develop a standard contract for RE purchase	CRE	WB
2.1.3. Develop a standardized price or approach to pricing, to third parties or to nearest utility, based on avoided costs or other principles, by region, season, time of the day.	CRE	IDB/GTZ

[72] See, Annex 2 of the ESMAP, *Project Concept Note: Mexico Renewable Energy Assistance Program*, 2009.

2.1.4. Develop arrangements of RE dispatch and calculation of firm energy, for transmission access and costs and for wheeling	CRE	IDB/GTZ
2.1.5. Study on the penetration of intermittent RE sources in the National Electricity System	CRE	WB
2.2. International Experience Dissemination - Renewable polices and lessons learned (Germany, USA, Australia, Brazil, India, China	SENER	WB
Environmental Regulation		
3.1. Regulatory arrangements		
Identify regulatory arrangements to include social and environmental issues and to promote the use of renewable energy.	SENER	WB
3.2. Cogeneration efficiency		
Definition of efficiency criteria for cogeneration projects	CRE	GTZ
Financing Support		
4.1. Development of Renewable Energy Fund		
4.1.1. Determine the parameters of operation of the Renewable Fund, setting clear procedures to select projects and define loan or grant agreements; project cash-flow	SENER	SENER

Source: http://www.esmap.org/filez/pubs/1210200912212_PCNEsmapRenewableMexico.pdf

Under an MOU with SENER *(P114892)* the Bank is providing support to the GoM to help it to:

- Integrate the policy to promote the use of renewables in power generation,
- Analyze options for modifying the regulatory framework for energy efficiency,
- Identify best practices for reducing gas flaring,
- Support the design of programs to promote the use of efficient lighting and appliances (See World Bank CTF efficiency program below),
- Support the development of a National Energy Strategy,
- Identify good practices in managing the key environmental and social issues in wind power development and provide practical advice on how best to address these issues in wind project siting, design, operation, and monitoring (*Guidelines for Scaling-up Wind Energy Development - P109850),* and
- Fund pre-feasibility studies and environmental assessments of selected mini-hydro project sites with relevant hydrological potential in Mexico to help fulfill one of the obligations of SENER under the renewable energy law (*Examining the Feasibility of Mini-hydro Projects in Mexico)*.

d. Efficient Lighting and Appliances Program

The World Bank program has four components, (1) residential lighting, (2) efficient refrigerators and air-conditioners, (3) municipal street lighting and other energy efficiency measures, and (4) SENER energy efficiency technical assistance and institutional strengthening.[73]

Residential Lighting. (Estimated total cost: $125 million - IBRD $85 million, CTF $5 million, CF advance payment $15 million, GOM $20 million). The World Bank program will help finance the acquisition and provide implementation support for the distribution of 70 million Compact Fluorescent Lamps (CFLs) for low-income urban and rural households, as part of the Government's national program

[73] *See,* World Bank, *MEXICO: Lighting and Appliances Efficiency Project*, Project Information Document (PID), Report No.: AB4690, March 24, 2009.

on energy efficiency which aims to replace 200 million Incandescent Bulbs (IBs) by CFLs in the residential sector over a 5-year period.

Replacement of Refrigerators and Air-Conditioners. (Estimated total cost: $415 million - IBRD $290 million, CTF $30 million, CF advance payment $10 million, GoM $85 million). The World Bank program is working with the GoM to provide subsidies and soft-loans (based on a 4 tier incentive scheme) to low-income households to purchase the replacement of about 1.2 million refrigerators and air conditioners as part of the GoM's recently launched program to replace 5.5 million units over 5 years. The program seeks to remove the affordability barrier for residents, ensure that the old equipment is scrapped and recycled properly to prevent any leakage and assure a proper monitoring system.

Municipal Street Lighting and Energy Efficiency. (Total estimated cost: $50 million - IBRD $25 million, CTF $10 million, CF advance payment $5 million, GOM $10 million). The World Bank program is supporting municipalities to develop energy efficiency projects, initially focusing on street lighting retrofits but could also include other areas such as water pumping. According to the World Bank, some of the barriers to develop energy efficiency investments in municipalities include high transaction costs, cumbersome processes, the need for multi-year contracts, and lack of financing. Under the program the Bank is supporting CONUEE to work with BANOBRAS and municipalities to help market and develop street lighting replacement projects. Under its program CONUEE helps identify opportunities and alternative implementation schemes and assists municipalities with the project development process. CONUEE is presently wrapping up a series of pilot projects with municipalities that it plans to roll-out and replicate on a wider scale using standard bidding schemes and incorporating lessons learned. The Bank is also supporting CONUEE develop and train a network of partners to act as project agents in order to facilitate the scale-up.

Technical Assistance and Institutional Strengthening. **($5 million, CTF).** In addition, the Bank is providing technical assistance ($2 million) to SENER to carry out energy security work related to the new energy efficiency law and institutional strengthening of CONUEE ($3 million) to support the restructuring of the commission and the implementation of its commitments under the new energy efficiency law.

e. Renewable Energy Financing Activities

The World Bank together with support from the GEF is also helping to fund a number of GoM large renewable energy projects and its Energy Poverty and Rural Electrification program (*Proyecto de Servicios Integrales de Energía para Pequeñas Comunidades Rurales en el Sureste de México*). These projects include:

- ***The Hybrid Solar Thermal*** project which seeks to demonstrate and encourage the replication of the Integrated Solar Combined Cycle Systems (ISCCS) power generation technology in Mexico (expected to close by December 2012).

- ***Rural Electrification*** project that supports the GoM's $100 million Energy Poverty and Rural Electrification program using renewable energy to bring electricity to over 2,500 communities by 2012 (effective in July 2009).
- ***The Large-Scale Renewable Energy Development GEF*** project that is helping to support the construction of a 101 MW IPP wind farm (close by December 2016).
- ***La Venta II*** *(P080104)* project that is purchasing carbon emission reductions from the La Venta II wind project which will reduce GHG emissions by 4 million tons CO_2e over a 20-year operation period (the closing date for the project is December 31, 2019).
- ***The Mexico Biomass Residues Based Co-generation Project*** *(P109794)* that is providing $7 million in carbon finance to support the development of a Biomass Residues Based Co-generation facility at the Modelo brewery replacing fossil fuel with biomass for heat and electricity generation.

f. Energy Efficient Cities Initiative (EECI)

In 2009 the World Bank's Energy Sector Management Assistance Program (ESMAP) launched a new five year Energy Efficient Cities Initiative (EECI) which seeks to help countries to (1) build institutional capacity at the city level to explore and deploy innovative, energy efficient solutions for the delivery of basic urban services, and (2) reduce the costs and environmental impacts of related energy use. This is a flexible, cross-cutting, and demand-driven initiative to provide city managers and planners with upstream, operational, and evaluation support while disseminating tools, experiences, and results. In its first year, the initiative conducted a number of energy efficiency studies including *Public Procurement of Energy Efficiency Services: Lessons from International Experience* and Innovative Financial Mechanism to Implement Energy Efficiency Projects in Mexico and is contributing to the development of urban development operations in five countries including Mexico.

3.3.5 German Cooperation

GTZ is presently helping to pay for staff in SENER and providing it with technical assistance in the design and implementation of its clean energy promotion and dissemination programs, such as solar collectors or combined heat and power generation. GTZ, the World Bank, IADB and the Organization of American States are also assisting the CRE to develop a new regulatory framework to eliminate entry barriers for renewable energy, rules and norms regarding the generation and exchange of electricity derived from renewable sources, and payments to generators of renewable energy sources. [74]

[74] ESMAP, *Project Concept Note: Mexico Renewable Energy Assistance Program*, Annex 3, p. 14 available at: http://www.esmap.org/filez/pubs/1210200912212_PCNEsmapRenewableMexico.pdf

3.3.6 British Embassy Mexico Climate Change Initiatives

The British Embassy in 2010 is wrapping up its current 2008-2010 climate change program. To date the Embassy has supported the development of the GoM's national climate change policies and the staffing needs at SEMARNAT's General Direction of Climate Change to implement the country's climate change agenda and has helped prepare three PEACCs in Veracruz, Nuevo León and Chiapas. It also worked with INE to develop a tool for preparing PEACCs and biofuels certification as a policy tool for environmental management. The Embassy also developed a legal framework for modifying environmental legislation in five Mexican states to better support renewable energy projects. It also worked with SENER to improve energy efficiency indicators and statistics and with CONAE (now CONUEE) to support energy efficiency measures in the commerce and service sectors.

However, under its new climate change strategy, the British Embassy will focus its attention to working with the private sector and supporting educational exchanges. The British Embassy is working with Price Waterhouse Coopers to undertake mini-expos with clean energy and technology suppliers in 12 States across Mexico. The goal is to reach the country's top 100 companies and bring companies together with technology and service providers. In addition, the United Kingdom Strategic Programmes Fund in Mexico supports projects undertaken with Mexican institutions from the public and private sectors, as well as from civil society that promote (1) human rights, or (2) the transition to a low carbon, high growth economy. Priority will be given to practical interventions that support low carbon technologies, renewable energies and energy efficiency; the development of policies that support the ratification and implementation of a post 2012 global climate framework; or campaigns to target key constituencies such as business or civil society to take action on climate change. The fund also supports projects that help build a legal framework that will encourage transparency and sustainable practices within Mexican companies to strengthen their competitiveness. The fund has invested over 80 million Mexican pesos (4 million pounds) since 2003. Proposals are evaluated on a rolling basis (see: http://ukinmexico.fco.gov.uk/resources/en/pdf/pdf1/lowcarbon-highgrowth-strategy).

3.3.7 Other Donor and International Programs

Spain – AECID. The Spanish development agency AECID is currently supporting the development of PEACCs for the states of Quintana Roo, Tlaxcala, and Michoacán (first stage).

Japan – JICA. Japan's development agency, JICA is providing support to SENER (2009-2011) on energy efficiency and is working with FIRCO and SAGARPA to promote small scale biodigesters in rural communities.

European Union. The EU is also wrapping up a cycle of climate change assistance (2007-2011) which includes investigation on the development of solar powered refrigeration, solar-hybrid power and cogeneration plants and opportunities for biofuel products in Latin America. It has also been working on selected renewable energy and energy efficiency technologies for Clean Development Mechanism project opportunities.

United Nations Environment Programme (UNEP). UNEP is planning to develop three clean energy private sector financing initiatives to work with commercial banks to promote energy efficiency in the tourism sector, the purchase of energy efficiency appliances, and the development of small scale biogas digesters.

ICLEI - Local Governments for Sustainability. The NGO ICLEI is partnering with eight member cities (Ciudad de México, Ciudad Juárez, Culiacán, Guasave, Querétaro, Tijuana, Tlalpan, Toluca) under its Cities for Climate Protection (CCP) Campaign (*Campaña Ciudades por la Protección Climática*) to help local governments measure GHG emissions generated through their actions, commit to emissions reduction targets, and develop and implement emission reduction action plans such as improved energy efficiency in buildings and transport, the use of renewable energy, and sustainable waste management, among other actions. In October 2009 ICLEI published its International Local Government Greenhouse Gas Emissions Analysis Protocol (IEAP) that is based on IPCC 2006 methodology, the WRI / WBCSD GHG Protocol, ISO 14064 Greenhouse Gases series of standards, and the GRI Public Sector Agency Supplement. The IEAP consists of the general principles and philosophy that any local government, regardless of location, should adhere to when inventorying GHGs from its government operations and community as a whole. The IEAP has been the subject of peer review by international organizations and ICLEI members since November 2007.

The Mexico Green Building Council (*El Consejo Mexicano de Edificación Sustentable*). The Mexican Green Building Council (Mexico GBC), a non-governmental organization made up of representatives from the construction industry, is working in Mexico to promote sustainable building technology, policy and best practice. The Mexico GBC is a member of the World Green Building Council and is an affiliated member of the International Initiative for a Sustainable Built Environment. Its primary function is the development of a consensus-based National Green Building Rating Tool (SICES) that will serve as voluntary standard and certification system for sustainable buildings and developments. The SIECES addresses site management, water conservation, energy efficiency, material selection and interior air quality. During its initial phase, the Technical Committee of SICES is focusing on the development of a certification guide for commercial buildings and low income housing, two areas with a high market potential for sustainable building.

