



**USAID**  
FROM THE AMERICAN PEOPLE

**AILEG** Analysis and Investment for  
Low-Emission Growth

# FINAL REPORT

## The Analysis and Investment for Low-Emission Growth (AILEG) Project

CONTRACT NO.: EEM-I-00-07-00004-00  
TASK ORDER: AID-OAA-TO-11-00041



**USAID**  
FROM THE AMERICAN PEOPLE



**AILEG**

Analysis and Investment for  
Low-Emission Growth

December 2013

This publication was produced for review by the United States Agency for International Development. It was prepared by Abt Associates Inc. under the AILEG Project.



**DISCLAIMER**

The authors' views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

Photos taken primarily by AILEG Staff, Abt Associates





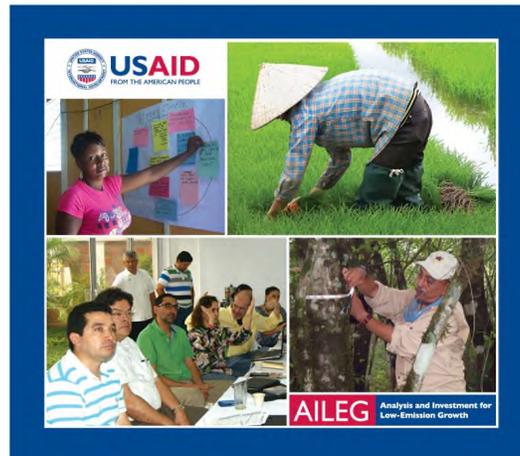
**USAID**  
FROM THE AMERICAN PEOPLE

**AILEG** Analysis and Investment for  
Low-Emission Growth

# FINAL REPORT

## The Analysis and Investment for Low-Emission Growth (AILEG) Project

CONTRACT NO. EEM-I-00-07-00004-00  
TASK ORDER: AID-OAA-TO-11-00041



Submitted to:

**Office of Economic Policy (EP)**  
**Bureau for Economic Growth, Education and Environment (E3)**  
**United States Agency for International Development**

Submitted by

**Abt Associates Inc.**

*In collaboration with:*

Applied GeoSolutions • Asian Institute of Management • Bloomberg New Energy Finance  
Duke University • Fedesarrollo • St. Catherine's Community Development Agency  
Stockholm Environment Institute • University of Los Andes • University of the Philippines

December 2013





**USAID**  
FROM THE AMERICAN PEOPLE

**AILEG** Analysis and Investment for  
Low-Emission Growth

# ACKNOWLEDGMENTS

The collaboration, insights, and leadership provided by many people and organizations from the U.S. Agency for International Development (USAID), governments and the climate change community have been instrumental to implementing the Analysis and Investment for Low-Emission Growth (AILEG) Project. Within USAID, our core AILEG management team—Dr. Yoon Lee (Contracting Officer’s Representative/COR, E3/EP), Dr. Eric Hyman (AILEG Lead Activity Manager, E3/EP), Dr. Michael Hanowsky (AILEG Co-Activity Manager, E3/GCC), and Michael Douglas (Contracting Officer)—provided the management, technical, and contractual input for which we are sincerely appreciative.

AILEG also greatly benefitted from the contributions from staff in USAID Offices/Bureaus including Gary Linden (E3), Dr. Robert Wuertz (E3), Rolf Anderson (E3/GCC), Alex Gainer (E3/EP), Lawrence Camp (E3/PEP), Collin Green (E3/GCC), Dr. Jennifer Leisch (E3/GCC), Patrick Smith (E3/GCC), Matthew Ogonowski (E3/GCC), Zephyr Taylor (E3/GCC), Dr. John Furlow (E3/GCC), Bernai Velarde (E3/MPEP), Kristen Madler (E3/Energy), and Sharon Hsu (E3/Asia). Support and partnerships with seven USAID missions and the Regional Development Mission for Asia Office (RDMA) staff included Chris Abrams and James Lee (USAID/Colombia); Patrick Smith, Chato Calderon (USAID/Vietnam); Joseph Foltz and Lily Gutierrez, Oliver Agoncillo, and Randy Vinluan (USAID/Philippines); Suzanne Ebert, Sharon Gulick, Michael Hanowsky, and Malden Miller (USAID/Jamaica); Ashley King (USAID/Central Asia); Kevin McGohtlin and Gina Cody (USAID/Mexico); Jennifer Tikka (USAID/Guatemala), and Orestes Anastasia (RDMA). Dr. Andrea Watson and Dan Bilello from the National Renewable Energy Laboratory also coordinated closely and participated in project activities with AILEG. The primary author is Dr. Marcia Gowen Trump (AILEG Project Manager) with Dr. Michael Westphal (AILEG Technical Director, Vietnam and Kazakhstan Country Manager), Michèle Laird (Colombia and Mexico Country Manager), Dana Kenney (Jamaica and the Philippines Country Manager), Dianna Gillespie, Santiago Enriquez, Rodolfo Camacho (PQA), Lindsay Kohlhoff, and Reed Allen (AILEG staff, Abt Associates).

Of particular importance were the AILEG country coordinators—Felicidad Narvaez (Philippines) and Dr. Alicia Hayman (Jamaica)—who brought incredible knowledge and climate change networks to AILEG activities. Special thanks go to our consortium partners including Dr. Brian Murray at Nichols Institute of Duke University, Milo Sjardin and David Poritsky of Bloomberg New Energy Finance, Dr. Charles Heap of Stockholm Environment Institute, Lauren Moser Counts and Katherine Vlnrotter of Enclude (formerly ShoreBank International and Triodos Facet), Diego de Velasco of Greenmax Consulting, and William Salas of Applied GeoSolutions. Local consultants, organizations, and climate change leaders in are noted throughout the report for their critical contributions. Finally in the seven AILEG countries, we collaborated with ministries, research institutes, non-governmental organizations (NGOs), private firms, banks, experts, and donors who are acknowledged throughout the report. All helped support AILEG demonstrate the value of using rigorous economic and investment practices to assist countries achieve sustainable growth while reducing greenhouse gas emissions and increasing climate resilience.



**USAID**  
FROM THE AMERICAN PEOPLE



# CONTENTS

<b>Acknowledgments</b> .....	<b>i</b>
<b>Acronyms and Abbreviations</b> .....	<b>v</b>
<b>Executive Summary</b> .....	<b>7</b>
<b>1. Introduction</b> .....	<b>12</b>
1.1. Project Overview and Tasks .....	12
1.2. General Project Activities.....	13
1.3. Project Implementation Strategy .....	14
1.4. Implementing Consortium and Partners.....	15
1.5. Organization of the Final Report.....	17
<b>2. Activity Accomplishments</b> .....	<b>18</b>
2.1. Summary of Accomplishments .....	18
2.2. Accomplishments by Tasks .....	24
Task 1. Assessments and Briefs.....	24
Tasks 2 and 3. Analytical support.....	25
Task 4. Training and Knowledge Dissemination .....	26
Task 5. Evaluations and Impact Assessments.....	27
<b>3. Outputs and Outcomes</b> .....	<b>28</b>
3.1. Performance Monitoring.....	28
3.2. Targets and Indicators Summary.....	28
Greenhouse Gas Emissions.....	29
Global Climate Change Training Participants .....	31
Climate Change Investments .....	31
Institutional Capacity Development.....	33
Stakeholder Adaptive Capacity Development.....	33
Climate Change Technical Assistance .....	35
National Legal and Regulatory Measures .....	37
Global Climate Change Training Hours.....	38
Sub-National Legal and Regulatory Measures.....	39
Expected Lifetime Energy Savings .....	39
Generation Capacity.....	40
Assessments and Analyses.....	40
Partnerships .....	44
3.3. Gender and Localization Results.....	44
<b>4. Lessons Learned and Recommendations for the Future</b> .....	<b>46</b>
<b>Annex A –AILEG Activities</b> .....	<b>49</b>
A.1 Colombia .....	50
A.1.1 Challenge .....	50
A.1.2 Activities, Outputs, and Deliverables.....	50



A.1.3	Achievements .....	52
A.1.4	Lessons Learned and Recommendations .....	53
A.1.5	AILEG Team and Partners .....	54
A.2	Guatemala.....	54
A.2.1	Challenge .....	54
A.2.2	Activities, Outputs, and Deliverables.....	54
A.2.3	Achievements .....	55
A.2.4	Lessons Learned and Recommendations .....	55
A.2.5	AILEG Team and Partners.....	55
A.3	Jamaica.....	56
A.3.1	Challenge .....	56
A.3.2	Activities, Outputs, and Deliverables.....	56
A.3.3	Achievements .....	59
A.3.4	Lessons Learned and Recommendations .....	59
A.3.5	AILEG Team and Partners.....	60
A.4	Kazakhstan.....	60
A.4.1	Challenge .....	60
A.4.2	Activities, Outputs, and Deliverables.....	60
A.4.3	Accomplishments.....	61
A.4.4	Lessons Learned and Recommendations .....	61
A.4.5	AILEG Team and Partners.....	61
A.5	Mexico.....	62
A.5.1	Challenge .....	62
A.5.2	Activities, Outputs, and Deliverables.....	62
A.5.3	Achievements .....	62
A.5.4	Lessons Learned and Recommendations .....	63
A.5.5	AILEG Team and Partners.....	63
A.6	The Philippines.....	63
A.6.1	Challenge .....	63
A.6.2	Activities, Outputs, and Deliverables.....	63
A.6.3	Achievements .....	66
A.6.4	Lessons Learned and Recommendations .....	67
A.6.5	AILEG Team and Partners.....	68
A.7	Vietnam .....	69
A.7.1	Challenge .....	69
A.7.2	Activities, Outputs, and Deliverables.....	69
A.7.3	Achievements .....	71
A.7.4	Lessons Learned and Recommendations .....	72
A.7.5	AILEG Team and Partners.....	72
A.8	Cost-benefit Analysis of Global Climate Change Mitigation: An AILEG USAID University Course .....	73
A.8.1	Challenge .....	73
A.8.2	Activities .....	73
A.8.3	Achievements .....	74
A.8.4	Lessons Learned and Recommendations .....	75
A.8.5	AILEG Team and Partners.....	76



A.9	Economics of Climate Change Adaptation: An AILEG USAID University Course .....	76
A.9.1	Challenge .....	76
A.9.2	Activities .....	76
A.9.3	Achievements .....	77
A.9.4	Lessons Learned and Recommendations .....	77
A.9.5	AILEG Team and Partners.....	77
A.10	Clean Energy Lending Toolkit.....	78
A.10.1	Challenge .....	78
A.10.2	Activities .....	78
A.10.3	Achievements .....	79
A.10.4	Lessons Learned and Recommendations .....	79
A.10.5	AILEG Team and Partners.....	79
<b>Annex B</b>	<b>– Post-Project AILEG Knowledge Dissemination .....</b>	<b>81</b>

## LIST OF TABLES

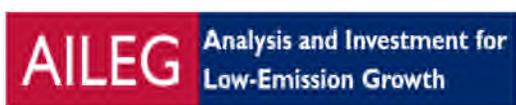
Table 1.	Summary of Country and Global Activities by Type of Technical Assistance .....	8
Table 2.	Summary of AILEG Indicators and Results.....	9
Table 3.	Summary of Country and Global Activities by Type of Technical Assistance .....	14
Table 4.	Unique Individuals Contracted among the Hiring Categories of Independent Consultants and Subcontractors.....	16
Table 5.	AILEG Accomplishments by Activities and Tasks.....	18
Table 6.	AILEG Training Events Summary .....	26
Table 7.	Summary of AILEG Indicators and Results.....	29
Table 8.	GHG Emission Reduction Potential per Year Identified through MACC and CBA.....	30
Table 9.	Number of People Trained by AILEG .....	31
Table 10.	Potential Climate Change Investments Identified through MACC Analyses by AILEG .....	32
Table 11.	Institutions by Country/Activity That Received AILEG Climate Change Capacity Development .....	34
Table 12.	Technical Assistance Days of AILEG Level of Effort.....	36
Table 13.	Discrete TA Opportunities through Workshops, Events, and Trainings.....	36
Table 14.	Person Hours of Training.....	39
Table 15.	Assessments and Analyses Completed .....	42
Table 16.	Partnerships Established under AILEG.....	44
Table 17.	AILEG Staff and Consultants by Gender and Country.....	45

## LIST OF FIGURES

Figure 1.	AILEG Project Implementation Process .....	15
-----------	--	----



**USAID**  
FROM THE AMERICAN PEOPLE



# ACRONYMS AND ABBREVIATIONS

<b>ADB</b>	Asian Development Bank
<b>AILEG</b>	Analysis and Investment for Low-Emission Growth
<b>AIM</b>	Action Impact Matrix
<b>AWD</b>	Alternate wetting and drying (in rice production)
<b>CAM</b>	<i>Corporación Autónoma Regional del Alto Magdalena/Autonomous Regional Corporation for Upper Magdalena (Colombia)</i>
<b>CBA</b>	Cost-benefit analysis
<b>CBO</b>	Community-based organization
<b>CE</b>	Clean energy
<b>CGE</b>	Computable general equilibrium model
<b>CNCG</b>	Climate, Nature and Communities in Guatemala– USAID Project <b>COR</b> Contracting Officer’s Representative
<b>CPEIR</b>	Climate Public Expenditure and Institutional Review (Philippines)
<b>DCA</b>	Development Credit Agency
<b>DNDC</b>	DeNitrification-DeComposition
<b>DOE</b>	Department of Energy (Philippines)
<b>DSM</b>	Demand-side management
<b>E3</b>	USAID Economic Growth, Education and Environment Bureau
<b>EC-LEDS</b>	Enhancing Capacity for Low Emission Development Strategies
<b>EE</b>	Energy efficiency
<b>EP</b>	USAID E3 Office of Economic Policy
<b>ETS</b>	Emissions trading scheme
<b>FI</b>	Financial institution
<b>FiT</b>	Feed-in tariff
<b>GCC</b>	USAID E3 Office of Global Climate Change
<b>GHG</b>	Greenhouse gas
<b>GOJ</b>	Government of Jamaica
<b>GPH</b>	Government of the Philippines
<b>GSO</b>	General Statistics Office (Vietnam)
<b>GVN</b>	Government of Vietnam
<b>GW</b>	Gigawatt
<b>IMDM</b>	International Movement of Development Managers (Philippines)
<b>INECC</b>	<i>Instituto Nacional de Ecología y Cambio Climático/Institute for Ecology and Climate Change (Mexico)</i>
<b>KETSA</b>	Kazakhstan Emissions Trading Scheme Administrator
<b>LCD</b>	Local capacity development



**USAID**  
FROM THE AMERICAN PEOPLE

**AILEG** Analysis and Investment for  
Low-Emission Growth

<b>LEAP</b>	Long-Range Energy Alternatives Planning model
<b>LEDS</b>	Low Emission Development Strategies
<b>LOE</b>	Level of effort
<b>MAC</b>	Marginal abatement cost
<b>MACC</b>	Marginal abatement cost curve
<b>MADS</b>	<i>Ministerio de Ambiente y Desarrollo Sostenible/Ministry of Environment and Sustainable Development (Colombia)</i>
<b>MOU</b>	Memorandum of Understanding
<b>MPEP</b>	USAID Office of Micro-Enterprise and Private Enterprise Promotion
<b>MRV</b>	Monitoring, reporting, and verification
<b>MSTEM</b>	Ministry of Science, Technology, Energy and Mining (Jamaica)
<b>MW</b>	Megawatt
<b>MWLECC</b>	Ministry of Water, Land, Environment and Climate Change (Jamaica)
<b>NAMA</b>	Nationally Appropriate Mitigation Action
<b>NEDA</b>	National Economic Development Authority (Philippines)
<b>NGO</b>	Non-governmental organization
<b>NREL</b>	National Renewable Energy Laboratory
<b>OIMB</b>	Oil Industry Management Bureau (Philippines)
<b>PES</b>	Payment for environmental services
<b>PIOJ</b>	Planning Institute of Jamaica
<b>RDMA</b>	USAID Regional Development Mission for Asia
<b>RE</b>	Renewable energy
<b>REDD+</b>	Reducing Emissions from Deforestation and Degradation Plus
<b>REL</b>	Reference emission level
<b>RL</b>	Reference level
<b>SAM</b>	Social Accounting Matrix
<b>SACDA</b>	St. Catherine Community Development Agency (Jamaica)
<b>SME</b>	Small and medium enterprises
<b>SOW</b>	Scope of work
<b>SWAT</b>	Soil Water Assessment Tool
<b>TA</b>	Technical assistance
<b>tCO<sub>2</sub>e</b>	Metric tons of carbon dioxide equivalents
<b>UDLA</b>	<i>Universidad de Los Andes/University of the Andes (Colombia)</i>
<b>UP-NEC</b>	University of the Philippines/National Engineering Center (Philippines)
<b>USAID</b>	United States Agency for International Development
<b>USEPA</b>	United States Environmental Protection Agency
<b>USFS</b>	United States Forest Service
<b>USG</b>	United States Government
<b>UWI</b>	University of the West Indies (Jamaica)
<b>WTP</b>	Willingness to pay



**USAID**  
FROM THE AMERICAN PEOPLE



# EXECUTIVE SUMMARY

## OVERVIEW OF ACTIVITIES

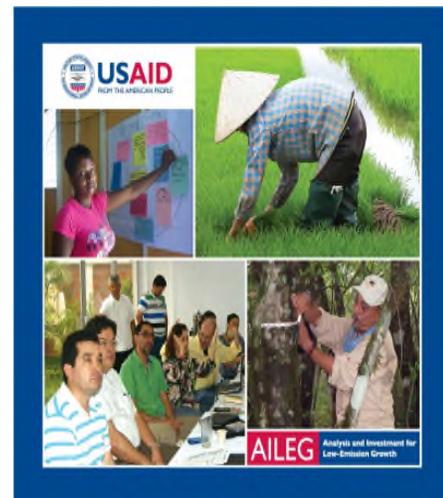
The United States Agency for International Development (USAID) provided technical support under the **Analysis and Investment for Low-Emission Growth (AILEG)** Project to help developing countries transition to clean, resilient growth paths. AILEG support helped strengthen low emission development strategies (LEDS), data systems, economic assessment and investment analyses of countries to sustain economic growth, protect vulnerable people and places, and reduce greenhouse gas emissions while building climate resilience.

Starting in September 2011, AILEG was a joint initiative of USAID’s Offices of Economic Policy (EP) and Global Climate Change (GCC) in the Bureau of Economic Growth, Education, and Environment (E3) ending October 12, 2013. The project involved significant collaboration with seven strategic LEDS countries and USAID missions in Colombia, Guatemala, Jamaica, Kazakhstan, Mexico, the Philippines and Vietnam. With an initial obligation in 2011 of \$1.5 million, final obligations from USAID to AILEG more than tripled to \$4.9 million by March 2013 with additional E3/GCC funding and buy-ins from missions in Colombia, the Philippines, and Vietnam,

With USAID, Abt Associates Inc. (the prime contractor) focused on identifying and implementing activities with capacity for rapid deployment, achievable outputs, and high local engagement given a two-year window of performance. AILEG activities were demand driven — USAID partner countries and Offices defined their needs for technical assistance from the centrally managed project. AILEG was to provide cross-cutting assistance across all U.S. Government’s (USG) climate change strategic objectives: 1) **adaptation** defined as building resilience to climate change; 2) **mitigation** by reducing greenhouse gas (GHG) emissions or increasing sequestration capabilities of landscapes; and, 3) **integration** through mainstreaming climate change actions into development planning.

AILEG supported country-based and global activities. The types of technical assistance (TA) and local capacity development (LCD) from AILEG included 1) gap or needs analyses; 2) data systems improvements and database management; 3) economic and financial investment analyses of mitigation and adaptation measures; 4) climate change policy assistance; and, 5) LEDS capacity development.

Table 1 demonstrates the diversity and breadth of assistance that AILEG provided. A total of 24 LEDS-related climate change activities for seven countries and 4 global activities were carried out with AILEG support leading to 35 deliverables (section 2, Annex A).





**TABLE I. SUMMARY OF AILEG ACTIVITIES BY COUNTRY AND TECHNICAL AREA**

Technical Assistance and Capacity Development Activities	Colombia	Guatemala	Jamaica	Kazakhstan	Mexico	Philippines	Vietnam	Climate Change Economics Training	Clean Energy Lending Toolkit
<b>Gap Analysis</b>	√	√	√	√	√	√	√		
<b>Data Strengthening</b>									
Energy Sector	√	√	√	√	√	√			
Agriculture Sector					√		√		
Forestry Sector	√	√			√	√			
Water Sector	√				√				
<b>Analysis</b>									
LEDS Modeling			√			√			
Cost-Benefit Analysis	√	√				√	√	√	
Marginal Abatement Cost Curve Analysis	√					√	√	√	
Macroeconomic Modeling					√				
Environmental Valuation	√							√	
Emissions Trading				√					
Climate Financing	√			√		√	√		√
<b>Policy Planning</b>									
Climate Action Plans	√		√		√				
Nationally Appropriate Mitigation Actions (NAMA)							√		
<b>Capacity Development</b>	√	√	√	√	√	√	√	√	√

**PROJECT RESULTS: OUTPUTS AND OUTCOMES**

The results of the 22 country and 4 global activities supported by AILEG are measurable and substantial. AILEG successfully delivered TA and LCD for 12 USAID 2013 Global Climate Change Standard Indicators, in addition to 2 customized indicators. Table 2 provides the results by the approved indicators for the activities listed above. Of critical importance to USAID, AILEG assisted the community in Princessfield, Jamaica to prepare a proposal that won \$50,000 from the UNDP/Global Environment Fund for developing a 4.2 kW solar photovoltaic project at a community center that will displace 40 kg CO<sub>2</sub>e/year from fossil fuels. AILEG trained 111 experts and government representatives in climate change analysis for 3,760 person-days, with almost 50% female participation. Over four hundred institutions improved their ability to address climate change in the seven countries. More than 300 stakeholders raised their capacity to adapt to climate change impacts. In the Colombia, Jamaica, the Philippines, and Vietnam, there were 17 laws, agreements, policies and strategies at the national and



subnational levels developed to address climate change. Seven partnerships were established in the AILEG countries that will increase national capacity overtime to mitigate and adapt to climate change. The project produced a LEDS video and AILEG webinar for USAID, which was uploaded to the USAID GCC website ([www.usaid.gov/climate/leds-columbia-jamaica-philippines-vietnam](http://www.usaid.gov/climate/leds-columbia-jamaica-philippines-vietnam)) and YouTube ([www.youtube.com/watch?v=nKkHIAujlX0](http://www.youtube.com/watch?v=nKkHIAujlX0)). AILEG also has been invited to present brown bags and papers post-project to donors and at conferences (Annex B).