3.3.8 Capacity Building and Educational Exchanges

German Clean Energy Exchange Program. The German Government through the German Academic Exchange Service and Centre for International Migration and Development's Integrated Experts Program provides funding for Mexican solar energy technology experts to travel to Germany to study for six months and then undertake a 6-month internship with a German company or organization. Upon returning to Mexico, participants undertake a pilot project with the support of their host German institutions.

British Chevening Scholarships Programme. The British Chevening Scholarships Programme provides scholarships for young international postgraduates to study in the UK and, when they return,

alumni participate in a range of networking and training events organized by the British Embassy in Mexico. For the last four years, the British Embassy created the "Chevening Fellowships" that target mid-career professionals who participate in short, intensive courses on areas, for example, related to climate change and international institutional governance. The programme is being co-sponsored by INE, Shell, BP, Unilever and the *Secretaría de Hacienda*.

The British Sustainable Development Dialogue Program seeks to "transform awareness about sustainable development among Mexican influencers to encourage sustainable practices through a transition from a co-operation programme to a practical policy focused dialogue". The Sustainable Development Dialogue program in Mexico focuses on six priority areas: (1) National governance for sustainable development; (2) Climate change and energy; (3) Sustainable tourism; (4) Sustainable consumption and production; (5) Sustainable urban development and/or sustainable cities; and (6) Natural resources management.

3.4 Clean Energy and Climate Change Funding Mechanisms in Mexico

3.4.1 National Development Bank for Public Works and Services (BANOBRAS) Clean Energy Program

BANOBRAS supports cogeneration and hydro, wind and biogas projects and has a special program to promote energy efficiency in municipalities. Special loans may be used for lighting, maintenance, air conditioners, elevators, and water pumps and equipment among other areas. According to BANOBRAS, the average repayment period on its loans is between 15 and 20 months. The Export-Import Bank of the United States (Ex-Im Bank) on February 25, 2010 announced that it entered into a memorandum of agreement with BANOBRAS to provide up to $1 billion in financing for Mexico's National Infrastructure Program which includes renewable energy projects.[75] According to the IADB, however, there is a "mismatch among financial products offered by public banks and the demand from private developers."[76]

3.4.2 GoM Energy Transition and Sustainable Energy Use Fund

The new renewable energy law, LAERFTE, calls for the creation of a new Energy Transition and Sustainable Energy Use Fund (*Fondo para la Transición Energética y el Aprovechamiento Sustentable de la Energía*) comprised of three thousand million pesos. The fund is still in its development stages. In addition, the Special Program for the Use of Renewable Energy calls for the development of financing schemes for different levels of renewable energy generation, including micro-financing and other support mechanisms to increase the participation of small renewable energy producers. The Special Program also proposes the development of guarantee and shared risk systems and other risk management mechanisms to help drive greater investment in new renewable energy technologies.

[75] *See,* http://www.exim.gov/pressrelease.cfm/06C979C5-D441-5C35-1FB5FA0E33813237/

[76] Amin, *IDB Public-Private Sector CTF Proposal*, at paragraph 58.

3.4.3 FIDE Energy Efficiency and Renewable Energy Loans

FIDE has a wide range of financial services to promote financing for energy efficiency (with a focus on high efficiency motors and appliances) and micro-generation and renewable energy projects. FIDE provides funding to the industrial, commercial and service sectors as well as municipalities and states. FIDE is currently working with the North American Development Bank (NADB) to develop a new program to replace inefficient refrigerators and is developing a loan program for new highly efficient air conditioners with a line of credit from NAFIN. Funds will be repaid through their electricity bills. In addition, FIDE also has lending programs for industrial energy efficiency projects. These include electric energy savings projects of different sizes for industry and commercial and service companies, installation of electric energy savings equipment, and replacement of air cooling systems (chillers).

FIDE, however, is only allowed to finance electrical savings and does not include thermal savings in the industrial sector from reducing the use of fossil fuels in the manufacturing process. FIDE has had less success in providing funding for Energy Service Companies (ESCOS). According to the recent ESMAP World Bank Study, "ESCOS's generally believe the administrative and reporting requirements are overly burdensome and that since the amount of funding provided for each project is not sufficient to cover all of the project costs, it does not often justify the time and expense of compliance with FIDE's regulations."[77]

3.4.4 NAFIN and JBIC

NAFIN and the Japan Bank for International Cooperation have entered into a joint venture to promote energy efficiency and renewable energy projects in Mexico. Under the agreement, JBIC has provided NAFIN with a $138 million line of credit, which in turn provides the funds to first floor banks that assess projects using their own credit review and collateral policies. NAFIN also can provide a guarantee with JBIC funds covering 80% of the total amount of the project. Most of the funds have been used for renewable energy projects. In support of its role to finance renewable energy and energy efficiency projects, NAFIN has created the Sustainable Projects and Climate Change Unit. Energy Service companies complain that the collateral requirements imposed by national first floor banks are too stringent. Banks often require collateral pledges of 200% of the loan amount and ESCO guarantees of savings are not accepted by banks in Mexico as collateral. This means that banks limit their creditworthy determination to a balance sheet analysis only. First floor banks in turn, complain that the NAFIN program is inflexible and bureaucratic.

3.4.5 Mexican Carbon Fund (FOMECAR)

In 2006 the National Bank for Foreign Commerce (*BANCOMEXT – Banco Nacional de Comercio Exterior, S.N.C.*) established, together with SEMARNAT and the Mario Molina Center for Strategic Studies

[77] World Bank ESMAP Report 338/09, *Innovative Financial Mechanism to Implement Energy Efficiency Projects in Mexico*, p. 35.

on Energy and the Environment (*CMM – Centro Mario Molina para Estudios Estratégicos sobre Energía y Medio Ambiente, A.C.*), the trust called the Mexican Carbon Fund (*FOMECAR – Fondo Mexicano de Carbono*) to promote the development of Clean Development Mechanism projects under the Kyoto Protocol and Certified Emission Reductions (CERs). BANCOMEXT also provides a line of credit for sustainable projects with support from the World Bank, Japan Bank for International Cooperation, the European Development Bank and KfW. One of the goals of the PECC is to restructure BANCOMEXT to facilitate greater access to financial as well as carbon markets.[78]

3.4.6 Carbon Markets in Mexico

According to the IADB, Mexico has the potential to mitigate an estimated 130 million tCO_2e. Nevertheless, Mexico has only registered CDM projects that mitigate 8.8 tCO_2e.[79] The PECC sets a goal of developing at least 25 new CDM projects and 5 new CDM programs.[80] The IADB notes that "[c]arbon finance has been difficult to pursue due to lack of information among private sector companies, over-regulation in public companies and a lack of financial programs to support sustainable projects among public and private banks, in addition to other inherent carbon market barriers such as carbon price volatility, lack of methodologies and difficulties to apply the additionality criterion."[81]

4. USAID Global Climate Change Funding and Congressional Earmarks

President Obama has committed the United States to being a global leader in addressing the impacts of global climate change, both at home and abroad. Climate change is by far one of the world's greatest challenges, and President Obama and Secretary of State Hillary Clinton have made the promotion of low-carbon growth a priority for U.S. diplomatic and development efforts. This commitment is reflected not only in the President's development budget but also on the Administration's pursuit of greater international cooperation on clean energy and climate change.

4.1 Clean Energy Definition

The latest USAID Operational Plan guidance defines Clean Energy as follows:

> **Clean Energy*** –Reduced net greenhouse gas emissions (GHG) from the energy sector, industry, and urban areas. Activities in this Sub-Key Issue should be developed with the **goal of achieving significant reductions in GHG trajectories over time**. Clean Energy activities may fit the criteria for the Energy Poverty and Security Key Issue, and should also be reported under that category where applicable. [Emphasis Added]

[78] See PECC Objective 4.3.3, goal T.17.
[79] Amin*, IDB Public-Private Sector CTF Proposal*, at paragraph 59.
[80] See PECC Objective 4.3.4 – T.21.
[81] Amin, *IDB Public-Private Sector CTF Proposal*, at paragraph 59.

Pursuant to Section 7081(b) of the 2010 Foreign Appropriations Act, USAID's clean energy programs and activities shall seek to reduce global warming by promoting "*the sustainable use of renewable energy technologies, energy efficient end-use technologies, carbon sequestration and carbon accounting*" and where possible shall include "*microfinance renewable energy programs, including solar energy programs*."[82] At the time of publication, USAID/Washington was still negotiating the definition of the "renewable energy microfinance" earmark with Congress. Nevertheless, the following is draft guidance from USAID/Washington as of April 2010:

> Renewable energy microfinance comes from a variety of providers, including financial institutions, renewable energy enterprises, and other sustainable sources. Consumer-oriented finance can help poor households to purchase renewable energy products and services. Enterprise-oriented finance can help renewable energy enterprises to start-up, improve their operations, and expand their outreach to poor households. In both cases, a mix of technical assistance, training, and public awareness will be required to build the market (i.e. both supply and demand) for renewable energy microfinance. USAID will work with a range of partners (including commercial banks, microfinance institutions, informal financing structures, as well as renewable energy enterprises of all sizes) to respond to the opportunities and constraints for renewable energy microfinance that are unique to each country context. USAID will also support efforts to reduce regulatory, policy and administrative barriers that limit the opportunities of renewable energy micro and small firms. Technologies supported by these programs can include *small-scale renewable and energy efficient devices, including wind, micro-hydro, and solar systems, biodigesters, improved cook stoves, efficient lighting devices, energy efficient appliances and other end-use efficiency improvements, and solar thermal technologies*. [Emphasis Added]

4.2 Clean Energy Program and Activity Areas

According to the Consolidated USAID FY 2010 GCC pillar funding definitions, criteria, and examples, dated March 2, 2010, a primary objective of USAID's clean energy programs and activities must be to reduce, mitigate, and/or sequester emissions of greenhouse gasses. Clean energy includes USAID programs and activities in the following areas:

[82] Language from the 2010 Foreign Appropriations Act, Section 7081(b) states: "CLEAN ENERGY PROGRAMS.—Funds appropriated by this Act under the headings "Development Assistance", "Economic Support Fund", and "Assistance for Europe, Eurasia and Central Asia" for clean energy programs and activities, may be made available only to promote the sustainable use of renewable energy technologies and end-use energy efficiency technologies, carbon sequestration, and carbon accounting: Provided, That of the funds made available for the United States Agency for International Development (USAID) for clean energy programs, not less than $10,000,000 shall be made available for microfinance renewable energy programs, including solar energy programs."

a) Direct expenditures on promotion and deployment of clean energy (renewable energy technologies, energy efficient end-use technologies, carbon sequestration and carbon accounting);

b) Expenditures related to the preparation and implementation of the clean energy components of Low Carbon Development Strategies or Low Emission Development Strategies (LEDS). These expenditures may include preparation of strategies and support for implementation of specific LEDS components. On April 9, 2001, USAID and the Department of State established the following Climate Change High Priority Performance Goals for LEDS:

> "By the end of FY 2011, U.S. assistance will have supported the establishment of at least 20 work programs to develop Low-Carbon Development Strategies (LCDS) that contain measurable, reportable, and verifiable actions. This effort will lay the groundwork for at least 30 completed LCDS by the end of FY 2013 and meaningful reductions in national emissions trajectories through 2020."[83]

Support for implementation of LEDS components related to nuclear or fossil fuel technologies, including the production or direct use of these fuels, does not qualify;

c) Expenditures for strengthening greenhouse gas inventory and accounting systems, including methodological development, energy statistical systems, archiving, quality control and improvement, reporting, and institutions and human capabilities;

d) Expenditures related to promoting carbon market readiness and carbon market mechanisms, institutions and human capabilities;

e) Expenditures on programs that promote or establish critical preconditions to sustainable clean energy programs. These can include:

- Design and technical support for development of clean energy programs and their components;
- Support for reforms that significantly improve cost recovery and establish the financial capacity in the energy sector to make investments in clean energy;
- Development of the enabling environment (policies, laws, regulations and institutions) that directly support sustainable clean energy programs;
- Establishment or strengthening of energy sector and utility regulatory and planning capacity that is an essential precondition to sustainable clean energy development; and
- Transmission and system operating investments that are specifically designed for the evacuation, transport and trade in renewable energy.