**TABLE 2. SUMMARY OF AILEG INDICATORS AND RESULTS**

Indicator (Relevant GCC Handbook Number)	Results	Unit	Comments
<b>GCC Indicator 3.2.1:</b> Number of activities related to technical assistance and capacity development of climate change	26	Activities	Includes country and global activities
<b>GCC Indicator 4.8-7:</b> Greenhouse gas (GHG) emissions, estimated in metric tons of carbon dioxide equivalents (tCO <sub>2</sub> e) reduced, sequestered, and/or avoided as a result of USG assistance	40	tCO <sub>2</sub> e per year	Princessfield, Jamaica solar community center <i>Potential Identified:</i> 74,232,221 tCO <sub>2</sub> e/yr
<b>GCC Indicator 4.8.2-6:</b> Number of people receiving training in global climate change as a result of USG assistance	111	Unique individuals	47% female 53% male
	8	Training events	
<b>GCC Indicator 4.8.2-10:</b> Amount of investment leveraged in U.S. dollars, from private and public sources, for climate change as a result of USG assistance	50,000	USD	UNDP/GEF Funds
<b>GCC Indicator 4.8.2-14:</b> Number of institutions with improved capacity to address climate change issues as a result of USG assistance	412	Institutions	Government, research, academic, for-profit and NGOs
<b>GCC Indicator 4.8.2-26:</b> Number of stakeholders with increased capacity to adapt to the impacts of climate change as a result of USG assistance	303	Unique individuals	28% female 72% male
<b>GCC Indicator 4.8.2-27:</b> Number of days of USG funded technical assistance in climate change provided to counterparts or stakeholders	3,762	Days	
<b>GCC Indicator 4.8.2-28:</b> Number of laws, policies, strategies, plans, or regulations addressing climate change (mitigation or adaptation) and/or biodiversity conservation officially proposed, or adopted as a result of USG assistance	2	Strategies	- Colombia, Mexico
	1	Agreements	- Philippines MOU
	3	Action plans	- Jamaica, Kazakhstan, Vietnam
<b>GCC Indicator 4.8.2-29:</b> Number of person hours of training completed in climate change as a result of USG assistance	3,040	Person hours	50% female 50% male
<b>GCC Indicator 4.8.2-30 (New 2013):</b> Number of subnational laws, policies, strategies, plans, agreements, or regulations addressing climate change (mitigation or adaptation) and/or biodiversity conservation officially proposed, or adopted as a result of USG assistance	11	Plans	Colombia, Guatemala, Jamaica
<b>GCC Indicator 4.8.2-31 (New 2013):</b> Expected lifetime energy savings from energy efficiency or energy conservation, as a result of USG assistance	2	MW per year	Philippines and Colombia EE MACC options identified with negative costs
<b>GCC Indicator 4.8.2-32 (New 2013):</b> Clean energy generation capacity installed or rehabilitated as a result of USG assistance	4.2	kW	Solar photovoltaic Princessfield, Jamaica
<b>Custom (Non-GCC) Indicator:</b> Number of assessments and analyses provided	32	Analyses	8 gap analyses, 24 technical assessments
<b>Custom (Non-GCC) Indicator:</b> Number of partnerships established to implement LEDS analyses	7	Partnerships	



**USAID**  
FROM THE AMERICAN PEOPLE

**AILEG** Analysis and Investment for  
Low-Emission Growth

## LESSONS LEARNED

Without evidenced-based economic and financial analyses, decision makers in countries and at USAID often lack robust information to make efficient, sustainable development decisions to protect against climate change. AILEG was able to rapidly serve key LEDS data and analytical needs of seven USAID partner countries. In September 2013, AILEG convened a final workshop held in Washington, D.C. at which the results and lessons learned were discussed with the broader climate change and development community. AILEG presented activity summaries at the Workshop along with a world café of the project's innovative use of economic or financial assessment methods and tools. A project video and webinar of the Workshop are posted on the USAID Global Climate Change Office website, providing wider dissemination to USAID missions, partner countries and the international community. Senior staff from USAID, U.S. State Department, U.S. Environmental Protection Agency (USEPA), U.S. Department of Agriculture (USDA), World Bank, Asian Development Bank, Inter-American Development Bank, National Renewable Energy Laboratory, many for and non-for-profit firms, and interested stakeholders contributed to the exchange of ideas and insights.

While serving highly diverse technical needs across seven countries, AILEG provided substantive TA and LCD support during the relatively short tenure of the project. The demand-driven nature of the project proved effective in fulfilling underserved economic and financial analysis needs, complementing on-going mission and country LEDS efforts. The AILEG country-based project management model to engage highly-respected local experts and organizations simultaneously across the seven countries allowed deep collaboration and sharing of lessons learned widely within each country. Having USAID Activity Managers from E3/EP and E3/GCC along with E3/GCC EC-LEDS country managers give technical leadership to the Contracting Officer Representative (COR), also led to quite effective engagement with missions and partner countries.

Lessons and recommendations emerging from USAID's AILEG technical assistance included:

- *The demand-driven approach allowed for rapid deployment, clarity of countries' needs, and high local engagement;*
- *Major sector niches for LEDS TA and LCD support show that more resources and enhanced training are needed in mitigation and adaptation economics, multi-criteria decision making, community and national mitigation action planning, and climate change data improvement, sharing and management;*
- *Expanding the application and standardization of best-practices in climate change economics with cost-benefit analyses and marginal abatement cost curve analysis, macroeconomic analysis, and environmental benefit valuation provided valuable economic growth and welfare information desired by decision makers to make informed climate change and development policies;*
- *Developing transparent, evidenced-based economic and financial investment analyses of mitigation and adaptation options led to cross-ministerial data sharing and dialogue needed to allocate scarce resources;*
- *Monetizing environmental benefits of climate change policies gave policy makers critical but often missing social opportunity costs of development decisions;*
- *Applying simpler, less-data intensive LEDS models and tools often is sufficient for meeting countries' climate change planning needs;*



**USAID**  
FROM THE AMERICAN PEOPLE

**AILEG** Analysis and Investment for  
Low-Emission Growth

- Engaging the government finance and planning agencies in economic and financial analyses up-front provided high buy-in to integrate project findings into broader policy decisions;
- Collaborating closely with USAID missions and partner country governments significantly increased the ownership and localization of the project findings; and,
- Leveraging central USAID/Washington with mission funding led to greater collaboration and engagement across USAID and by the countries.

The effort needed to fully integrate climate change into development planning will require longer project support than the two-year AILEG project life. AILEG successfully delivered substantive short-term assistance in low-emission economic and financial investment planning to these countries, but governments and key stakeholders across all countries stressed the desire for additional public and private sources to continue to support developing countries' transformations to climate resilient and prosperous low carbon growth.





**USAID**  
FROM THE AMERICAN PEOPLE

**AILEG** Analysis and Investment for  
Low-Emission Growth

# I. INTRODUCTION

## I.1. PROJECT OVERVIEW AND TASKS

The **Analysis and Investment for Low-Emission Growth (AILEG)** Project of the United States Agency for International Development (USAID) provided assistance to developing countries to transition to clean, resilient growth. AILEG was managed by the Offices of Economic Policy and Global Climate Change in the Bureau of Economic Growth, Education, and Environment (E3/EP and E3/GCC). The project strengthened capabilities of USAID partner governments and societies to conduct economic and financial investment assessments of climate change mitigation and adaptation actions. The goal was to assist countries to expand economic growth and protect vulnerable people and places, while reducing GHG emissions and increasing climate change resiliency.

The contract was awarded by USAID to Abt Associates Inc., and operations began on September 29, 2011 and ended on October 11, 2013. Several drivers focused AILEG activities:

- **Demand-driven:** AILEG was demand driven, responding to partner country and USAID mission/Office requests.
- **Strategic:** USAID envisaged AILEG to support the USG's three strategic climate change objectives: 1) **adaptation** by building resilience of peoples and places to climate change; 2) **mitigation** through reducing GHG emissions or increasing carbon dioxide sequestration capacities of landscapes; and, 3) **integration** by mainstreaming climate change into development planning.<sup>1</sup>
- **Rapid deployment, achievable outputs, and local ownership:** Given the compressed project life, Abt Associates in collaboration with USAID and partner country partners identified and implemented activities focused on rapid deployment, achievable outputs, and high local engagement/ownership.

AILEG had five areas of potential technical assistance (TA) and capacity development (LCD):

- **Task 1. Assessments and briefs**
- **Task 2. Short-term technical assistance and capacity building**
- **Task 3. Collaboration with counterparts to complete economic analysis**
- **Task 4. Training and knowledge dissemination**
- **Task 5. Evaluations and impact assessments**

All project activities discussed in the next sections contributed to one or more of these general tasks. Throughout the project life, the emphasis and level of assistance for the various tasks changed given the demand-driven nature of partner country and USAID needs.

---

<sup>1</sup> U.S. Agency for International Development, *USAID Climate Change and Development Strategy* (Washington, DC: USAID, January 2012).



**USAID**  
FROM THE AMERICAN PEOPLE



## 1.2. GENERAL PROJECT ACTIVITIES

AILEG provided three types of activities under which funding, management, and operations were carried out, monitored, and reported to USAID:

1. **Country Activities** based on technical assistance and capacity development requests from Colombia, Guatemala, Jamaica, Kazakhstan, Mexico, the Philippines, and Vietnam.
2. **Global Capacity Development Activities** on cross-cutting requests from the Agency for training in the economics of climate change mitigation and adaptation, the development of a clean energy lending toolkit, a culminating AILEG workshop, and knowledge dissemination with workshops and analyses.
3. **General Technical, Administration, and Management Activities** that encompassed supporting the above activities by AILEG personnel with technical, contractual, financial, and management oversight.

In two years, AILEG supported 24 LEDS activities in seven countries—Colombia, Guatemala, Jamaica, Kazakhstan, Mexico, the Philippines, and Vietnam—and 4 global support activities (2 training courses, the Clean Energy Lending Toolkit, and AILEG Final Workshop). Starting off with an initial obligation in 2011 of \$1.5 million, the final obligations from USAID to AILEG more than tripled to \$4.9 million by March 2013 with buy-ins from several missions (Colombia, the Philippines, and Vietnam) and additional E3/GCC funding.

With AILEG assistance, country decision makers and the Agency could obtain low emission development strategies (LEDS) support to improve climate change data management systems, economic and financial analysis, and identification of clean energy investment financing. The AILEG assisted countries and USAID missions/Offices with a broad suite of analytical methodologies and tools. AILEG provided the following broad types of TA and LCD support:

- **Needs/Gap Analyses:** Conducted rapid appraisals with in-country teams (consultants, organizations, academia, NGOs) and government counterparts of EC-LEDS needs not redundant with other USAID and/or donor assistance.
- **Data Strengthening:** Increased reliability and verifiability of sector data used in LEDS.
- **Economic and Financial Analyses:** Supported country counterparts and teams to prepare analyses of various economic and financial investment options for LEDS.
- **Policy Analysis and Recommendation:** Assisted government counterparts and country stakeholders to expand and mainstream climate change policy support.
- **Capacity Development:** Provided training and strengthening of core climate change data management, economic analysis, and financing capabilities in organizations and countries.