[83] *See,* USAID-State Department Power Point, *Climate Change High Priority Performance Goals*, April 9, 2010, available from the USAID/EGAT Climate Change Team.

f) Expenditures on nuclear, gas, coal and oil for production, direct use as well as electricity generation in almost all situations **do not** qualify as clean energy expenditures. In general, do not classify funds used for the production, direct use, or improvement of energy efficiency of nuclear, coal, oil or other fossil fuels as "clean energy" expenditures. There may be a very limited number of exceptional cases of fossil fueled generation that can be classified as clean energy due to exceptional greenhouse gas reductions involved. The expenditures that would qualify are limited to those associated with electricity generation and gas transmission infrastructure using gas that would otherwise be flared or vented.

g) For transmission and operating system infrastructure, where only part of the energy carried by the system is "clean energy," a reasonable allocation of a portion of the USAID expenditure should be determined and documented.

h) Expenditures that are intended to significantly improve the performance and reduce losses of electricity and gas distribution utilities may qualify as clean energy if they are integral to a GHG emissions reduction plan.

4.3 GCC Focused/Direct Clean Energy Criteria

The GCC Sub-Key Issues respond to a Congressional earmark and Administration Initiative, and **must be chosen for any activity or part of activity that receives climate change funds**. According to USAID/Washington guidance, a GCC program or activity must meet the following criteria:

- The narrative should cite whether the GCC funding is "Focused" or "Indirect." Programs that receive focused funding (i.e., are not attributed to any other earmark) should address the Administration's priorities of helping developing countries achieve climate resilient and low emissions development through support for creation and implementation of national strategic plans on climate change, emissions inventories, carbon market readiness, and targeted field demonstration activities. The Agency may issue further detailed guidance on these priorities.

- The program or activity explicitly seeks climate change-related outcomes in the form of a GCC objective.

- The program or activity is monitoring its impact on addressing climate change using one or more GCC indicators, at least one of which must be a USAID standard GCC Indicator. Programs with field level activities and impacts must report estimated CO_2 emissions reductions and sequestration."

Focused/Direct GCC funded investments in Clean Energy must also meet all of the following criteria:

1. **Funding:** Program/activity must use focused funding from the GCC initiative and the clean energy pillar (i.e., must use funding apportioned from the $108.5M clean energy directive) and not be attributed to any other initiative.

2. **Policy Priorities:** Program/activity helps developing countries achieve climate resilient and low emissions development through support for creation and implementation of national strategic plans on climate change, emissions inventories, carbon market readiness, targeted clean energy field demonstration activities and activities that promote or establish critical preconditions to sustainable clean energy programs that will lead to significant deviations in carbon emission trajectories over the long-term from established baselines.

3. **Objective:** Program/activity has an explicit objective to seek climate change-related outcomes of reducing, mitigating, and/or sequestering emissions of greenhouse gasses.

4. **Indicators:** Program/activity monitors its impact using one or more USAID climate change indicators, at least one of which must be a standard indicator. Relevant standard indicators are under 4.4.1 (Modern Energy Services), 4.8.1 (Natural Resources and Biodiversity), and 4.8.2 (Clean Production) and include the following language: "*Quantity of greenhouse gas emissions, measured in metric tons CO_2 equivalent, reduced or sequestered as a result of USG assistance.*"
5. **Outcome:** The activity contributes to the objective of stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system by promoting efforts to reduce or limit greenhouse gas emissions or to enhance greenhouse gas sequestration. Such a program/activity would contribute to one or more of the following:

    a. The mitigation of climate change by limiting anthropogenic emissions of GHGs including gases regulated by the Montreal Protocol; or

    b. The protection and/or enhancement of GHG sinks and reservoirs; or
    c. The integration of climate change concerns with the recipient countries' development objectives through institution building, capacity development, strengthening the regulatory and policy framework, or research; or
    d. Developing countries' efforts to meet their obligations under the UNFCCC.

In addition, Operating Units must provide the following information on USAID's clean energy programs:

- A brief explanation of the relationship between the activity/program and the sustainable deployment of clean energy technologies;
- The anticipated long-term impact on CO_2 emissions in that country;
- How the activity supports that country's commitments under the UN Framework Convention on Climate Change (UNFCCC).

- How the activity supports USG commitments under the UNFCCC.

Finally, it is important to note that USAID/Washington is still negotiating with Congress regarding whether the following activities are eligible to receive "Focused/Direct" GCC Clean Energy funding:

- A program that promotes combined heat and power (**cogeneration**) from fossil fuels (coal, oil and/or natural gas) in district heating
- Design and implementation of a **"smart grid"** program to modernize energy generation, transmission and distribution systems for which a significant amount of the energy carried by the system is electricity generated by fossil-fuels.

5. Analysis of Existing Clean Energy and Climate Change Efforts and Potential USAID Opportunities

The GoM has multiple programs to increase the use of renewable energy and energy efficiency and mitigate the impacts of climate change. At the same time there are numerous bilateral and multilateral donor agencies engaged or planning to engage in this area. Although the field is crowded, there are five areas where USAID has the potential to play a leadership role in helping the GoM meet its clean energy goals and emission reduction targets for 2012 and beyond. A central theme throughout each of these areas is the opportunity to engage at the state and municipal level.

5.1 Renewable Energy and Energy Efficiency Regulatory and Policy Development

5.1.1 Existing Renewable Energy and Energy Efficiency Regulatory and Policy Efforts

a. Renewable Energy Regulatory and Policy Development

New Renewable Energy Law (LAERFTE). The World Bank, the Inter-American Development Bank, the German development agency (GTZ) and the Organization of American States are all providing considerable assistance to the GoM to help promote a low carbon development path through increased use of renewable energy and energy efficiency. As Table 13 shows, numerous international donors are providing technical assistance to SENER, CRE, CFE, SEMARNAT to implement reforms in the country's legal, regulatory and policy framework for renewable energy and energy efficiency. Most of these reforms called for under the new renewable energy law (LAERFTE) are underway and will be developed by the time USAID/Mexico's new clean energy and climate change program is in place in 2011. The World Bank, IADB and GTZ all have consultants providing assistance to SENER, CFE and CRE and extensive experience working on renewable energy policy and incentive frameworks.

Table 13. Renewable Energy Regulatory and Policy Reform

Clean Energy / Climate Change Program	GoM Ministry or Implementing Entity	International Donors Support	USG Program & Partners Past & Present (* USAID)	U.S.-Mexico Bilateral
Renewable Energy Regulatory and Policy Reform				
SENER Institutional Strengthening	SENER	WB, GTZ		
Regulatory Reforms under new renewable energy law (LAERFTE)	SENER, CRE	IADB, WB, GTZ		
Action Plan to Eliminate the Barriers to the Devel. of Wind Gen. in Mexico	SENER	SENER, IIE, UNDP, GEF		
RE Supply Chain and Economic Development				
Support for the creation of a competitive supply-chain and services industry in the wind energy sector in Mexico		IADB $5 M from GEF		
Study of the economic benefits of developing a wind power industry within Mexico		IADB CTF Proposal		
Methods for promoting the adoption of clean energy technologies at scale	IIE, SENER,		DOE Proposal	Yes
RE supply chain opportunities assessment			* USAID/Mexico Competitiveness Program (MCP)	
RE Environmental and Social Impacts				
Cumulative impact assessment for endemic and migratory birds and bats for current and future wind projects on the Isthmus of Tehuantepec in Oaxaca		IADB-CECCI		
Develop a long term and sustainable Development Plan for Local Communities on the Isthmus of Tehuantepec in Oaxaca		IADB CTF Proposal		
Identify reg. arrangements to include social and env. issues and promote RE	SENER	WB		
Identify good practices to mgt. key env. and social issues in wind power dev. and advise on ways to address these issues in wind project siting, design, operation, and monitoring`	SENER	WB		
Developed legal framework for modifying Env. legislation in five Mexican states to better support renewable energy projects		UK		

Supply Chains, Environmental and Social Impacts. Similarly, the World Bank and other donors are also providing support to the GoM on other key policy issues such as the development of renewable energy supply chains and addressing the environmental and social implications of wind energy. Under

its recent Clean Technology Fund proposal, the IADB is seeking to create a Development Plan for Local Communities on the Isthmus of Tehuantepec in Oaxaca to help structure and implement a program to support community development and investment that is sustainable over the long-run. Mexico's Wind Energy Association, AMDEE, is also in the process of establishing a new foundation to help channel assistance to such communities.

Transmission Infrastructure and Connection. Transmission infrastructure is a significant barrier to the development of renewable energy in Mexico. Under the GoM's Special Program for the Use of Renewable Energy, SENER and CFE are also charged with developing the transmission and interconnection infrastructure necessary to take advantage of national renewable energy sources. Table 14 summarizes the work being done related to electricity transmission for renewable energy.

Table 14. Renewable Energy Transmission and Cross Border Trade

Clean Energy / Climate Change Program	GoM Ministry or Implementing Entity	International Donors Support	USG Program & Partners Past & Present (* USAID)	U.S.-Mexico Bilateral
RE Transmission and Cross-Border Trade				
Develop arrangements of RE dispatch and calculation of firm energy, for transmission access and costs and for wheeling	CRE	IADB/GTZ		
Study on the penetration of intermittent RE sources in the National Electricity System	CRE	WB		
Promote the development of a regional RE market between California and Baja California			DOE	Yes
Establish a Special Joint U.S.-Mexico Commission to address cross-border RE transmission issues	SENER, SRE		DOE, DOS	Yes
Undertake Smart Grid Maturity Model exercise and help develop smart-grid pilot projects	SENER		DOE Proposal	Yes
Provide TA for U.S.-Mexico cross border city-to-city RE projects *			* MCP 2010	
Promote and public financing of open-access transmission *			* MCP 2010	
USAID report documenting the analysis and explanation of wind energy export potential from Mexico to the U.S., and considerations of what is needed for the potential to be realized			*CP/RE 2007	

Cross-Border Renewable Energy Markets. One region impacted by the lack of transmission infrastructure is Baja California which has tremendous potential for wind energy development and export to the State of California to help meet the State's Renewable Portfolio Standard. Nevertheless, the region's renewable energy potential far exceeds the current transmission capacity on both sides of the U.S.-Mexico border. The U.S. and Mexico governments have expressed a desire to work together under the U.S.-Mexico Bilateral Agreement to promote the development of a regional renewable energy

market between California and Baja California. Presently, the U.S. and Mexican governments are exploring the establishment of a Special Joint Commission to address transmission issues between the two countries. Meanwhile, the California Renewable Energy Transmission Initiative (RETI) is conducting a series of studies to determine what additional transmission capacity is needed to increase access to renewable energy. A second obstacle to cross-border renewable energy is the potential impact that a substantial increase in intermittent wind power (say 5,000 MW) might have on both CFE's and Imperial Irrigation District's (IID) electricity grids even if they are not directly connected to the renewable power source. The World Bank is currently conducting a study to look at the penetration of intermittent renewable energy sources in Mexico's National Electricity System (although not directly focused on Baja California).

State and Municipal Regulatory and Policy Support. The new renewable energy law instructs SENER and CFE to enter into agreements with state and municipal governments to facilitate access to areas with high potential for renewable energy, including establishing new land use and construction regulations and simplifying the administrative procedures for obtaining permits and licences for renewable energy.[84] It appears that this is an area where there is less international donor support.

b. Energy Efficiency Regulatory and Policy Development

Energy Use and Efficiency Law. As is the case for the renewable energy law, there is considerable international donor assistance to help SENER and CONUEE develop the regulatory framework to implement the new energy use and efficiency law as demonstrated by Table 15.

Table 15. Energy Efficiency Regulatory and Policy Reform

Clean Energy / Climate Change Program	GoM Ministry or Implementing Entity	International Donors Support	USG Program & Partners Past & Present (* USAID)	U.S.-Mexico Bilateral
EE Regulatory and Policy Reform				
SENER – EE institutional strengthening	SENER	WB, GTZ, Japan-JICA (2009-11)		
CONUEE – EE institutional strengthening and restructuring	CONUEE	WB $3 M		
Support for regulatory reforms under new Sustainable Use and Energy Efficiency Law	SENER, CONUEE	WB		
Analysis of options for modifying the regulatory framework for en**No index entries found.**ergy efficiency	SENER, CONUEE	WB		
Support to SENER to carry out energy security work	SENER	WB $2 M		

[84] *Ley para el Aprovechamiento de Energías Renovables y el Financiamiento de la Transición Energética* (LAERFTE), Art. 8o.

under new EE law.				

Energy Efficiency Standards. Under the new sustainable energy use law, CONUEE is charged with developing a series of new energy efficiency standards set out in Table 16. It appears that CONUEE has both the technical capacity and financial donor support to develop such standards. Under the U.S.-Mexico Bilateral Framework, both countries expressed interest in possibly collaborating on the development of a joint lighting standard and harmonizing North American energy performance standards (freezers and refrigerators, three-phase motors, and room air conditioners). At the 2009 North American Leaders Summit, Mexico, the U.S. and Canada also issued a *Declaration on Climate Change and Clean Energy* committing to developing a "framework to align energy efficiency standards in the three countries."

Table16. Energy Efficient Norms and Building Codes

Clean Energy / Climate Change Program	GoM Ministry or Implementing Entity	International Donors Support	USG Program & Partners Past & Present (* USAID)	U.S.-Mexico Bilateral
CONUEE Energy Efficiency Norms Under EE Law		WB		
Update refrigerator and water heater norms	SENER, CONUEE			
Update minimum efficiency standards	SENER, CONUEE			
Norm to promote the moderate use of air conditioners	SENER, CONUEE			
Update the norm for three-phase motors	SENER, CONUEE			
Insulation standards for new federal public administration buildings	SENER, CONUEE			
Develop a joint U.S.-Mexico lighting standard	SENER, CONUEE		EPA Proposal	Yes
Harmonize North American energy performance standards (freezers and refrigerators, three-phase motors, and room air conditioners)	SENER, CONUEE,		EPA Proposal	Yes
Collaborative Labeling and Appliance Standards Program (CLASP) - evaluate impact of EE standards for motors, refrigerators, clothes washers and room air conditioners *	FIDE		* USAID/EGAT, LBNL, IIEC, and ASE	
Development of Local Energy Efficient Building Codes		WB		
Incorporation of insulation standards in local construction regulations.	CONUEE, local government			
Enforcement and compliance with applicable norms required for construction licenses	CONUEE, local government			

Product and Building Certification. Under the new energy use and efficiency law, CONUEE is also responsible for developing a voluntary energy efficiency product certification system similar to EPA's Energy Star Program. The GoM's Program for Sustainable Energy Use specifically expresses a desire to learn from EPA's Energy Star program in areas such as: the range of products to certify, the procedures for certifying products, the relationship with producers, harmonizing the standards for the

benefit of producers, relations with other energy institutions in other countries, market elements previously used, and best practices in promoting energy efficiency. As part of the U.S.-Mexico Bilateral Framework, both countries have agreed to share experiences on EPA's Energy Star Program.

In addition, CONUEE is developing a certification program and campaign for efficient building equipment/materials and working with state and municipal governments to promote the incorporation of insulation standards in local construction regulations and strengthen compliance with applicable norms required for construction licenses. According to the World Bank, with "the large growth potential of electricity use in the commercial and public service sectors, a focus on tightening energy-efficiency standards and enforcement for lighting, refrigeration, air conditioning, and buildings will be crucial to reducing greenhouse gas emissions from this sector."[85] The Mexico Green Building Council (MexicoGBC), a non-governmental organization comprised of representatives from the construction industry, is also developing a National Green Building Rating Tool (SICES) that will eventually serve as a voluntary certification standard for sustainable buildings and developments similar to the Leadership in Energy and Environmental Design (LEED) certification system in the U.S. Table 17 summarizes the different energy efficiency certification initiatives currently underway in Mexico.

Table 17. Energy Efficiency Certification

Clean Energy / Climate Change Program	GoM Ministry or Implementing Entity	International Donors Support	USG Program & Partners Past & Present (* USAID)	U.S.-Mexico Bilateral
CONUEE Energy Efficiency Certification		WB		
Develop voluntary energy efficiency product certification program modeled after Energy Star				
Share experiences on EPA's Energy Star Program	CONUEE, SENER		EPA Proposal	Yes
Develop a certification program and campaign for efficient building equipment/materials	CONUEE			
Develop a certification for estimating the electricity consumption of new buildings	SENER, CONAVI, INFONAVIT, CONUEE			
Voluntary Green Building Certification		WB		
The Mexico Green Building Council is developing a National Green Building Rating Tool (SICES) for a Mexico voluntary certification system similar to the Leadership in Energy and Environmental Design (LEED) system		MGBC		

[85] *Ibid.*

5.1.2 Opportunity to Support the Development of Renewable Energy and Energy Efficiency Policies and Regulations

USAID is known for its energy and regulatory policy work around the globe. USAID has extensive experience helping countries develop their renewable energy and energy efficiency regulatory frameworks, policies and incentives both at the national and local level. In Mexico, USAID has worked with CONAE and FIDE to develop many of the energy efficiency codes and voluntary standards that are in existence today. USAID/Mexico has also worked with SENER, FIRCO and SAGARPA to promote the use of rural renewable energy applications and its CP/RE program helped lay much of the policy groundwork for the new renewable energy law. Although other international and multilateral donors are providing considerable technical assistance to support the development of federal renewable energy and energy efficiency policy and regulations, there might be opportunities for USAID to assist CONUEE in the development, and above all, the implementation, of its energy efficiency standards and certification schemes. In addition, USAID is well positioned to support regulatory and policy developments at the state and municipal level where it has extensive expertise and many prior years of experience.

a. Support for CONUEE Energy Efficiency Standards and Product Certification

USAID could assist CONUEE in the development of new energy efficiency standards and its new product certification program. Although further analysis is necessary to determine what level of assistance CONUEE needs, it appears that CONUEE could potentially benefit from targeted USAID technical assistance in the near term to review such standards or assist with its efforts to obtain input from different stakeholders, something USAID does well. USAID could also support exchanges with EPA's Energy Star Program and hire technical experts to assist CONUEE in the design of its new product certification program. Developing a product accreditation system is another area where USAID might provide assistance but this could potentially be expensive. Given the support from the World Bank and IADB such funding might not be necessary.

Perhaps where USAID could provide the greatest assistance to CONUEE is in helping promote its new or revised efficiency standards once they have been developed, about the time when the Mission's new clean energy and climate change program would be up and running. This work would build on USAID/Mexico's former programs with the Alliance to Save Energy and the Collaborative Labeling and Appliance Standards Program (CLASP) program. USAID is not only experienced in developing policy but its strength lies in helping governments implement such policy. CONUEE has lost a great deal of institutional memory in recent years and could benefit from the U.S. experience on implementing energy efficiency standards and certifying products.

b. State and Municipal Energy Efficiency and Renewable Energy Policy

State Legislatures. USAID could work with state legislatures to improve their understanding of clean energy and educate them on different policy options that are being adopted by other states or

which have been successfully applied elsewhere around the globe. USAID might consider undertaking a comparative study of state and municipal clean energy policies in Mexico and help develop model legislation that state legislatures could use as a guide for promoting renewable energy and energy efficiency.

Development of Renewable Energy and Energy Efficiency Policies and Practices. States and municipal governments can play an important role in developing policies and programs that promote renewable energy and energy efficiency to complement federal initiatives. In fact, in the U.S., it has been the states that have lead the way on climate change. USAID has an opportunity to build on its current and prior work with the Government of Mexico City (GDF) and municipal governments on renewable energy and energy efficiency (green procurement under PEPs, energy performance contracting) to help state and local governments develop innovative policies and programs in favor of renewable energy and energy efficiency. Such work might include:

- ***Streamlining Licensing Procedures for Renewable Energy Projects.*** USAID could work with SENER to provide technical assistance to states and local governments to help them streamline licensing procedures [86] for renewable energy projects, compile and develop model regulations and procedures, and document how procedures have been applied in different jurisdictions around the country. Such work would also complement efforts to develop and implement mitigation measures under state climate change action plans (PEACCs) and could leverage the work of the World Bank's ESMAP Energy Efficient Cities Initiative (EECI) to help deploy innovative energy efficient solutions for the delivery of basic urban services.

- ***Development and Enforcement of Local Building Codes.*** According to a recent UNEP report, buildings in Mexico were responsible for approximately 12% of total CO_2e of the country's emissions in 2006.[87] Residential building codes currently do not address energy use and efficiency and the "federal building thermal envelope standard has to be mandated by local codes and enforced by local authorities."[88] The National Program for the Sustainable Use of Energy listed enforcement of existing energy codes as an area that needed improvement. USAID could work with CONUEE to support the adoption of new local efficiency standards and residential building codes (particularly in the northern states) and help local government develop its capacity to enforce such codes. USAID might also reach out to the construction industry and building suppliers to raise awareness of CONUEE and local building standards and codes and help CONUEE implement its campaign to use more efficient building equipment and materials. This would build on past USAID/Mexico and the Lawrence Berkeley National Laboratory support for commercial building standards (1993-

[86] *Low-Carbon Development for Mexico*, p. 31.
[87] UNEP Sustainable Buildings and Climate Initiative, *Greenhouse Gas Emission Baselines and Reduction Potentials from Buildings in Mexico*, 2009, p. 7. See: http://www.unep.org/sbci/pdfs/SBCI-Mexicoreport.pdf
[88] *Ibid*, p. 51.

2001). It also relates to one of the most recent USAID/Mexico TIES University Partnerships awarded in January 2010 between University of Colorado at Boulder and the Universidad de Guanajuato to develop a graduate program on sustainable and energy efficiency designs with a focus on the building systems. Such standards would have a long lasting impact in Mexico and serve as models for other local governments to follow.

- ***Financial, Policy and Regulatory Incentives for Renewable Energy and Energy Efficiency.*** Building on the work of PEPs, USAID could work with SENER and CONUEE and local governments to help them lead by example by adopting green procurement practices (energy efficient appliance and equipment purchase requirements for public facilities) and help local governments overcome the barriers to its implementation, establishing renewable energy and energy efficiency goals and standards for public facilities, and developing public benefit funds and incentive mechanisms for energy efficiency and renewable energy that complement government programs.

c. Cross Border Renewable Energy Trade

The promotion of cross-border renewable energy trade does not directly contribute to the reduction of GHG emissions in Mexico (a central objective of Global Climate Change funding). Nevertheless, it does contribute to broader economic growth and could potentially contribute to the development of Mexico's renewable energy wind industry. Economics will continue to be the main driver behind renewable energy development in Baja California. As we have seen barriers to its development are more financial (Who will pay for new transmission lines in Mexico? Will the public in the south-west U.S. be willing to assume the cost of new transmission lines?), technical (What will the impacts on the environment and existing transmission infrastructure be – both CFE's and IID's in the U.S.?) and political (Will the public oppose the construction of new transmission lines?) than regulatory. USAID could play a supportive role and help the new U.S. and Mexican Special Joint Commission in its effort to address transmission issues between the two countries. USAID might conduct studies on the impact of intermittent power on CFE's electric grid or work with the GoM and state and municipal authorities to address possible regulatory barriers that might be identified. Another way in which USAID might support cross border renewable energy trade is by working with the private sector, state and municipal authorities and SEMARNAT to expedite the environmental impact process for the planning and development of new transmission lines and help ensure that the concerns of local communities are adequately taken into consideration, similar to the work of RETI in California.

5.2 Renewable Energy and Energy Efficiency Information and Capacity Building

5.2.1 Existing Renewable Energy and Energy Efficiency Information and Capacity Building Efforts

The lack of adequate and sufficient technical capacity in the area of renewable energy and energy efficiency and access to information and tools on the subject remains a barrier in Mexico. The new renewable energy and energy use laws each mandate SENER and CONUEE to collect and develop information and help build capacity in the area of renewable energy and energy efficiency. A summary of these efforts is provided in Table 18 for renewable energy and in Table 19 for energy efficiency.