AILEG Workshop in the Philippines



Table 3 summarizes the specific AILEG assistance gave to each country or USAID global support. Annex A provides the in-depth discussions and summaries of these AILEG activities. Important cross-cutting issues discussed in this report also include monitoring and evaluation, gender impacts and localization.

**TABLE 3. SUMMARY OF AILEG ACTIVITIES BY TASKS, COUNTRY AND TECHNICAL AREA**

Technical Assistance and Capacity Development Activities	Colombia	Guatemala	Jamaica	Kazakhstan	Mexico	Philippines	Vietnam	Climate Change Economics Training	Clean Energy Lending Toolkit
<b>Gap Analysis</b>	√	√	√	√	√	√	√		
<b>Data Strengthening</b>									
Energy Sector	√	√	√	√	√	√			
Agriculture Sector					√		√		
Forestry Sector	√	√			√	√			
Water Sector	√				√				
<b>Analysis</b>									
LEDS Modeling			√			√			
Cost-Benefit Analysis	√	√				√	√	√	
Marginal Abatement Cost Curve Analysis	√					√	√	√	
Macroeconomic Modeling					√				
Environmental Valuation	√							√	
Emissions Trading				√					
Climate Financing	√			√		√	√		√
<b>Policy Planning</b>									
Climate Action Plans	√		√		√				
Nationally Appropriate Mitigation Actions (NAMA)							√		
<b>Capacity Development</b>	√	√	√	√	√	√	√	√	√

### 1.3. PROJECT IMPLEMENTATION STRATEGY

AILEG’s implementation strategy followed an iterative process by which needs of particular countries and USAID missions/Offices were generated or received by: 1) USAID E3/EP or E3/GCC Offices and forwarded to AILEG, which then followed up with the respective entity or country; or 2) Abt Associates or partner organizations, which brought such requests for vetting to USAID E3/EP and E3/GCC. Figure



It captures the full process from receiving a request to conducting a needs assessment, and the prioritization, selection, and implementation of an activity. The process was completely transparent; was collaborative with the key stakeholders; and gained stakeholder buy-in—often with USAID mission co-funding of up to 50 percent of the assessment activities (Colombia, Vietnam, and the Philippines).

**FIGURE I. AILEG PROJECT IMPLEMENTATION PROCESS**



### **I.4. IMPLEMENTING CONSORTIUM AND PARTNERS**

As the prime contractor, Abt Associates managed and led the assistance for AILEG in collaboration with its partners, Bloomberg New Energy Finance and Duke University’s Nichols Institute. As activities became defined, AILEG reached out to and included additional subcontractors and consultants as needed. The list of AILEG partners providing key personnel, short-term TA, third-country and country counterparts, and consultants is shown in **Other U.S. Government:**

- U.S. State Department
- U.S. Environmental Protection Agency (USEPA)
- U.S. Department of Agriculture/United States Forest Service (USFS)
- National Renewable Energy Laboratory (NREL)

**Other Organizations:**

- World Bank
- EC-LEDS Global Partnership
- United Nations Development Program

- World Resources Institute

Table 4. Over the life of the project, AILEG also collaborated with many key LEDS and climate change programs and organizations:

**USAID:**

- Bureau of Economic Growth, Education and Environment (E3)
  - Office of Economic Policy (E3/EP)
  - Office of Global Climate Change (E3/GCC)
  - Micro-Enterprise and Private Enterprise Promotion Office (MPEP)
  - Energy Office (E3/EN)
  - Forestry and Biodiversity Office (E3/FAB)
  - Land Tenure and Resource Management (E3/LTRM)
- Latin America and Caribbean Bureau (LAC)
- Asia Bureau
- Regional Development Mission for Asia (RDMA)
- USAID/Colombia, USAID/Guatemala, USAID/Jamaica, USAID/Central Asia, USAID/Mexico, USAID/Philippines, and USAID/Vietnam

**Other U.S. Government:**

- U.S. State Department
- U.S. Environmental Protection Agency (USEPA)
- U.S. Department of Agriculture/United States Forest Service (USFS)
- National Renewable Energy Laboratory (NREL)

**Other Organizations:**

- World Bank
- EC-LEDS Global Partnership
- United Nations Development Program
- World Resources Institute

**TABLE 4. INDIVIDUALS CONTRACTED AMONG THE HIRING CATEGORIES OF INDEPENDENT CONSULTANTS AND SUBCONTRACTORS**

Affiliation	F	M	Total	% F	% M
Independent Consultant	8	15	23	35%	65%
Applied Geosolutions (AGS)	0	6	6	0%	100%
Balcostics Limited	8	3	11	73%	27%
Bloomberg Finance L.P.	2	1	3	67%	33%
Research Centre for Family Health and Community Development (CEFACOM)	4	0	4	100%	0%
Center for Advanced Philippine Studies	2	4	6	33%	67%



Duke University’s Nichols Institute	0	1	1	0%	100%
Environmental Foundation of Jamaica	3	1	4	75%	25%
Fedesarollo	7	4	11	64%	36%
Greenmax Consulting	0	1	1	0%	100%
International Movement of Development Managers (IMDM)	2	6	8	25%	75%
Stockholm Environment Institute (SEI)	0	1	1	0%	100%
St. Catherine Community Development Agency	4	0	4	100%	0%
T&C Consulting	1	4	5	20%	80%
Universidad de los Andes	6	3	9	67%	33%
<b>Totals</b>	<b>47</b>	<b>50</b>	<b>97</b>	<b>48%</b>	<b>52%</b>

## I.5. ORGANIZATION OF THE FINAL REPORT

The final report is organized as follows:

- **Executive Summary**
- **Section 1. Introduction**
- **Section 2. Activity Accomplishments**
- **Section 3. Outputs and Outcomes**
- **Section 4. Lessons Learned and Recommendations**
- **Annex A: Description of AILEG Activities**

The Executive Summary reviews the project, its accomplishments, outcomes, lessons learned, and recommendations for the key stakeholders, including partner countries, USAID, and other climate change analysts and decision makers. The Introduction (Section 1) covers the basic operational and technical assistance details of the project along with specific AILEG Tasks and Activities. Activity Accomplishments (Section 2) summarizes major AILEG achievements by activity. Section 3 provides the outcomes of the project as reported by the approved USAID Global Climate Change Standard Indicators, which are relevant to AILEG. Section 4 comprises broader, project-wide lessons learned and recommendations beyond those from individual activities. Finally, Annex A includes detailed descriptions of all AILEG activities, describing the challenges, solutions, outputs, and deliverables as well as activity-based lessons learned and recommendations.



## 2. ACTIVITY ACCOMPLISHMENTS

### 2.1. SUMMARY OF ACCOMPLISHMENTS

AILEG’s accomplishments are extensive and deliver results across all project Tasks. AILEG was able to assist with **24 LEDS-related climate change activities for seven countries and 4 global activities** over the two-year project life. Annex A contains detailed descriptions by country and global support activities, along with the activities’ outputs and outcomes. The following sections summarize the accomplishments of the activities by country and tasks (Table5).

**TABLE 5. AILEG ACCOMPLISHMENTS BY ACTIVITIES AND TASKS**

Activity	Accomplishments ( <i>Deliverable</i> )
<b>COLOMBIA</b>	Budget: \$645K, \$200K USAID mission buy-in
1. AILEG EC-LEDS Needs Assessment (Task 1)	Conducted gap assessment of Colombia LEDS needs. <i>AILEG Needs Assessment for EC-LEDS in Colombia</i> , April 2012.
2. AILEG EC-LEDS Economic Analyses and Capacity Building for Colombia (Tasks 2, 3, 4, and 5)	
a. Development of Commercial Building Marginal Abatement Cost Curve (MACC) Analysis for EC-LEDS Planning in Colombia	Development of MACC analysis based on energy use surveys of commercial buildings in three major cities prepared by the University of Los Andes. Efficient lighting in offices is most attractive investments with large abatement potential and negative net costs. <i>Marginal Abatement Cost Curve Development for Buildings of the Commercial Sector in Colombia</i> , October 2013.
b. Environmental Valuation of and Payment for Environmental Services of the <i>Páramo de Santurbán</i> Ecosystem for LEDS Planning	Surveys to estimate environmental benefits and potential payment for environmental services (PES) of <i>Páramo de Santurbán</i> , a high-altitude area, conducted by <i>Fedesarrollo</i> November 2012. Policy recommendations for consumer payments (PES) for water, ecotourism, carbon capture with the value estimated to be from USD 215-860 million annually. <i>Environmental Valuation of the Páramo de Santurbán, Colombia</i> , October 2013.
c. Upper Magdalena Watershed Hydrological Modeling for Regional (Huila River Basin) Climate Change Policy Planning	Modeling of climate change impacts on the watershed to assist the Huila District climate change planning with future water and energy availability to prepare action plans. Results showed higher water and energy availability than other less rigorous predictions. <i>Hydrological Model Needs/Methodology Report</i> , October 2012. <i>Estimation of the Effects of Climate Change on Water Resources in the Suaza River Basin, a Tributary of the Magdalena River</i> , October 2013.
d. Capacity Building for CAM ( <i>Corporación Autónoma Regional del Alto Magdalena</i> ) Technical Staff	Trained staff on hydrological models to assess impact of climate change and land use changes on water resources and sedimentation of reservoirs for hydropower generation, July 2013. <i>CAM Hydrological Modeling Workshop</i> , August 2013.