Table 18. Mexico Renewable Energy Information and Outreach

Clean Energy / Climate Change Program	GoM Ministry or Implementing Entity	International Donor Support	USG Program & Partners Past & Present (* USAID)	U.S.-Mexico Bilateral
Renewable Energy Information and Outreach	WB			
Prepare a National Renewable Energy Inventory	SENER			
Create a catalogue of pilot and demonstration alternative energy projects for rural communities that can be replicated	SENER			
Develop national and regional catalogues of producers and suppliers of different clean energy technologies	SENER			
Increase public support for renewable energy	SENER		DOE, EPA	Yes
Support the establishment and strengthening of organizations dedicated to promoting energy efficiency and renewable energy	SENER			
Work with states to facilitate access to areas with high RE potential and simplify local permits for RE	SENER			
The British Sustainable Development Dialogue Programme – Climate change and energy		UK		
British Chevening Scholarships Programme – career professionals on climate change		UK Embassy		
TIES Mexico *			* TIES	
German Solar Energy Tech. Expert Exchange Program		German Gov.		
National Inventory of Renewable Energy	WB			
Biomass potential study	SAGARPA, SENER	IADB CTF Proposal		
Geothermal potential study	SENER	IADB CTF Proposal		
Solar energy potential	SENER	(WB considering Funding)		

Wind energy maps in Oaxaca*			*MREP 92-04	
LFG energy recovery model (Updated by EPA in 2009)*			*MREP, CP/RE and EPA	
Assessment of water resources, micro-hydro potential, existing hydro-power infrastructure, solar and wind resources in southern Mexico *			* CP/RE 05-09	

Table 19. Mexico Energy Efficiency Information and Outreach

Clean Energy / Climate Change Program	GoM Ministry or Implementing Entity	International Donor Support	USG Program & Partners Past & Present (* USAID)	U.S.-Mexico Bilateral
Energy Efficiency Information and Outreach				
Catalogue of equipment and electrical appliances that must include information on energy consumption	CONUEE			
Dev. system of information on energy consumption	CONUEE			
Disseminate information on government energy efficiency funds and trusts	CONUEE			
Develop a strategy for issuing recommendations to states and municipalities on energy efficiency	CONUEE			
Promote energy efficiency in school programs and specialization programs in higher education	CONUEE			
Help SENER improve energy efficiency indicators and statistics (2008-2009)	SENER	UK		
USAID TIES University Partnerships	Universities		USAID/Mexico TIES	
CONUEE EE Awards (fed, state, local gov. private sector)	CONUEE			
FIDE EE technical assistance – (EE end user software program)*			*MREP 92-04	
PEMEX EE - energy audit train-the-trainer program *			*MREP 92-04	
Energy service company (ESCO) mkt. development *	CONAE		*MREP 92-04	

While a great deal of information on renewable energy and energy efficiency applications exists in Mexico, it is not well catalogued or easily accessible. For example, in the transition from CONAE to CONUEE, much of CONAE's historical information on its web site, such as software tools, was lost in the development of CONUEE's new web site.[89] As part of CONAE's energy efficiency information strategy, it

[89] Van Wie McGrory, et. al., *Market Leadership by Example: Government Sector Energy Efficiency in Developing Countries*, p. 11. Conference Paper, Proceedings of the ACEEE 2002 Summer Study on Energy Efficiency in Buildings, 2002, May 20, 2002; CONAE, *Elementos de apoyo para la realización de proyectos tipo ESCO en México*,

built a "Virtual CONAE" on its web site to link CONAE's 14 liaison offices for energy efficiency (*Unidades Regionales de Eficiencia Energética - U3Es*) to other research centers, energy efficiency offices, and financing institutions in Mexico and abroad; and provide economic and technical information and software tools to evaluate energy efficiency projects. In addition, CONAE established a National Network of Ports of Attention (*Red Nacional de Puertos de Atención CONAE -PAC*) made up of existing institutions (primarily universities, industrial and commercial associations, or government agencies) to provide technical resources to different users who did not have access to the Internet to help identify the energy savings potential and feasibility of different energy efficiency measures. Information on U3Es and PACs are no longer available on the CONUEE site. Further, while the new CONUEE web site has a dedicated page for states and municipalities, the site has yet to be populated. Presently the CONUEE web site simply references the Promoting an Energy-Efficient Public Sector (PEPS) program that was previously supported by USAID/Mexico and which is outdated.

SENER and CONUEE are not only working to fill the information gap but are developing new initiatives to strengthen the capacity of renewable energy trade organizations, state and municipal governments, and the private sector in the areas of renewable energy and energy efficiency. During U.S.-Mexico Bilateral discussions, Mexico specifically cited the need to increase public support for renewable energy. SENER and Mexico's Wind Energy Association, AMDEE, also noted that state and municipal governments need to be better informed on the capabilities of renewable energy technologies and ways they can support its development. The IADB's MuniAPP and the World Bank's Energy Efficient Cities Initiative are both working to strengthen the institutional capacity of Mexican local governments to develop infrastructure and service projects that incorporate public-private partnerships and energy efficiency. As SENER and CRE develop new clean energy policies and regulations in the coming months under the new laws on renewable energy (LAERFTE) and energy use and efficiency, there will be a need to help educate local governments and the private sector on such changes. The CRE has no presence outside of Mexico City and lacks a strategy for disseminating information on the new clean energy regulatory framework. SENER also cited the need to build capacity within the regional and local offices of CFE on renewable energy and the new regulations and procedures.

5.2.2 Opportunities to Promote Renewable Energy and Energy Efficiency Information and Capacity Building

Although SENER and CONUEE are receiving technical assistance from donors to implement their obligations under the new laws on renewable energy and efficient energy use, there are, nevertheless, opportunities for USAID to assist the GoM in (1) gathering, developing and disseminating the information required by the two laws, and (2) building greater acceptance of and understanding of renewable energy and energy efficiency, and (3) strengthening the public's and federal and local

November 2000; and DOF, *ACUERDO que establece las disposiciones para el ahorro de energía en las oficinas públicas de la Administración Pública Federal para el ejercicio fiscal 2002*, Diario Oficial, July 31, 2002.

government understanding of new renewable energy and energy efficiency norms, regulations, policies, and procedures.

a. Support for GoM Renewable Energy and Energy Efficiency Information and Dissemination

USAID could work with SENER and CONUEE to help them meet their mandate under the new laws on renewable energy and energy use and efficiency to collect and disseminate information on renewable energy and energy efficiency and make it more accessible to the public in the following areas:

- Multiple projects on renewable energy and energy efficiency at the state and local level have been carried out in Mexico but there is a lack of information, or access to such information, to help promote project replication. Working with SENER, CONUEE, FIDE and other government Secretariats and the IADB and World Bank and other donors, USAID could help identify and catalogue pilot and demonstration renewable energy projects for rural communities, renewable and energy efficient projects for state and municipal governments, as well as private sector projects that can be replicated. For example, USAID could help develop a reference document for implementing municipal energy efficiency water supply, sewerage, street lighting and municipal building programs. [90]

- USAID in the short term might assist SENER in completing elements of the National Renewable Energy Inventory.

- USAID could work with CONUEE to develop information on energy consumption, government energy efficiency funds and trusts, and a strategy for making recommendations to states and municipalities on energy efficiency.

- USAID could also work with SEMARNAT, SENER, CONUEE, FIDE, and FIRCO to revise and update their web sites to make renewable energy and energy efficiency information more readily available to the public and also target different audiences, such as states and municipalities, working with the National Institute for Federalism and Municipal Development (INAFED) (See proposal to develop a State and Local Clean Energy and Climate Change Network in Section 5.5.2 (c) below).

b. Renewable Energy and Energy Efficiency Capacity Building

Improved Public Understanding of Renewable Energy and Energy Efficiency. USAID might consider continuing to work with the GoM, Mexican universities and other local partners, such as the renewable energy trade associations and municipal associations to improve the public's and the government's understanding of renewable energy, the procedures for entering into self-supply

[90] Alliance to Save Energy, *Manual for Development of Municipal Energy Efficiency Projects*, 2008.

contracts and selling surplus renewable electricity back to CFE, energy efficiency codes and standards, voluntary certification programs, GoM renewable energy and energy efficiency programs, and successful demonstration projects.

Federal and Local Government Capacity. Capacity building within the government is also needed. For example, USAID could assist SENER in building the capacity of local CFE offices and technical staff on renewable energy technologies and new CFE rules and procedures as they are developed, help strengthen the capacity within the Secretariat of Tourism to adopt an energy efficiency strategy for the tourism industry, and the capacity of FIRCO in the area of energy efficiency for agro-industries. In addition, USAID could help strengthen the technical capacity of federal and state government entities and the private sector to conduct energy audits and develop bankable renewable energy and energy efficiency projects. This would build on USAID's past work on municipal strengthening and complement nicely the efforts of the World Bank's Energy Efficient Cities Initiative and the IADB's MuniAPP municipal program to promote public-private partnerships in the development of infrastructure and services projects.

Improved Capacity of Renewable Energy Associations. In addition, USAID could work with the GoM to strengthen renewable energy associations and partner with them in outreach and training events.

University and Continuing Education Programs. USAID/Mexico's new clean energy and climate change component should continue to work with Mexico higher education to ensure that capacity building programs are ongoing and sustainable. This may include collaborating with universities directly through a contractor, continued support for TIES university partnerships, or a combination of both. Two recent USAID/Mexico TIES university partnerships announced in August of 2009 seek to improve student, faculty and professional understanding of renewable energy and energy efficiency (*Universidad Autónoma de Nuevo León*) and develop expertise in energy efficiency and renewable energy as they relate to buildings (*Universidad de Guanajuato*). USAID/Mexico might consider working with SENER and CONUEE to undertake an assessment of renewable energy and energy efficiency degree and non-degree programs and extension or long distance learning courses available in Mexico to determine where the needs and opportunities are.

5.3 Renewable Energy and Energy Efficiency Project Development

5.3.1 Existing Efforts to Promote Renewable Energy and Energy Efficiency Projects

Renewable Energy. Table 20 provides a summary of GoM and international donor renewable energy development programs in Mexico. The GoM with support from the World Bank and the IADB, are implementing a large scale renewable energy program to develop wind, geothermal and solar power facilities and a rural renewable electricity program that seeks to bring power to some 2,500 low income

and indigenous communities by 2012. The USAID/Mexico CP/RE program's work in rural electrification with SENER set the stage for the development of its proposal to the World Bank for its current rural off grid renewable energy program. In addition, World Bank is providing support for mini-hydro electric projects and for studies to identify biomass and biofuel project opportunities. UNEP is also exploring developing a program to support private sector funding of small scale biogas digesters in rural areas. This is an area where USAID has worked in the past with FIRCO and on Methane-to-Markets.

Table 20. Summary of Mexico Renewable Energy Projects

Clean Energy / Climate Change Program	GoM Ministry or Implementing Entity	International Donors Support	USG Program & Partners Past & Present (* USAID)	U.S.-Mexico Bilateral
Rural RE Electrification				
SENER Off Grid Rural Renewable Energy Program *		WB - $100 M	* CP/RE 05-09	
Foundation for the Development of the Istmo Wind Corridor and Renewable Energy (Small-Hydro off grid)		?		
FIRCO agriculture off-grid RE Program *			*MREP 92-04 *CP/RE 05/09	
Promotion of small scale biodigesters in rural communities	FIRCO and SAGARPA	Japan – JICA		
Investigation on the development of solar powered refrigeration and solar-hybrid power	IEE	EU		
Develop microfinance opportunities for small-scale rural renewable energy projects *			* MCP. 2010	
Small Hydro				
Foundation for the Development of the Istmo Wind Corridor and Renewable Energy (Small-Hydro off grid)				
Pre-feasibility studies and environmental assessments of selected mini-hydro project sites		WB		
Biomass and Biogass				
Biomass potential study		IADB CTF Prop.		
Opportunities for biofuel products		EU		
Private sector financing initiatives to develop small scale rural biogas digesters.	Commercial Banks, FIRCO,	UNEP - in Project Proposal Stage		
Methane to Markets (municipal landfills and pig farms)*			* CP/RE and EPA	
GoM Large Scale Renewable Energy Projects		WB, IADB, IFC, GEF	*MREP 92-04	

CONUEE & FIDE Energy Efficiency Programs. Under the National Program for the Sustainable Use of Energy and its 2010 Annual Work Plan, CONUEE is targeting seven sectors for energy efficiency

improvements: (1) transport, (2) lighting, (2) household and building equipment/materials, (4) cogeneration, (5) buildings, (6) industrial motors, and (7) water pumps. A summary of these energy efficiency interventions with a list of donor support is provided in Table 21.

Table 21. Summary of Mexico Energy Efficiency Programs

Clean Energy / Climate Change Program	GoM Ministry or Implementing Entity	International Donor Support	USG Program & Partners Past & Present (* USAID)	U.S.-Mexico Bilateral
FIDE-IADB Energy Efficiency Market Transformation Program (Phase II) (cited in the PECC)		Funding Contemplated in CTF Invest. Plan		
EE Lighting				
Lighting in Public Administration	CONUEE			
Street lighting *	CONUEE, BANOBRAS $10 M	WB – CTF $40 M	*MREP 92-04	
Residential lighting	CONUEE $20 M	WB – CTF $105 M		
FIDE - Energy Efficient Lamp Program (*Programa Lámparas Ahorradoras en el Sector Doméstico*).	FIDE			
FIDE LED Lighting Pilot Prog. – 17 indust. projects*	FIDE		*MREP 92-04	
EE Appliances				
Substitution of refrigerators and air conditioners (Program to Live Better -*Programa Ahorra Energía para Vivir Mejor*)	CONUEE, ___ $85 M	WB – CTF $330 M		
FIDE EE appliance financing for the domestic sector	FIDE			
Commercial bank appliance financing program	Commercial Banks	UNEP Proposal		
Solar water heaters (PROCALSOL)	CONUEE, FIDE,	GTZ funding through 2009		
Cogeneration				
Develop a cogeneration strategy	SENER, CONUEE			
Identify regulatory barriers to cogeneration	SENER, CONUEE			
Explore regulatory instruments to promote efficient cogeneration	SENER			
Conduct a cogeneration efficiency study		IADB CTF Proposal		
Def. of efficiency criteria for cogeneration projects	CRE	GTZ		
Invest. and dev. of cogeneration plants		EU		
Industrial Motors				
Promote new norm for three-phased motors				
Substitute 414,000 inefficient three-phased motors (10 year +) by 2012				
FIDE TA and financing (HEM motor sub. prog)*			*MREP 92-04	
Water Pumps				

Rehab. agricultural water pumping systems	SAGARPA, CNA CONUEE			
Upgrade municipal water and wastewater pumps (ASE – Watergy)*	CONUEE		*MREP 92-04 ASE – Watergy, CP/RE 05-09	

Transportation and Cogeneration. Although transportation and cogeneration offer, by far, the greatest potential for energy savings (for transportation, two times greater than all of the other six sectors combined with an estimated 2,736 TWh of accumulated savings by 2030), both interventions fall outside the Congressional Appropriations Act definition for end use energy efficiency. Cogeneration from renewable sources, however, such as bagasse, would count towards the earmark. Nevertheless, considerable private sector investment is already being devoted to bagasse cogeneration and USAID assistance would not have a significant impact.[91]

Residential Lighting and Appliances. As the Table 21 indicates, there is substantial funding available for residential lighting and appliance projects as well as World Bank funding for CONUEE's municipal lighting program. It is not clear if there is additional international donor support for the GoM solar water heater program (PROCALSOL) once GTZ funding ends. A second round of funding for FIDE's energy efficiency programs is also contemplated under the Clean Technology Fund Investment Plan for Mexico but no funds have been disbursed to date.

Sustainable Housing Initiatives. Buildings and residential energy users are two important sources of CO_2 emissions. With the demand for housing in Mexico on the rise, there are a number of programs in Mexico to promote the development of sustainable housing which incorporate renewable energy and/or energy efficiency measures for low and middle income families (See Table 22). In 2008, CONUEE developed a pilot project in the State of Baja California that incorporated energy efficiency measures and solar energy technologies for low income residents connected to the electric grid.[92] In 2008, the GoM also launched a new program in partnership with states and municipalities to develop Integrated Sustainable Urban Developments (*DUIS*) that are energy efficient and incorporate options for self electricity generation, such as renewables. The DUIS program has identified some 21 potential projects, ten of which are located in the border states of Baja California (3 projects), Sonora (3 projects), Chihuahua (1 project), and Nuevo León (3 projects). The USAID/Mexico Competitiveness Program has also been providing assistance to the GoM's Green Mortgage initiative to help develop appropriate equipment standards for the program.

[91] See *Program Especial para el Aprovechamiento de Energías Renovables*, pages 87 and 88 for a list of private sector bagasse cogeneration projects already approved.

[92] IADB, *Residential Use of Renewable Energy and Energy Efficiency in Baja California – Plan of Operations*, ME-T1023, September 2008.

Table 22. Energy Efficient Buildings and Sustainable Housing and Urban Development Programs in Mexico

Clean Energy / Climate Change Program	GoM Ministry or Implementing Entity	International Donor Support	USG Program & Partners Past & Present (* USAID)	U.S.-Mexico Bilateral
EE Buildings - Sustainable Housing and Urban Development				
Promote RE in Public Sector installations and Public Housing	CONUEE			
Promote better insulation practices and the use of air conditioners	CONUEE			
Green Mortgage (*Hipotecas Verdes*) *	SENER, CONAVI, INFONAVIT, CONUEE		* MCP 2010	
"This is Your House" (Programa "Ésta es Tu Casa")	CONAVI			
Sustainable Urban Developments (*Desarrollos Urbanos Integrales Sustentables – DUIS*) – 700,000 new housing units p/y. (SE, SHCP, SEDESOL, SEMARNAT, SENER, CONAVI, INFONAVIT, BANOBRAS, SIF, FOVISSSTE, FONATUR)	Multiple Ministries			
FIDE Sustainable Housing Pilot Program (*El Programa de Vivienda Sustentable*) (solar ph. panels – target 50,000 homes	FIDE, CONAVI, PROMÉXICO			
Strengthen building code enforcement	CONUEE, State and local gov.			
Solar Energy and Energy Efficiency in Low Income Residences in Baja California (2008 Pilot Project)	CONUEE and State of Baja CA	IADB-JFC $749K (2008)		
Energy Efficient Cities Initiative (EECI) - deploy innovative, EE solutions for the delivery of basic urban services (studies to date)		WB – ESMAP		
British Sustainable Development Dialogue Program - transform awareness about Sustainable urban development and/or sustainable cities				

Smart Grids. Although not part of the GoM's Special Program for the Sustainable Use of Energy, the GoM has expressed a strong desire to develop new Smart Grid pilot applications for urban areas in Mexico. SENER listed this as one of its top priorities in discussions under the US-Mexico Bilateral Framework on Clean Energy and Climate Change in January, 2010. At the *2009* North American Leaders Summit, Mexico also signed on to a declaration with the U.S. and Canada agreeing to collaborate on building a smart grid in North America. Smart Grids use monitoring systems that keep track of the electricity flowing in the system and are able to detect where electricity is needed in real

time. It also informs end users and energy producers when peak or off peak loads occur and when electricity rates are highest.[93]

DOE has agreed to work with Carnegie Mellon University to assist SENER and CFE in undertaking the Smart Grid Maturity Model exercise to determine where opportunities for smart grid applications lie. DOE is then planning to bring GoM representatives to the U.S. to see how smart grids are being applied. SENER indicated that it would be interested in receiving USAID assistance to help it identify and launch a smart grid pilot project before the UNFCCC Conference of the Parties in Cancun in December. Such a timeframe seems overly ambitious given that they have yet to complete the Maturity Model. According to DOE, a small scale smart grid project can cost between $1.4 and $2.4 million dollars. It is important to note that the USAID/EGAT Climate Change Office is still negotiating with Congress on whether GCC Clean Energy funding can be used to help in the "design and implementation of a "smart grid" program to modernize energy generation, transmission and distribution systems for which a significant amount of the energy carried by the system is electricity generated by fossil-fuels."

Support for State and Municipal Energy Efficiency Projects. In additional to GoM efforts to collaborate with local governments on sustainable housing, there is a considerable amount of technical assistance and capacity building directed at state and local governments to adopt energy efficiency measures in government services and projects. Table 23 below provides a compilation of the different renewable energy and energy efficiency policy, information, capacity building and project development assistance for states and municipal governments. Both FIDE and CONUEE have energy efficiency programs for states and municipal governments and FIDE and BANOBRAS provide special financing instruments for state and municipal efficiency projects. CONUEE is in the process of expanding a pilot municipal energy efficient lighting program (street and traffic lights and lighting in state and municipal buildings) with support from the World Bank. It is also implementing a program to rehabilitate municipal water pumping systems and working with local governments to incorporate insulation standards in local construction regulations and strengthen the enforcement of local building codes.

[93] Through the use of two-way digital load controlling switches or smart meters, Smart Grids can track both the sale and use of electricity to and from the grid and independently control large energy consuming devices. Smart Grids are more efficient, reduce energy consumption and can handle intermittent power from renewable energy sources.

Table 23. Support for Energy Efficiency and Renewable Energy at the State and Municipal Level

Clean Energy / Climate Change Program	GoM Ministry or Implementing Entity	International Donors Support	USG Program & Partners Past & Present (* USAID)	U.S.-Mexico Bilateral
State and Municipal Clean Energy Policy, Information and Capacity Building				
Support state energy commissions and state and municipal governments	FIDE			
Technical assistance to states and municipal governments on energy efficiency	CONUEE	WB support for EE law		
Strengthen insulation standards in local construction regulations and helping to ensure compliance with applicable efficiency norms required for licenses	CONUEE	WB support for EE law		
State and municipal land use and construction regulations and permits for RE projects	SENER	WB support for RE law		
Energy Efficient Management in the Public Sector (PEPs) – EE purchasing *	CONAE - CONUEE		USAID/EGAT w LBNL and ECLEI	
Energy Efficient Cities Initiative (EECI) (studies to date)		WB		
Public-Private Partnership Development (MuniAPP) program (municipal public services)	ITESM	IADB		
State and Municipal Clean Energy Projects				
TA for public street lighting, stoplights, potable water and wastewater pumping, municipal buildings and air conditioning projects	FIDE			
Municipal water pumping*	CONUEE – FIDE		*MREP, CP/RE Watergy	
Municipal street and public lighting *	CONUEE – FIDE, BANOBRAS (GoM $10 M)	WB – CTF $40 M	*MREP 92-04	
Energy Efficient Management in the Public Sector (PEPs) EE purchasing *	CONAE - CONUEE		USAID/EGAT w LBNL and ECLEI	
Landfill gas (Methane-to-Markets - USAID helped dev. Proj. docs for Tamaulipas and Morelos sites)*	SEMARNAT		* CP/RE and EPA 05-09	
Municipal EMS - Mexico City Government (GDF) *			* CP/RE 05-09, MCP 2010	
Book on best practices for state and municipal RE project development*	State and Munic. Gov.		* M CP 2010	
State and Municipal Clean Energy Finance				
FIDE				
NAFIN		JBIC Guarantee, IADB $300K		
BANOBRAS		Ex-IM $1 Billion		
BANCOMEXT – Mexican Carbon Fund				

In addition, as previously mentioned, the IADB is also in the process of launching a new municipal strengthening program with the ITESM, called MuniAPP, that will provide technical, institutional and legal assistance to enable Mexican municipalities to develop public-private partnerships for infrastructure and services projects.[94] The USAID/Mexico Competitiveness Program is in the process of developing guidelines for local governments on public-private partnerships for renewable energy and energy efficiency projects that it hopes will be incorporated into MuniAPP's trainings. In addition, the World Bank's ESMAP program launched in 2008 a new five year Energy Efficient Cities Initiative (EECI) to help build institutional capacity at the city level to explore and deploy innovative, energy efficient solutions for the delivery of basic urban services and reduce the costs and environmental impacts of related energy use.