<b>GUATEMALA</b>		Budget: \$65K
1. Cost-Benefit Analysis (CBA) of the Climate, Nature and Communities in Guatemala (CNCG) Project (Tasks 3 and 5)	Assisted USAID/Guatemala to conduct a CBA of potential non-timber forest products to rural communities in the CNGG Project of the Péten, Guatemala. <i>Cost-Benefit Analysis (CBA) of the USAID Climate, Nature, and Communities in Guatemala (CNCG) Project, October 2013.</i>	
<b>JAMAICA</b>		Budget: \$524K
1. EC-LEDS Scoping Mission for Jamaica (Task 1)	Participated in USG Scoping Missions on climate finance and modeling sections. Missions: September and December 2012. <i>EC-LEDS Scoping Mission Report for Jamaica, January 2013.</i>	
2. Climate Finance Technical Assistance (Tasks 2 and 3)	Assessed climate and clean energy finance flows; developed a small-scale energy efficiency and renewable energy lending options; and recommended a climate financing strategy. <i>Jamaica Climate Finance Assessment Report, October 2013.</i>	
3. Economic and Energy Modeling Training (Tasks 2, 3, and 4)	Assessment of planning processes for EC-LEDS, economic modeling and data capabilities and needs and recommendations for future capacity building. <i>Economic Planning and Modeling Assessment Report for Jamaica, October 2013.</i>	
4. Integrating LEDES into Development Planning (Tasks 2, 3, and 5)	Country visits to solicit needs and develop activities to support Second National Energy Plan, energy sector data and community renewable energy action plans, December 2012.	
a. National Energy Action Plan 2013-2016	Assisted Ministry of Science, Technology, Energy and Mining to develop the Second National Energy Policy Action Plan 2013-2016; fostered communication and dialogue among the various agencies and Ministries; and, helped integrate climate change into existing energy sector planning processes. <i>Report on National Energy Action Plan 2013-2016 for Jamaica, October 2013.</i>	
b. Community-level action plans	Conducted focus groups with a community-based organization (St. Catherine Community Development Agency); facilitated creation of two community-level renewable energy (RE) and energy efficiency (EE) action plans in Princessfield and Content. Mentored and assisted CBO in preparing and submitting funding proposals to UNDP/GEF for action plan projects linked to livelihood improvements. Global Environment Fund (GEF) awarded funds to Princessfield project proposal. <i>Jamaica Community Energy Efficiency and Renewable Energy Action Plans Final Report, October 2013.</i>	
c. AILEG Jamaica Symposium	Organized the AILEG Jamaica Symposium in July 2013 for stakeholder engagement and dialogue on low-emission considerations, specifically in decision making using LEDES economic modeling; financing; sector-specific action plans and local-level considerations for energy efficiency and renewable energy. It defined processes and outputs used in the GOJ's low-emission considerations in national planning. <i>AILEG Jamaica Symposium Proceedings, October 2013.</i>	



Community-based Climate Change Planning



<b>KAZAKHSTAN</b>	<b>Budget: \$158K</b>
I. Capability Mapping Assessment of Emissions Trading System (Task 3)	AILEG and USAID/Central Asia agree on technical assistance to assess capabilities vs. needs of government, private sector and other stakeholders, December 2012. Developed candidate Kazakhstan ETS Administrator (KETSAs) Operating Model showing needed capabilities and recommended candidates; designed roadmap and timelines for KETSAs operations; and, created blueprint for donor-supported involvement <i>Capacity Building Support for the Emissions Trading Scheme in Kazakhstan: ETS Administrator Capability Mapping Report, October 2013.</i>
<b>MEXICO</b>	<b>Budget: \$250K USAID, 50% NREL cost-sharing 2<sup>nd</sup> year</b>
I. EC-LEDS Modeling Support to Mexico (Tasks 1, 3, and 4)	Convened and participated in workshop at the <i>Instituto Nacional de Ecología y Cambio Climático</i> (INECC), Mexico's climate change planning agency, to develop needs for USAID and NREL assistance through AILEG on macroeconomic CGE modeling for climate change planning, September 2012. CGE modeler started working April 2013 with INECC. Work in progress, with NREL funding 2 <sup>nd</sup> 6 months of effort. <i>Social Accounting Matrices and Modeling for Computable General Equilibrium Analysis (Training), August 2013.</i>



A major emitter of greenhouse gases is the oil industry, which will participate in the Kazakhstan Emissions Trading System



**USAID**  
FROM THE AMERICAN PEOPLE

**AILEG** Analysis and Investment for  
Low-Emission Growth

PHILIPPINES	Budget: \$895K, 50% USAID mission cost-sharing
1. Renewable Energy Financial Flows and Barriers to Investment Analysis (Tasks 3 and 4)	Analysis by Bloomberg New Energy Finance of Philippines' renewable energy financing markets with barriers and policy recommendations. Feed-in Tariff guarantee issues determined to be key impediment to meeting government renewable energy targets. Stakeholders' Workshop on Renewable Energy in the Philippines Financial Flows and Barriers for Investment, February 2013. <i>Renewable Energy in the Philippines Financial Flows and Barriers to Investment</i> , October 2013.
2. Energy and Forestry Sector Data and Database Management Assessments (Tasks 2, 3, and 4)	AILEG supported forestry sector and energy sector experts prepared work plans for sector data assessments, with involvement of leading local experts and institutions (University of Philippines). Separate forestry database and energy sector needs assessments were prepared by AILEG local teams. <i>Scoping and Review of Forestry Data and REDD+ in the Philippines</i> , September 2013. <i>Assessment of REDD+ and Forestry Data in the Philippines</i> , September 2013. <i>Final Report on Energy Data Assessment &amp; Recommendation for an Integrated Energy Database</i> , September 2013. <i>Stakeholders' Workshop Proceedings: Energy Data Assessment and Integrated Energy Database</i> , October 2013.
3. Demand-Side Management Marginal Abatement Cost Curve (MACC) Analysis (Tasks 2, 3, and 4)	MACC analysis prepared by IDMI affiliate of Asian Institute of Management of demand-side management (DSM) technologies mitigation options by local institution. Informal workshops held with the Government of the Philippines (GPH) on generating the Marginal Abatement Cost Curves (MACCs) and using technology data provided to relevant GPH stakeholders, April 2013. <i>DSM Technology Data for the Philippines</i> , October 2013. <i>Marginal Abatement Cost Curves (MACCs) for the Residential, Commercial and Industrial Sectors in the Philippines</i> , October 2013.
4. LEAP Energy Sector Modeling Training (Tasks 3 and 4)	Trained government, academia, energy company, subnational experts and other key stakeholders in Long-Range Energy Alternatives Planning (LEAP) model use to assist with energy and transport sector climate change planning. Convened LEAP Training 1 Workshop, January 28–February 4, 2013. Held LEAP Training 2 Workshop, May 14–17, 2013. <i>Training Workshop #1: Using LEAP for Energy and Climate Change Mitigation Assessment—Report of Proceedings</i> , October 2013. <i>Training Workshop #2: Using LEAP for Energy and Climate Change Mitigation Assessment—Report of Proceedings</i> , October 2013.
5. Culminating Activity (Task 4)	A culminating event for the AILEG Philippines work, titled “Lessons Learned in LEDS Data Assessment and Modeling and Analysis of Renewable Energy Financial Flows and Investment Barriers: Ensuring Sustainability through Partnerships,” was held on June 18, 2013. A Memorandum of Understanding (MOU) for cooperation in capacity development, including for LEAP modeling, LEDS implementation, and developing/managing energy data, was signed by the Department of Energy and six Philippine universities. <i>Proceedings of AILEG Culminating Workshop in the Philippines</i> , October 2013.



Clock-wise from left: Signing the LEDS Data Sharing MOU by the Government & Universities, solar panel installations, Manila skyline and LEAP training workshop in the Philippines AILEG activities



<b>VIETNAM</b>	
<b>Budget: \$707K, 50% USAID mission cost-sharing</b>	
1. Vietnam Data Needs Assessment (Task 1)	Conducted EC-LEDS needs assessment to identify AILEG priority activities with the government ministries managing climate change and development planning. <i>Background Report on AILEG Data Needs Assessment for EC-LEDS in Vietnam</i> , approved March 2012. <i>AILEG First and Second EC-LEDS Data Needs Assessment Workshops</i> , March and June 2012. <i>Vietnam EC-LEDS Data Needs Assessment</i> , October 2012.
2. Data Management Systems and Economic Analyses for EC-LEDS Vietnam (Tasks 2, 3, 4, and 5)	Prepared marginal abatement cost curves (MACCs) of alternative low-emission rice management practices to determine least-cost options for Vietnam. Study showed rice management practices with relatively limited emission reduction potentials and negative costs moderately adopted, but major awareness and support needed for positive costs of water management mitigation option with high emission reduction potential. LEDS data collection and legal needs analysis conducted for the waste and agriculture sectors. Held workshop presenting results in July 2013. <i>LEDS Data Collection and Legal Mandates Report in Vietnam</i> , October 2013.
a. Agriculture Sector Database System Improvements	Assisted Provincial Statistics Offices in three provinces to incorporate statistically reliable data collection of alternative rice and livestock management practices to assess adoption of low emission options. Trained local data processors and tested mobile phone data collection for rice production in provinces; more than 1,000 households surveyed, January to June 2013. <i>Vietnam LEDS Agricultural Survey and Mitigation Analysis Report</i> , October 2013.
b. Rice Emissions Monitoring, Reporting, and Verification (MRV) System Development	Pilot-tested web-based rice emissions MRV Tool to assess if it works with survey data to assist in national reporting on GHG emissions, explore emissions trajectories for policymaking, and monitor progress toward mitigation goals. <i>Rice Emissions MRV Tool Report</i> , October 2013.
c. Financial Analysis of Using Livestock Wastes for Energy Production	Bloomberg New Energy Finance prepared analysis of using livestock wastes for electricity production for larger bio-digesters. <i>Livestock Methane Capture and Electricity Production in Vietnam</i> , October 2013.
d. Workshop on Nationally Appropriate Mitigation Actions (NAMA)	Prepared and convened NAMA Workshop for government ministries with the Ministry of Planning and Investment in July 2013 with World Resources Institute and National Renewable Energy Laboratory. <i>Vietnam NAMA Workshop Proceedings</i> , October 2013.



Introductory AILEG Workshop in Vietnam



<b>Global Support: Training and Knowledge Dissemination</b>	
AILEG Cost-Benefit Analysis for Global Climate Change Mitigation Training (Task 4)	<p><b>Budget: \$127K</b> Mitigation economics training under USAID University for USAID and other USG and partner country participants. Best practices included cost-benefit analysis, cost-effectiveness analysis, MACCs, and decision making for climate change policy makers. Total 24 trained; 50% of participants and presenters were women. <i>Cost-Benefit Analysis for Global Climate Change Mitigation Proceedings, March 2013.</i></p>
AILEG Economics of Global Climate Change: Adaptation Training (Task 4)	<p><b>Budget: \$109K</b> Adaptation economics training course under USAID University for USAID and USG staff, focused on preparing the incremental costs of interventions with and without adaptation in the agriculture, energy, water, infrastructure, and biodiversity sectors. Trained 22 participants; 50% women. <i>Economics of Global Climate Change Adaptation Proceedings, March 2013.</i></p>
Clean Energy Lending Toolkit (Task 4)	<p><b>Budget: \$126K</b> Developed a manual with Enclude (international bank) to assist financial intermediaries to decide if, and if so how, to lend to renewable energy and energy efficiency project developers. <i>Clean Energy Lending Toolkit, October 2013.</i></p>
Final AILEG Workshop	<p><b>Budget: \$55K</b> Held a final project workshop in Washington, D.C. to disseminate the AILEG findings and results to the broader LEDS and climate change community. Over 100 people attended the all-day workshop <i>Final AILEG Workshop Proceedings, September 2013.</i></p>



Solar panels in the Philippines



## 2.2. ACCOMPLISHMENTS BY TASKS

### TASK I. ASSESSMENTS AND BRIEFS

The initial step for AILEG when approached by a country or USAID mission was to conduct needs or gap assessments and report back with briefs, if appropriate. AILEG provided seven needs analyses of the priority LEDS niches where data, economic, or financial technical assistance could help policy makers, private investors, and civil society make evidence-based climate change policies and invest in clean energy projects. While all seven countries are at extremely different levels of LEDS commitments and climate change policy planning, some cross-cutting needs do exist:

#### Data:

- LEDS data, database collection, and management gaps exist for key emitting sectors; in particular, energy, forestry, watershed management, and agriculture.
- Governments have a firm grasp of country-specific data needs for climate change policy making, but are limited by resource funding and capacity constraints.
- Digitized, centralized LEDS data systems (collection, reporting, tracking, and verification) are not yet sufficient and need investment to standardize processes and provide transparent verification.



Rice production is a major GHG source. AILEG assisted Vietnam by including rice management questions in national surveys for 3 districts.

#### Analytics:

- Deeper economic analysis of mitigation options using international best practices was requested by government planning and finance as well as sector (energy, agriculture, forestry, and environment) ministries or agencies to make key growth and welfare decisions.
- Countries want assistance on estimating ecosystem and other co-benefits associated with mitigation and adaptation measures, as well as models that integrate actions across key sectors.
- High turnover in government personnel exacerbates the need to develop leading climate change research and train academic entities in best practices and applications. Most of AILEG's level of effort (LOE) went to local consultants and local research institutes, NGOs, and private firms.

#### Policy and Impact Evaluation:

- Climate change decision makers in countries need better tools and methods for the integration of mitigation and adaptation activities to prepare comprehensive, sustainable growth policies.
- Climate change policy analysis and evolution is fractured across different agencies with various degrees of line authority and enforcement capabilities to incorporate climate change policy and project financing into development planning.



### TASKS 2 AND 3. ANALYTICAL SUPPORT

Both tasks—short-term and longer-term capacity development—delivered technical support for analysis of the economic and financial investment LEDS needs of partner countries and USAID. Strengthening LEDS data collection, improvement, management, and MRV systems were foundational components of AILEG to ensure accurate, consistent information was available to policy makers for planning.

Overall, AILEG supported more than 20 technical analyses in seven countries (Table 5). Annex A presents details of all such analyses. Highlighted accomplishments from activities supporting Tasks 2 and 3 include:

#### Database and Data Improvement:

- AILEG assisted governments and associated research institutes or universities in Colombia, Vietnam, the Philippines, and Jamaica to develop customized, country-specific data systems for energy efficiency and environmental co-benefits, agriculture systems, and the energy and forestry sectors.
- The Philippines Climate Change Commission signed an MOU with key academic leaders to institutionalize collaboration on data improvement for LEDS.

#### Economic Analysis:

- MACCs for energy efficiency, demand-side management, and rice production mitigation options were prepared in concert with leading research and national institutes in Colombia, the Philippines, and Vietnam, respectively. Preparation of MACCs by local firms or institutes led to dialogues among analysts and policy makers about the constraints and implications of estimating costs per unit of emission reduction by potential mitigation measure. These discussions raised the importance of having comparative economic assessment tools while incorporating non-economic parameters (environmental co-benefits, safety, and health) into such decision making.
- AILEG assistance to countries in cost-benefit analysis and cost-effectiveness analysis—along with macroeconomic computable general equilibrium (CGE) modeling as part of MACC analysis and general climate change policy analysis in Colombia, Guatemala, Mexico, the Philippines, and Vietnam—enhanced local and USAID capabilities to apply best practices in financial and economic approaches to analyzing climate change mitigation options (renewable energy, energy efficiency, and sustainable landscapes).
- AILEG’s economic estimation of environmental services and co-benefits in Colombia’s *Páramo de Santurbán* and Guatemala’s Péten demonstrated the importance of internalizing market (agroforestry products, tourism, recreation) and non-market (erosion control, biodiversity) values of critical ecosystems when developing climate change policies, determining payment for environmental services (PES), and allocating scarce national resources in development planning.



Colombia’s high-altitude *Páramo de Santurbán* ecosystem is threatened by gold mining and encroachment. AILEG helped value the environmental benefits of these systems.



**TASK 4. TRAINING AND KNOWLEDGE DISSEMINATION**

AILEG supported eight training events as shown in Table 6, along with many workshops that contained knowledge dissemination (see Accomplishments). The training events included courses for partner government and local stakeholders in LEADS modeling (Jamaica, Philippines), agricultural surveying and marginal abatement cost analysis (Vietnam), social accounting matrix modeling for computable general equilibrium (CGE) model development (Mexico), hydrological modeling (Colombia), cost-benefit analysis for global climate change mitigation, and the economics of climate change adaptation (Global)). AILEG vetted for stakeholder input and disseminated all reports of analyses to governments and other key experts. In addition, throughout the project life AILEG collaborated with global LEADS partners in country and internationally, for example attending and presenting at several RDMA Asia LEADS Forums.

**TABLE 6. AILEG TRAINING EVENTS SUMMARY**

Location	Number of Trainings	Training Title	Dates
Colombia	1	Estimating the Effects of Climate Change on the Hydrological Cycle	7/22/2013
Mexico	1	Social Accounting Matrices and Multiplier Models	5/19/2013 & 7/9/2013
Philippines	3	LEAP for Energy and Climate Change Mitigation Assessment	1/28-29/2013
		LEAP, MACCs, and Multi-Criteria Attribute (MCA) Decision Making	5/14-17/2013
		MACC Mini Training	5/21/2013
Vietnam	1	Agriculture Survey and Mobile Phone Training	1/22/2013
Global	2	Cost-Benefit Analysis of Global Climate Change Mitigation	3/4-7/2013
		Economics of Global Climate Change Adaptation	3/11-13/2013



Participants learned how to assess climate change policy and project impacts on the energy and transport sectors in the AILEG Second LEAP Model Training Workshop, Philippines.



## TASK 5. EVALUATIONS AND IMPACT ASSESSMENTS

AILEG made one evaluation of a climate change project: USAID’s Climate, Nature and Communities in Guatemala (CNCG) Project in Guatemala, which used cost-benefit analysis to assess the net economic and GHG emissions sequestration benefits potential from development of non-timber products. The AILEG Final Workshop in September 2013 partnered by USAID and the AILEG team in Washington, D.C. presented the findings and results of the project activities, with LCDs available and an AILEG video located on the USAID Global Climate Change website (page [www.usaid.gov/climate/leds-columbia-jamaica-philippines-vietnam](http://www.usaid.gov/climate/leds-columbia-jamaica-philippines-vietnam)) and on YouTube ([www.youtube.com/watch?v=nKkHIAujlx0](http://www.youtube.com/watch?v=nKkHIAujlx0)).



Front row: USAID AILEG Management Team, Dr. Yoon Lee, Dr. Eric Hyman, Dr. Michael Hanowsky, Jay Knott (Abt), Dr. Robert Wuertz at AILEG Final Workshop, September 2013



World Café Activity Booths at AILEG Final Workshop



AILEG and NREL panel, Dr. Tulika Narayan, Dr. Michael Westphal, Dan Bilello, and Jette Finden



**USAID**  
FROM THE AMERICAN PEOPLE

**AILEG** Analysis and Investment for  
Low-Emission Growth

## 3. OUTPUTS AND OUTCOMES

### 3.1. PERFORMANCE MONITORING

Under the AILEG Contract, the Task Order guidance for monitoring and evaluating did not provide explicit numerical targets or require specific Intermediate Results *per se*; rather, it defined possible reporting and indicator options more broadly. It stated that performance monitoring:

*“...will cover outputs such as number of assessments, analyses, workshops, and short-term technical assistance, policy recommendations sent to partner country governments, and evaluations completed... Outcomes should be tracked by numbers of stakeholders, and ... as appropriate to the activity USAID requires the use of at least one Global Climate Change (GCC) Standard Indicator such as:*

- *Number of laws, policies, agreements or regulations addressing climate change proposed, adopted or implemented as a result of USG assistance;*
- *Number of people receiving USG-supported training in environmental law, enforcement, public participation, and cleaner-production policies, strategies, skills and techniques; or*
- *Number of people receiving USG-supported training in global climate change including the Framework Convention on Climate Change, greenhouse gas inventories, mitigation and adaptation analysis.” AILEG Task Order, p.8-9.*

Hence, the AILEG management team in collaboration with the USAID AILEG core management team (COR, Activity Managers) developed an approved, but evolving, set of performance monitoring criteria and reporting indicators for the project. AILEG’s targets and indicators changed over time due to annual modifications of the official USAID GCC Standard Indicators and the demand-driven nature of AILEG activities. To comply with the latest USG requirements, AILEG agreed with its Activity Co-Manager (Dr. Eric Hyman) to report on eight mandatory GCC Indicators, which may be found in the *GCC Indicator Handbook* (2012) and 2013 GCC Master List under Section 4.8, Environment.<sup>2</sup> Thus, the relevant indicators for AILEG included Indicator 4.8-7 on GHG emissions reduced or sequestered as a result of the project, and all indicators under Section 4.8.2, Clean Productive Environment. AILEG also proposed to report on two additional customized indicators on (a) the number of assessments and analyses conducted and (b) the number of LEDS AILEG/country partnerships formed.

### 3.2. TARGETS AND INDICATORS SUMMARY

AILEG met and delivered measureable, verified results on all of the key USG Global Climate Change Standard Indicators, along with several customized indicators (Table 7). A discussion of the findings follows.

---

<sup>2</sup> The GCC Standard Indicators used for this report were from the USAID’s website features a 2013 Master List of GCC Indicators. Throughout most of the AILEG project, though, the 2012 *GCC Indicator Handbook* remained the official publication available.



**TABLE 7. SUMMARY OF AILEG INDICATORS AND RESULTS**

Indicator (Relevant GCC Handbook Number)	Results	Unit	Comments
<b>GCC Indicator 3.2.1:</b> Number of activities related to technical assistance and capacity development of climate change	26	Activities	Includes country and global activities
<b>GCC Indicator 4.8-7:</b> Greenhouse gas (GHG) emissions, estimated in metric tons of carbon dioxide equivalents (tCO <sub>2</sub> e) reduced, sequestered, and/or avoided as a result of USG assistance	40	tCO <sub>2</sub> e per year	Princessfield, Jamaica Solar-Powered Community Centre <i>Potential Identified:</i> 74,232,221 tCO <sub>2</sub> e/yr
<b>GCC Indicator 4.8.2-6:</b> Number of people receiving training in global climate change as a result of USG assistance	111	Unique individuals	47% female 53% male
	8	Training events	
<b>GCC Indicator 4.8.2-10:</b> Amount of investment leveraged in U.S. dollars, from private and public sources, for climate change as a result of USG assistance	50,000	USD	UNDP/GEF Funds
<b>GCC Indicator 4.8.2-14:</b> Number of institutions with improved capacity to address climate change issues as a result of USG assistance	412	Institutions	Government, research, academic, for-profit and NGOs
<b>GCC Indicator 4.8.2-26:</b> Number of stakeholders with increased capacity to adapt to the impacts of climate change as a result of USG assistance	303	Unique individuals	28% female 72% male
<b>GCC Indicator 4.8.2-27:</b> Number of days of USG funded technical assistance in climate change provided to counterparts or stakeholders	3,762	Days	
<b>GCC Indicator 4.8.2-28:</b> Number of laws, policies, strategies, plans, or regulations addressing climate change (mitigation or adaptation) and/or biodiversity conservation officially proposed, or adopted as a result of USG assistance	2	Strategies	- Colombia, Mexico
	1	Agreements	- Philippines MOU
	3	Action plans	- Jamaica, Kazakhstan, Vietnam
<b>GCC Indicator 4.8.2-29:</b> Number of person hours of training completed in climate change as a result of USG assistance	3,040	Person hours	50% female 50% male
<b>GCC Indicator 4.8.2-30 (New 2013):</b> Number of subnational laws, policies, strategies, plans, agreements, or regulations addressing climate change (mitigation or adaptation) and/or biodiversity conservation officially proposed, or adopted as a result of USG assistance	11	Plans	Colombia, Guatemala, Jamaica
<b>GCC Indicator 4.8.2-31 (New 2013):</b> Expected lifetime energy savings from energy efficiency or energy conservation, as a result of USG assistance	2	MW per year	Philippines and Colombia EE MACC options identified with negative costs
<b>GCC Indicator 4.8.2-32 (New 2013):</b> Clean energy generation capacity installed or rehabilitated as a result of USG assistance	4.2	kW	Solar photovoltaic Princessfield, Jamaica
<b>Custom (Non-GCC) Indicator:</b> Number of assessments and analyses provided	32	Analyses	8 gap analyses, 24 technical assessments
<b>Custom (Non-GCC) Indicator:</b> Number of partnerships established to implement LEDS analyses	7	Partnerships	