5.3.2 Opportunities to Promote the Development of Renewable Energy and Energy Efficiency Projects

Based on the GoM's existing programs and where other donors are working and on USAID's past experience and expertise, there are two areas where the Mission might support renewable energy and energy efficiency project development: (1) at the state and municipal level and (2) in residential housing.

a. State and Municipal Renewable Energy and Energy Efficiency Project Development

State and municipal governments are important energy consumers. According to the IADB, municipalities in Mexico are expected to be a fast growing off-take market given that their electricity tariffs are higher than other users (with the exception of the commercial sector).[95] The U.S. based independent power producer, Econergy, for example, is constructing two 20 MW wind farms in Santa Catarina near Monterrey and in Loreto Bay to provide electrical power to local municipalities. Ample opportunities exist for energy savings in the delivery of municipal services.

- ***Project Design and Development.*** Building on its extensive experience working with renewable energy in Mexico and with local governments on project finance, USAID could collaborate with SENER and CONUEE, the ITESM and other donors and financial institutions to provide technical assistance to states and municipal governments to identify and develop bankable renewable energy and energy efficiency projects that could be replicated elsewhere. USAID could support CONUEE with promoting municipal lighting projects, water pumps, and building retrofits; help guide states through the permitting process with CFE for self supply contracts; work with large cities to develop landfill gas methane electricity generation projects providing financial and technical analysis, site drawings and terms of reference for an international bidding process.

[94] The total budget for the MuniAPP program is 5,463,409 with a little over $2 million from the IADB.
[95] *A Blueprint for Green Energy in the Americas*, at p. 354.

- ***Intermediary with Banks.*** Given the economic downturn, financing for renewable projects will continue to be a big constraint for municipalities and cities. USAID could help overcome this constraint by serving as an important link with exiting GoM energy efficiency funding mechanisms, such as NAFIN, BANOBRAS and BANCOMEXT.

- ***Public Private Partnerships and Performance Contracting.*** USAID could continue to partner with the IADB funded MuniAPP program at the ITESM to promote energy efficiency public-private-partnerships and work with the World Bank's ESMAP program to promote different performance contracting and energy service company (ESCO) models for state and municipal energy efficiency initiatives. USAID/Mexico has many years of experience in performance contracting in Mexico and around the globe that it could bring to bear.

- ***Carbon Funding.*** Just as in the case of renewable energy, USAID could also assist in improving state and municipal capacity to obtain carbon offsets as an additional source of funding.

b. Sustainable Housing and Smart Grids

Were USAID to work on promoting more efficient residential building standards and enforcement of building codes at the local level, it could also help promote the development of sustainable housing. The GoM expressed an interest in USAID supporting the DUIS initiative but did not specify what role it might play. Activities might include helping verify that energy efficiency standards are applied to the DUIS program and providing technical assistance to monitor and evaluate the energy savings in DUIS projects. Such information could be used in developing future standards (as CONUEE is doing with the renewable energy and energy efficiency pilot housing project that it is undertaking in Baja California with funding from the IADB). USAID might also explore the possibility of providing a Development Credit Authority loan guarantee with commercial banks to complement GoM financing mechanisms for DUIS projects. Finally, USAID might also provide technical assistance to the DUIS administration to help it effectively manage and implement the program.

In line with its DUIS program, is the GoM's desire for USAID assistance in developing smart grid pilot projects. USAID in the short term could potentially provide technical assistance to the GoM and DOE and Carnegie Mellon in the design and development of Smart Grid pilot projects but funding for smart grid meters would be best left to other international donors, such as the World Bank. Another option for the Mission might be to provide a TIES grant to one of the universities that currently have American Recovery and Reinvestment Act funding to develop smart grid training and pilot programs with a local university partner in Mexico. The U.S. university could partner with a Mexican university to not only build national technical capacity on smart grids but could also be directed to provide technical assistance to SENER and CFE in the development of smart grid projects. Such support would help develop Mexico's term capacity in smart grids while also supporting ongoing U.S.-Mexico Bilateral Agreement priorities. Nevertheless, if the Mission uses GCC Clean Energy funding for smart grids it will

need to get assurances from USAID/EGAT that it does not run afoul of the Congress Appropriations Act language.

5.4 Renewable Energy and Energy Efficiency Finance

5.4.1 Existing Efforts to Promote Renewable Energy and Energy Efficiency Finance

Access to financing will continue to be a major barrier to both renewable energy and energy efficiency projects. There are a number of financing initiatives in Mexico supported by the GoM and international donors to promote these sorts of projects. A summary is set out in Table 24. The IADB is currently negotiating a shared $1.2 billion Conditional Credit Line for Investment Projects (CCLIP) for NAFIN and BANCOMEXT that will include new financing and guarantees for energy efficiency investments either directly or through commercial banks. It is also providing technical support to NAFIN to strengthen its recently created Sustainable Projects and Climate Change Unit. The new renewable energy law also calls for the creation of a new Energy Transition and Sustainable Energy Use Fund which has yet to be launched. Considerable international donor support is being provided to BANOBRAS, NAFIN and BANCOMEXT for renewable energy and energy efficiency projects.

Table 24. Clean Energy and Climate Change Funding Mechanisms in Mexico

Clean Energy / Climate Change Program	GoM Ministry or Implementing Entity	International Donor Support	USG Program & Partners Past & Present (* USAID)	U.S.-Mexico Bilateral
Funding for Energy Saving Appliances and Equipment				
FIDE EE loans (NADB and NAFIN) refrigerators and air conditioners and RE and EE financing for industrial, commercial and service sectors as well as municipalities and states				
Substitution of refrigerators and air conditioners (Program to Live Better -*Programa Ahorra Energía para Vivir Mejor*)	CONUEE $85 M	WB – CTF $330 M		
Residential lighting	CONUEE $20 M	WB – CTF $105 M		
Solar water heaters (PROCALSOL)	CONUEE, FIDE,	GTZ funding through 2009		
BANOBRAS Clean Energy Loans		Ex-IM $1 Billion		
Energy Transition and Sustainable Energy Use Fund (New)		IADB,		
Clean Energy and Climate Change Project Funding				
NAFIN – JBIC guarantee for RE and EE (Mostly RE projects)	NAFIN	JBIC Guarantee, IADB $300K TA and line of credit		
BANCOMEXT		IADB EE line of credit.		
Mexican Carbon Fund (FOMECAR) – BANCOMEXT &				

SENARNAT – promote CDM projects				
National Climate Change Financing Facility (New)		IADB-CECCI $2 M		
Green Mortgage (*Hipotecas Verdes*) *	SENER, CONAVI, INFONAVIT, CONUEE			* MCP 2010
Strategic Programmes Fund – to support low carbon technologies, RE, EE, development of CC policies post 2012.		UK		
Private sector Financing Initiative - to work with commercial banks to promote EE in the tourism sector, the purchase of energy efficiency appliances, and the development of small scale biogass digesters.	Commercial Banks, FIRCO,	UNEP Project Proposal Stage		
Microfinance opportunities for small-scale rural renewable energy projects *	Micro-Finance Institutions		* MCP 2010	
Public financing of open-access transmission *	CFE		* MCP 2010	

On the commercial side, UNEP is currently exploring developing three new clean energy private sector financing initiatives to work with private banks to promote energy efficiency in the tourism sector, the purchase of energy efficient appliances, and develop small scale biogas digesters. Mexico's Special Program for the Use of Renewable Energy calls for SENER to help develop financing schemes for different levels of energy generation, including small scale producers, and provide micro-financing and other support mechanisms to increase the participation of small renewable energy producers. At present, the USAID/Mexico Competitiveness Program is working to develop microfinance opportunities for small-scale rural renewable energy projects. Efforts to get commercial banks to recognize energy efficiency performance contracts as collateral have not been successful.

5.4.2 Opportunities to Increase Access to Renewable Energy and Energy Efficiency Financing

Although the GoM is providing financial support for off grid rural renewable energy projects and financial incentives to purchase efficient lighting, refrigerators, air conditioners and solar water heaters, such programs will not be sufficient to reach all potential end-users. Opportunities exist to build on and expand the USAID/Mexico Competitiveness Program's microfinance initiative to strengthen the capacity and knowledge base of microfinance institutions to understand the renewable energy business and evaluate and make loans for small-scale renewable and energy efficient devices and the development of renewable energy micro-enterprises. These include such technologies as wind, micro-hydro, and solar systems, biodigesters, improved cook stoves, efficient lighting devices, energy efficient appliances and other end-use efficiency improvements, and solar thermal technologies (such as solar water heaters).

USAID can assist microfinance institutions develop the necessary tools to be able to conduct assessments to determine the renewable energy needs of clients and develop new products to respond to those needs. USAID could promote partnerships between microfinance institutions and renewable energy or energy efficiency producers and/or suppliers to develop different loan products for lending to rural enterprises or communities. For example in the Solomon Islands, villagers make a small deposit for

the up-front cost of a solar LED lighting system and then pay for the investment in monthly installments with crops which are taken to a cash-for-crops exchange which in turn arranges to repay the microfinance institution.[96] USAID could also work with the private sector, international donors, the GoM and state and local governments and communities to raise co-financing for the establishment of renewable energy revolving funds and explore using USAID's Development Credit Authority loan guarantee program to support the fund.

USAID could also provide technical assistance to renewable and energy efficient suppliers to improve their business operations to better access financing. USAID might also support efforts to reduce regulatory, policy and administrative barriers that limit the opportunities for micro and small renewable energy firms. Such a program would contribute to the 2010 Congressional Appropriations Act renewable energy microfinance earmark and would build on many years of USAID/Mexico experience in micro finance, ties to the private sector, and understanding of small-scale renewable energy projects.

5.5 Climate Change and GHG Emissions Monitoring

5.5.1 Existing Climate Change and GHG Monitoring Efforts in Mexico

The World Bank and the British Embassy are both providing support to SEMARNAT's General Direction of Climate Change to mainstream environmental considerations into productive sectors and to implement the GoM's National Climate Change Strategy and Special Climate Change Program (PECC). The USAID/Mexico Competitiveness Program is also currently providing technical assistance to SEMARNAT's Climate Change Office to develop a computerized monitoring and reporting system to track each federal government entity's GHG emissions reductions under the PECC and to develop a mid-term climate strategy in time for the UNFCCC COP16 in Cancun, Mexico in December 2010. This is an area where additional assistance from USAID will likely be needed, and for continuity's sake, should continue under the Competitiveness Program.

Table 25 summarizes the climate change and emissions monitoring programs currently underway in Mexico. International climate change donor support is also going to help state governments develop their own climate change action plans and strategies (PEACCs). Little international donor attention, however, is being paid to how the PEACCs are being implemented. Outside of ICLEI – Local Governments for Sustainability, which is working with cities to improve their GHG emissions monitoring and verification, there is not a significant amount of international donor support for emissions monitoring, reporting and verification (MRV).

[96] Parthan, Binu, "Solomon Islands Solar: A New Microfinance Concept Takes Root", *Renewable Energy World International* , Volume 12, Issue 2, March/April 2009 at: http://www.renewableenergyworld.com/rea/news/article/2009/04/solomon-islands-solar-a-new-microfinance-concept-takes-root

Table 25. Mexico Climate Change and GHG Monitoring and Verification Programs

Clean Energy / Climate Change Program	GoM Ministry or Implementing Entity	International Donor Support	USG Program & Partners Past & Present (* USAID)	U.S.-Mexico Bilateral
Climate Change and GHG Monitoring and Verification				
CC Regulatory and Policy Reform				
SEMARNAT General Office of Climate Change Policy Institutional Strengthening	SEMARNAT	GtZ, WB, IADB,		
INE – Institutional Strengthening				
National CC Strategy		IADB, WB		
PECC Implementation		IADB, WB		
PECC tracking and monitoring computer program (2010)*			* MCP - 2010	
State climate change action plans and strategies (PEACCs)	SEMARNAT, INE, States	WB, IADB, UK, Spain,	* MCP – 2010	
SEMARNAT to help develop 8 PEACCs by 2012	SEMARNAT-INE			
ITESM's Center for Dialogue and Analysis on North America – On-Line Course to Develop PEACCss				
ICLEI - Cities for Climate Protection (CCP) Campaign – dev. GHG emissions monitoring, actions plans and emissions reduction targets (Mexico City, Juárez, Culiacán, Guasave, Querétaro, Tijuana, Tlalpan, Toluca)*	Cities	ICLEI - Local Governments for Sustainability	* USAID/EGAT	
Work with U.S. and Mexican Border states to develop GHG emissions inventories that meet int. & U.S. standards	Border states		EPA	Yes
Assist INE in supporting the development of PEACCs and strategies to reduce GHG emissions			EPA	Yes
GHG MRV				
Mexico Greenhouse Gas Inventory Program (*GEI México*).	SEMARNAT, CESPEDES, WRI, WBCSD		*MREP 92-05	
Mexico Voluntary GHG Registry - Incorporate GEI Mexico and link with RETC	SEMARNAT and INE			
Pollution Release and Transfer Registry (RETC)				
Strengthen GoM monitoring, reporting, and verification (MRV) capacity	SEMARNAT – INE		EPA	Yes
National Emissions Market among state owned entities in energy sector, including CFE, and private co. from key sectors (by 2012)				
Help design a Cap and Trade Program	SEMARNAT, INE, PEMEX	WB		
EMA to develop and implement a certification and accreditation system for GHG emissions auditors	EMA, SEMARNAT, INE			

Furthermore, there is no source in Mexico that documents what state, municipal and city governments are doing to promote renewable energy and energy efficiency mitigation measures and on climate change in general. States and municipal governments also do not have a means available to them to share experiences and lessons learned. Although the National Governors Conference (*Conferencia Nacional de Gobernadores - CONAGO*) has a sub-committee on energy which includes energy efficiency, there is presently no effective or formal framework or mechanism that supports collaboration between states on renewable energy, energy efficiency and climate change more broadly. The same is true for municipalities and state legislatures. Neither the National Conference of Mexican Municipalities (*Conferencia Nacional de Municipios de México - CONAMM*) which was recently formed in 2009, nor the Municipal Association of Mexico (*Asociación de Municipios de México - AMMAC*), or the Association of Local Authorities of Mexico (*Asociación de Autoridades Locales de México A. C. - AALMAC*) have specific programs or working groups dedicated to clean energy or climate change.

In addition, multiple GoM programs are working on renewable energy, energy efficiency and climate change issues at the state and local level but there is no easy way for local governments to access the information. The National Institute for Federalism and Municipal Development (*Instituto Nacional para el Federalismo y el Desarrollo Municipal - INAFED*) under the *Secretaria de Gobernación* publishes an annual catalogue of federal programs for municipalities (Catálogo de Programas Federales para los Municipios) but the 2009 version fails to include information on SENER, CONUEE, FIDE or SEMARNAT renewable energy, energy efficiency or climate change programs. Information in the catalogue is also not replicated on the INAFED website for people seeking specific federal assistance.

At the recent U.S.-Mexico Bilateral Framework discussions, the governments expressed a desire to continuing to work with the U.S. and Mexican Border states to develop GHG emissions inventories that meet international and U.S. standards and to further develop Mexican state climate change action plans and strategies (*Programa Estatal de Acción ante el Cambio Climático - PEACC*) to reduce GHG emissions. In addition, the two countries agreed to collaborate on strengthening the GoM's monitoring, reporting, and verification capacity and to help Mexico implement mandatory GHG emissions reporting under its emissions registry program, RETC.

5.5.2 Climate Change and GHG Monitoring Opportunities

Based on what other donors are doing and USAID's prior climate change experience in Mexico, USAID is well positioned to help SEMARNAT track the implementation of the PECC and further refine it beyond 2012 and improve GHG MRV and support the development and promotion of a voluntary GHG registry. In addition, USAID could work with states to help implement and improve upon their PEACCs, compile information on state, municipal and city renewable energy, energy efficiency, and climate change policies and measures and GoM programs, and help develop a one-stop-shop web site for state and local governments and a clean energy and climate change network for local government employees. Given the funding limitations of its climate change program, USAID/Mexico should explore with the USAID/EGAT Climate Change Office options to joint fund efforts to strengthen Mexico's PECC and low

carbon development strategy and work with states and city governments to improve and implement their PEACCs.

a. Strengthen GHG Monitoring, Reporting, and Verification (MRV)

MRV is the cornerstone of any low carbon development strategy and is essential for accessing carbon credits. In June 2009, the House of Representatives passed The American Clean Energy and Security Act of 2009 (commonly known as the Waxman-Markey bill) to reduce "greenhouse gas" emissions via an extensive cap and trade system for larger emitters designed to eventually cover up to 85 percent of all emissions. While the passage of the bill in its current format is unlikely given the political and economic climate, there is a chance that a less comprehensive GHG bill limited to the energy sector (for example the American Power Act (S.1733) being developed by Senators John F. Kerry, Democrat, Republican Lindsey Graham, and Independent Joseph Lieberman) could be adopted. Should future legislation incorporate a cap and trade system, it is more than likely that it would allow capped sources to use "offset credits" to meet a portion of their annual compliance obligations and permit a portion of those credits to come from international programs approved by EPA. An essential component of any GHG emissions trading program is the ability to monitor, report and verify that emission reductions occur. Mexico has great potential to benefit from a U.S. offset market given its close proximity and its relatively advanced stage of emissions monitoring. Nevertheless, Mexico will need to greatly improve its monitoring, reporting and verification system should it hope to comply with future EPA standards which are likely to be stringent. The following are areas where USAID can help build this capacity:

- ***MRV.*** Consistent with the priorities established under the U.S.-Mexico Bilateral Framework, USAID has an opportunity to work with EPA to help strengthening the GoM's monitoring, reporting, and verification capacity

- **Emissions Inventories.** USAID can help the GoM to improve federal, state, municipal and private sector emissions inventories in line with the work of the IPCC, and develop facility level reporting requirements under RETC.

- ***National voluntary GHG registry and RETC.*** USAID can help the GoM implement its national voluntary GHG registry and mandatory GHG emissions reporting requirement under its emissions registry program, RETC (*Registro de Emisiones y Transferencia de Contaminantes*). Studies have shown that companies that participate in public registry systems reduce the use of the substances listed under their own volition.

- ***Private Sector Participation in GHG Registry.*** USAID can also work with SEMARNAT, INE, NGOs, and business and trade associations to increase the number of private sector companies participating in Mexico's voluntary GHG Protocol (GEI Mexico Program soon to be the new

voluntary National GHG Registry), expand the number of sectors covered under the Registry, and facilitate its integration with RETC.

- ***Emissions Auditor Accreditation Program.*** Work with SEMARNAT which has requested USAID's assistance in helping Mexico's Accreditation entity (*Entidad Mexicana de Acreditación -EMA*) develop and implement a certification and accreditation system for emissions auditors.

- ***Carbon Markets.*** At the same time that USAID works to improve MRV, it can also help SEMARNAT and INE increase the knowledge and understanding of the public and private sector of carbon markets.

b. Implementation and Refinements of Mexico's PECC

Considerable funding is and will be available to the GoM to refine and modify its PECC after 2012. Nevertheless, USAID is well positioned to support the GoM in such effort. The USAID/Competitiveness Program is currently assisting SEMARNAT in the development of a web-based monitoring and GHG emissions tracking tool to help determine if the 2012 targets established under the PECC are met. The USAID/ Competitiveness Program should continue to support SEMARNAT in the development of its tracking tool. Given the cross cutting nature of the PECC, however, it makes sense that the new clean energy and climate change program going forward support SEMARNAT in the more substantive revisions and modifications to the PECC beyond 2012. If the new program supports PEACCs and helps strengthen GHG MRV, it would also follow that it would work with SEMARNAT on the PECC.

c. Strengthen State and City Climate Change Action Plans and Strategies (PEACCs)

The development of state climate change action plans and strategies (PEACCs) is important given the size of Mexico and the role that states can play in complementing GoM mitigation efforts. Although there is not enough funding to go around for all the states in Mexico to conduct PEACCs, USAID should focus its attention on working with the GoM and state and local governments and the private sector to help implement and improve existing PEACCs leaving funding for PEACCs to other donors such as the IADB and World Bank. State GHG inventories are also at different stages of development and will need to be strengthened to meet international and U.S. standards. As with the GoM's PECC, States are also likely to need assistance to monitor and evaluate whether GHG emission reductions under their PEACCs are achieved. The following are interventions USAID might undertake to strengthen PEACCs and local renewable energy and energy efficiency mitigation efforts:

- ***PEACC Implementation and Strengthening.*** Working with INE, USAID could provide technical assistance to states and cities to implement and refine their PEACCs. Working on PEACCs would be a natural continuation of USAID/Mexico's past work on emissions monitoring and its present work through the Competitiveness Program. Supporting the implementation and strengthening of state and city PEACCs would help integrate the work of its two clean energy and landscape

pillars. It would also enable USAID to take advantage of existing ties between U.S. and Mexico border states and promote greater US-Mexico state-state interaction elsewhere in the country. The development and refinement of PEACCs will also provide important lessons learned for the global effort to promote low carbon development strategies.

- ***State and Local Clean Energy and Climate Change Mitigation Policies, Initiatives and Activities to Develop and Implement PEACCs.*** USAID could also work with the GoM, Mexican states and municipalities to gather and catalogue information on state and municipal (1) renewable energy and energy efficiency mitigation programs; (2) examples of policies and initiatives to reduce greenhouse gas emissions and promote renewable energy and energy efficiency; and (3) information on activities that states undertake in developing and implementing state climate change mitigation strategies (PEACCs) similar to the information that the EPA has on its State and Local Climate and Energy Program web site.[97]

- ***State and Local Clean Energy and Climate Change Web Page and Network.*** USAID could explore with SEMARNAT, SENER, CONUEE, FIDE, and FIRCO and renewable energy trade associations developing and helping to populate a State and Local Clean Energy and Climate Change (clean energy encompassing renewable energy and energy efficiency) web site that would provide local governments with a one-stop source for clean energy and climate change information that is cross cutting and pulls together information from different Secretariats and states on a variety of climate change topics, similar to the EPA's State and Local Climate and Energy Program web site,[98] that might include: (1) Examples of programs from different states, (2) Activities that states undertake in developing and implementing state climate change mitigation strategies, (3) Network for state government staff; (4) Catalogue of state and local renewable energy, energy efficiency and climate policies and incentives; (5) Information on Federal, state, and municipal climate change and clean energy programs; (6) Additional resources, education and outreach, and targeted workshops and educational materials; (7) Webcasts and podcasts; (8) Different listservs by group and topic; and (9) Events.

- ***State and Local Clean Energy and Climate Change Network.*** Like the EPA site, USAID could help establish an electronic State and Local Clean Energy and Climate Change Network that would provide state, municipal and city government staff information on the latest developments at the local level and provide them with the opportunity to share information and experiences on issues related to renewable energy, energy efficiency and climate change. As part of the network, USAID could also work with state and municipal associations[99] to convene

[97] See: http://www.epa.gov/slclimat/state/index.html for a complete list of the different state clean energy and climate change programs and policies that are covered on the EPA Local Climate and Energy Program web site.

[98] See: http://www.epa.gov/slclimat/state/index.html

[99] The National Governors' Conference (*Conferencia Nacional de Gobernadores - CONAGO*); the National Conference of Mexican Municipalities (*Conferencia Nacional de Municipios de México - CONAMM*); Municipal Association of Mexico (*Asociación de Municipios de México - AMMAC*); and the Association of Local Authorities of Mexico (*Asociación de Autoridades Locales de México A. C. - AALMAC*).

special sessions on renewable energy, energy efficiency and climate change at their annual or regional meetings and help develop working groups on different subjects that could be tracked and supported through the electronic network. In addition, USAID could help expand the network to take advantage of existing U.S.-Mexico state and city partnerships to exchange information on different climate change mitigation policies and approaches and promote capacity building not only between U.S. and Mexico states, municipalities and cities but also south-south cooperation within Mexico.[100]

[100] For information on other similar networks see the USAID funded Alliance to Save Energy, Municipal Network for Energy Efficiency (MUNEE) program (http://www.munee.org/node/7) that works in 17 countries in Eastern Europe and Eurasia and addresses national policy reform, tracks best practices, promotes energy planning and energy management techniques at the local level, creates networks for energy efficiency, and provides capacity on developing bankable business plans for energy efficiency projects; and (2) the American Council for an Energy-Efficient Economy's (ACEEE) State Clean Energy Resource Project (SCERP) at http://www.aceee.org/energy/state/scerp.htm.

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Appendix 1

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