## GREENHOUSE GAS EMISSIONS

**GCC Indicator 4.8-7:** Greenhouse gas (GHG) emissions, estimated in metric tons of carbon dioxide equivalents (tCO<sub>2</sub>e) reduced, sequestered, and/or avoided as a result of USG assistance

**Project Outcome** = 40 kg CO<sub>2</sub>e per year reduced

**Indicator Type:** Outcome



**USAID**  
FROM THE AMERICAN PEOPLE



With the support of St. Catherine’s Community Development Agency (SACDA) and the AILEG Jamaica Country Coordinator, Dr. Alicia Hayman, AILEG provided technical support to Princessfield, Jamaica to prepare a clean energy proposal that won \$50,000 from the UNDP/Global Environment Fund in November 2013 for a 4.2 kW solar photovoltaic project at a community center that displaces 40 kg CO<sub>2</sub>e/year from fossil fuels. AILEG country activities, hence, will result in direct GHG emissions being reduced. The project also identified potential emissions that could be sequestered through USAID’s CNCG technical assistance in Guatemala; negative costs of mitigation options identified during MACC development in Colombia, Philippines, Vietnam; and another potential project in Jamaica.

The total identified potential GHG emission reductions (or in the case of Guatemala, sequestration) estimated by AILEG are 74,232,221 tCO<sub>2</sub>e per year (see Table 8). Table 8 also presents potential quantities of GHG emissions reduced if investments identified in MACC analyses for Colombia, the Philippines, and Vietnam and in cost-benefit analysis (CBA) for Guatemala and Jamaica are implemented. Mitigation options identified for Colombia, Jamaica, the Philippines, and Vietnam could lead to significant emission reductions, if adopted and implemented by private and public sectors. Annex A provides details about the mitigation options identified for each country.

By slowing forest degradation and conversion in the Maya Biological Reserve through the USAID Guatemala Climate, Nature and Communities in Guatemala (CNCG) Project, carbon sequestration for the Petén region would be enhanced and lead to more rural household income generation opportunities, especially for women-owned businesses selling non-timber forest products (*xaté* palm and *ramón* nut). Technical assistance efforts in Kazakhstan were wholly driven to build capacity in establishing the national emissions trading scheme (ETS), which in turn will reduce GHG emissions. Because it was a capability mapping activity, it did not directly lower the rate of growth in emissions but helped facilitate institutional development to allow trading to proceed smoothly and cost-effectively.

**TABLE 8. GHG EMISSION REDUCTION POTENTIAL PER YEAR IDENTIFIED THROUGH AILEG MACC DEVELOPMENT AND CBA**

Country	Emissions Reduced or Sequestered (tCO <sub>2</sub> e/year)
Colombia	54,640
Guatemala	684,829
Jamaica	0.08
Philippines	71,207,900
Vietnam	2,284,852
<b>Total</b>	<b>74,232,221</b>



## GLOBAL CLIMATE CHANGE TRAINING PARTICIPANTS

**GCC Indicator 4.8.2-6:** Number of people receiving training in global climate change as a result of USG assistance

**Project Outcome** = 111 (47% female) unique individuals

**Indicator Type:** Outcome

AILEG provided a total of eight trainings, with six climate change-related trainings in four countries (Colombia, Mexico, the Philippines, and Vietnam) and two global economics of climate change courses under USAID University, partnered in Bethesda, Maryland (Table 6). Such events resulted in 111 unique<sup>3</sup> people being trained from multiple line-authority agencies and ministries, as well as private sector, NGO, academia, research institutes, and other stakeholder entities (Table 9). Almost half the participants were women.

**TABLE 9. NUMBER OF PEOPLE TRAINED BY AILEG**

Country	Count			Percentages (%)	
	Female	Male	Total	Female	Male
Colombia	5	7	12	42%	58%
Mexico	2	2	4	50%	50%
Philippines	25	24	49	51%	49%
Vietnam	6	8	14	43%	57%
Global	14	18	32	44%	56%
<b>Total</b>	<b>52</b>	<b>59</b>	<b>111</b>	<b>47%</b>	<b>53%</b>

\* Unique individuals are reflected in these totals, to avoid double counting people who attended several training sessions.

## CLIMATE CHANGE INVESTMENTS

**GCC Indicator 4.8.2-10:** Amount of investment leveraged in U.S. dollars, from private and public sources, for climate change as a result of USG assistance

**Project Output** = USD \$50,000 UNDP/GEF funding

**Indicator Type:** Output

The Princessfield, Jamaica proposal, developed with AILEG support, for the installation of solar photovoltaic panels on a local community center was approved by the UNDP/GEF for additional support of \$50,000. In addition, AILEG activities identified other key clean energy and adaptation investment potential through a variety of technical assistance including preparing marginal abatement cost curve (MACC) development for Colombia, the Philippines and Vietnam, and cost-benefit analysis (CBA) in Guatemala. Table 10 lists the number and value of potential mitigation or adaptation investments identified through MACC development in Colombia, the Philippines, and Vietnam with the potential to be leveraged with private or public-private funds. Cost data from MACCs can either be positive or

<sup>3</sup> The totals reported in Table 9 reflect unique individuals who participated in the trainings, rather than potentially double counting participation of the same person at multiple training activities.



negative values. Negative values represent investments that would be *cheaper* than the business-as-usual scenario.

**TABLE 10. POTENTIAL CLIMATE CHANGE INVESTMENTS IDENTIFIED THROUGH MACC ANALYSES BY AILEG**

Country	Sector	Number of Mitigation Options Identified	Value (USD)
Colombia (Energy Efficiency options)	Shopping Malls	28	\$ 691,147.51
	Office Buildings	27	\$ 753,837.43
	Hotels	24	\$ 228,473.89
	Hospitals	22	\$ 262,092.46
<b>Colombia Total</b>		<b>101</b>	<b>\$ 1,935,551.29</b>
Philippines	Cement	6	\$ (279,479,600.00)
	Chemicals	8	\$ (728,840,000.00)
	Coconut & Vegetable Oil	6	\$ (5,103,310,000.00)
	Commercial	7	\$ (2,156,780,200.00)
	Food Processing	9	\$ (1,308,360,000.00)
	Glass	5	\$ (2,035,130,000.00)
	Industrial	11	\$ (3,205,076,700.00)
	Mining	5	\$ (562,690,000.00)
	Pulp & Paper	6	\$ (3,619,660,000.00)
	Residential	15	\$ (2,612,889,400.00)
	Semiconductor	7	\$ (756,000,000.00)
	Steel/Metal	5	\$ (2,146,790,000.00)
	Sugar	5	\$ (3,831,000.00)
Wood	6	\$ (922,990,500.00)	
<b>Philippines Total</b>		<b>101</b>	<b>\$ (25,441,827,400.00)</b>
<b>Vietnam</b>	Rice	<b>3</b>	<b>\$ 175,279,274.87</b>

**Guatemala:** Development of community forestry enterprises for timber and non-timber products will seek an investment of US\$20,938,800, with a reduction of 684,828.7 tCO<sub>2</sub>e/year.

**Jamaica:** Funding proposals for the two Community Action Plans' flagship projects identified that the solar-powered Training Centers require a combined initial investment of US\$254,544.00 with a potential reduction of 0.08 tCO<sub>2</sub>e/year. At the national level, AILEG assisted the Government of Jamaica (GOJ) in identifying 16 priority investments for its Second NEAP.

**Vietnam:** The Livestock Methane Capture and Electricity Production analysis identified a capital cost of US\$2.2 million for a 2 MW project; no emissions reduction values were calculated.

**Kazakhstan:** Establishment of a national ETS will pave the way for long-term climate change investments.

**Clean Energy Lending Toolkit:** The Toolkit will enable private and public stakeholders to identify climate change investments.



**USAID**  
FROM THE AMERICAN PEOPLE



## INSTITUTIONAL CAPACITY DEVELOPMENT

**GCC Indicator 4.8.2-14:** Number of institutions with improved capacity to address climate change issues as a result of USG assistance

**Project Output** = 412 institutions

**Indicator Type:** Output

AILEG improved the capacity of 412 unique institutions across countries and activities to address climate change through workshops, events, trainings, and stakeholder meetings (Table 11). The unit is drilled down to the lowest available level of detail on program or office. For example, based upon attendance records, if one person's affiliation was with the Philippines Department of Energy (DOE), Oil Industry Management Bureau (OIMB), and a second person was affiliated with DOE OIMB, Natural Gas Management Division, these are counted as two institutions.

Table 11 provides a breakdown of institutional type by country/activity with marginal overlap between countries and activities with international institutions. Institutions under the Global Climate Change activities are those with attendees at one or both of the GCC trainings held in Bethesda, Maryland, in March 2013, or the final AILEG conference in Washington, DC, on September 10, 2013. The range of institutional types and the total number of institutional types by country/activity is comparable to the number of prescribed activities in a given scope of work. For example, in Kazakhstan AILEG assisted 11 institutions across four institution types because its scope focused singularly on technical assistance for the national ETS. On the other hand, in Jamaica AILEG assisted a large number and spread of institutions, as it worked across four sets of activities: community action planning, national climate financing, national climate modeling, and energy action plans. AILEG Colombia is an outlier: while it worked on three separate activities, the number of institutions involved was limited.

## STAKEHOLDER ADAPTIVE CAPACITY DEVELOPMENT

**GCC Indicator 4.8.2-26:** Number of stakeholders with increased capacity to adapt to the impacts of climate change as a result of USG assistance

**Project Outcome** = 303 (28% female) individuals

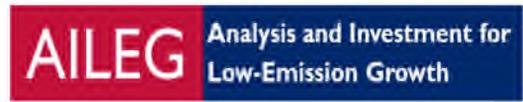
**Indicator Type:** Outcome

As the focus of the AILEG Project was LEDS, adaptation was highlighted and integrated into the project's activities. Adaptation activities under AILEG included:

**Colombia:** To protect ecosystems, the PES evaluation of the *Páramo de Santurbán* and the hydrological modeling of the Upper Magdalena Watershed helped stakeholders quantify and value ecosystem services, building a case for their protection for benefits including climate change adaptation. Eight (50% female) individuals from ministries, predominantly CAM, were involved in developing the PES with two from CAM sent to a four-day training in Mexico. Twelve (25% female) individuals from the partner country government were involved in the hydrological modeling. Overall, 23 (30% female) individuals received adaptive capacity development in Colombia.



**USAID**  
FROM THE AMERICAN PEOPLE



**TABLE 11. INSTITUTIONS BY COUNTRY/ACTIVITY THAT RECEIVED AILEG CLIMATE CHANGE CAPACITY DEVELOPMENT**

Institutional Type	Country						Global		
	Colombia	Guatemala	Jamaica	Kazakhstan	Mexico	Philippines	Vietnam	Clean Energy Lending Toolkit	Global Climate Change
Academia		2	3	1	6	17	4		1
Bi-lateral			2			2	6		
Community		30	2						
Consultant			3			2	1		13
Finance									
Industry Group		3	4			3			
Multi-lateral		1	1	1		2	1		3
NGO		27	5		2	13	8		5
Non-Partner Country Government			3			1			
Non-USAID USG						1	3		7
Partner Country Government	3	25	21	5	2	39	49		2
Private Sector		11	7	3	1	10	5	3	1
USAID	1	1	2	1		4	4		25
<b>Total</b>	<b>4</b>	<b>100</b>	<b>53</b>	<b>11</b>	<b>11</b>	<b>94</b>	<b>81</b>	<b>3</b>	<b>57</b>



**USAID**  
FROM THE AMERICAN PEOPLE



**Guatemala** Forest-based LEDS promotes adaptation and mitigation through maintenance of the tree canopy and its influence on temperature and the hydrological cycle. In Guatemala, 148 (9% female) individuals from partner country government and community and private enterprise groups were involved in the CBA for development of a timber and a non-timber forest product.

**Jamaica:** The climate finance assessment identified ways the GOJ could leverage funds that integrate adaptation and mitigation and gave examples of mitigation and adaptation benefits from a single project. As an adaptation-focused, island nation, Jamaica gained technical assistance on increasing funding for adaptation options through integration with mitigation options. Eighty-one (42% female) individuals from partner country government, the private sector, NGOs, financial institutions, and USAID attended the climate finance focus group on June 27, 2013, and the culminating conference on July 10, 2013, that shared climate finance assessment results.

**Philippines:** In the Philippines, 29 (66% female) individuals from the partner country government, USAID, NGOs, and the private sector participated in the Reducing Emissions from Deforestation and Degradation Plus (REDD+) Workshop on June 21, 2013.

**Global:** AILEG's USAID University course, *The Economics of Climate Change Adaptation*—held at Abt Associates on March 11-13, 2013—used case studies to train participants in the methodologies of the economics of climate change adaptation in key economic sectors, such as infrastructure, water resources, and agriculture, helping inform future project selection. Twenty-two (50% female) individuals from predominantly USAID/Washington and USAID missions attended.

## CLIMATE CHANGE TECHNICAL ASSISTANCE

**GCC Indicator 4.8.2-27:** Number of days of USG funded technical assistance in climate change provided to counterparts or stakeholders

**Project Output** = 3,762 days of TA provided by AILEG individuals; 49 days of TA provided at workshops, events, and trainings

**Indicator Type:** Output

Days of TA were tallied using the LOE of AILEG staff, independent consultants, and subcontractors and the days of workshops, events, and trainings held. These numbers were not added to give the total days of TA, as there was overlap between LOE and the activities due to preparation and implementation of activities being included in the LOE.

Table 12 lists the number of days of TA counted through staff, independent consultant, and subcontractor LOE. Please note that the LOE of 65 individuals was not tracked because those individuals were hired through fixed-price contracts; thus, the number of days of TA from LOE represents an underestimate. The Global



AILEG's Hydrological Training Workshop for estimating climate change impacts in the Upper Magdalena Watershed in Colombia



Activities and General Management category includes the time spent by the AILEG Project Manager (Dr. Marcia Trump), AILEG Technical Director (Dr. Michael Westphal), Finance and Contract Specialist (Reed Allen), staff working on the global activities including the Clean Energy Lending Toolkit, climate change economic courses for USAID University, editing documents and presentations, and AILEG Final Workshop.

Table 12. Technical Assistance Days of AILEG Level of Effort

Country/Activity	Days of LOE
Colombia	643
Guatemala	25
Jamaica	354
Kazakhstan	38
Mexico	149
Philippines	521
Vietnam	692
Global Activities and General Management	1,340
<b>Total</b>	<b>3,762</b>

Table 13 lists the workshops, events, and trainings held. Countries with shorter SOWs had fewer TA events and fewer formal stakeholder TA interactions throughout the life of the project. Discrete TA for workshops, events, and trainings is shown in Table 13.

**TABLE 13. DISCRETE TA OPPORTUNITIES THROUGH WORKSHOPS, EVENTS, AND TRAININGS**

Country	Workshop/Event/Training	Date	Days
Colombia	PES Training in Mexico	9/17/2012	4
	Páramo Valuation	7/9/2013	1
	CAM Hydrology Workshop	7/22/2013	1
	Estimating the Effects of Climate Change on the Hydrological Cycle	7/22/2013	1
Global	Clean Energy Lending Toolkit Stakeholder Meetings	Mar-Sep, 2013	N/A
	Economics of Global Climate Change Adaptation	3/11-13/2013	3
	Cost-Benefit Analysis of Global Climate Change Mitigation	3/4-7/2013	3
	Final AILEG Conference, DC	9/10/2013	1
Guatemala	Stakeholder Consultation: Maya Biosphere Reserve	May-Jun 2013	2
	Stakeholder Consultation: National Influence	May-Jun 2013	2
	Stakeholder Consultation: Sierra de las Minas Biosphere Reserve	May-Jun 2013	2
	Stakeholder Consultation: Western Highlands	May-Jun 2013	2
Jamaica	Content Women's Focus Group Discussion	4/19/2013	1
	Princessfield Women's Focus Group Discussion	4/22/2013	1
	Princessfield Men's Focus Group Discussion	4/25/2013	1
	Content Men's Focus Group Discussion	4/25/2013	1
	Content Visioning Workshop	5/27/2013	1
	Princessfield Visioning Workshop	5/31/2013	1
	First Action Impact Matrix (AIM) Workshop	6/3/2013	0.3
	Princessfield Action Planning Workshop	6/10/2013	1
	Content Action Planning Workshop	6/12/2013	1
	Second AIM Workshop	6/14/2013	1
	Joint Stakeholder Workshop	6/24/2013	1
	NEAP Focus Group	6/26/2013	0.3
	Climate Finance Focus Group	6/27/2013	0.3
	LEDS Modeling Focus Group	7/1/2013	0.3



**USAID**  
FROM THE AMERICAN PEOPLE



Country	Workshop/Event/Training	Date	Days
	Final Jamaica Symposium	7/9-10/2013	2
Kazakhstan	Stakeholder Meetings	Apr-Jun, 2013	N/A
Mexico	Strategic Planning Workshop	5/1/2013	1
	Social Accounting Matrices Weekly Meetings 1-8	May 19-Jul 7, 2013	12
	Social Accounting Matrices and Multiplier Models	5/19/2013 & 7/9/2013	2
Philippines	LEAP for Energy and Climate Change Mitigation Assessment	1/28-29/2013	2
	Financial Flows and Barriers for Investment Workshop	4/5/2013	1
	Energy Data Assessment and Integrated Energy Database Workshop	4/10/2013	1
	LEAP, MACCs, and MCA	5/14-17/2013	3
	MACC Mini Training	5/21/2013	1
	Culminating Workshop	6/18/2013	1
	REDD+ Workshop	6/21/2013	1
Vietnam	AILEG Stakeholder Workshop - Needs Assessment Report Results & Activities	6/13/2012	1
	Agriculture Survey and Mobile Phone Training	1/22/2013	1
	AILEG Introductory Workshop	3/29/2013	1
	Government NAMAs Workshop	5/21-22/2013	2
	Culminating Agriculture Workshop	7/11/2013	1
<b>Total</b>			<b>49</b>

## NATIONAL LEGAL AND REGULATORY MEASURES

**GCC Indicator 4.8.2-28:** Number of laws, policies, strategies, plans, or regulations addressing climate change (mitigation or adaptation) and/or biodiversity conservation officially proposed, or adopted as a result of USG assistance

**Project Output** = two national strategies, one national agreement, and five national plans

**Indicator Type:** Output

Measures formally proposed within an official government process include:

**Colombia—one national strategy:** The partner country government tasked AILEG with developing the commercial building sector MACC for incorporation into the National Climate Change Plan, part of a larger, existing government effort to development MACCs for all building sector types.

**Jamaica—one national plan:** AILEG worked hand-in-hand with the Ministry of Science, Technology, Energy and Mining (MSTEM) and other government and private stakeholders to develop and introduce the Second National Energy Action Plan.

**Kazakhstan—one national plan:** At the national level, recommended Emission Trading Systems capabilities mapping to the government.

**Mexico—one national strategy:** AILEG collaborated with the INECC LEDS working group to determine their macroeconomic modeling needs and establish the LEDS analytical framework, specifically whether a general equilibrium or partial equilibrium approach should be used, and whether the model would be developed over time in-house or would be outsourced.



**USAID**  
FROM THE AMERICAN PEOPLE

**AILEG** Analysis and Investment for  
Low-Emission Growth

**Philippines—one national agreement:** The Philippines DOE signed an MOU with six universities at the AILEG Philippines closing event on June 18, 2013, for LEDS capacity development and implementation. The six universities are Ateneo de Manila University - School of Government, Central Luzon State University, Mapua Institute of Technology, Polytechnic University of the Philippines, Technological University of the Philippines, and the University of the Philippines Diliman.

**Vietnam—three national plans:** Assisted the Ministry of Planning and Investment's General Statistics Office (GSO) in development of new agricultural survey plans to differentiate rice production management practices; at the national-governance level, proposed NAMA development for wind and biogas power generation; and prepared legal mandate changes needed at the national level to institutionalize green energy and LEDS policies into development planning.

The short duration of individual activities limited partner country governments' ability to officially propose, adopt, or implement legal and regulatory measures. However, AILEG was able to make recommendations to partner country governments based on MACC and CBA results. Within Colombia, in addition to the EE MACC, AILEG recommended strategies to protect the *Páramo de Santurbán* through consumer payment for water, development of ecotourism, and carbon capture measurement; and recommended water management tactics in the Upper Magdalena Watershed for inclusion in the Huila 2050 Climate Change Plan. In Jamaica, AILEG provided recommendations to the GOJ on opportunities for climate financing, LEDS modeling, and integration of community-level climate change action with national-level efforts. AILEG Kazakhstan's main function was to make policy and strategy recommendations to the national ETS. In addition to recommendations for energy efficiency measures identified in the MACC and for REDD+ development in the Philippines, a workshop in April 2013 explained a strategy to implement existing laws related to LEDS. In Vietnam, AILEG found that existing legal mandates for the Ministry of Natural Resources and Environment are sufficient for LEDS data collection, and recommended strategies for developing livestock biogas electricity generation and for survey methodology for rice and livestock production practices.

## GLOBAL CLIMATE CHANGE TRAINING HOURS

**GCC Indicator 4.8.2-29:** Number of person-hours of training completed in climate change as a result of USG assistance

**Project Output** = 3,040 person hours

**Indicator Type:** Output

For the trainings listed earlier (Table 13), the number of person hours participants completed is broken out by country and gender in Table 14.



**TABLE 14. PERSON HOURS OF TRAINING**

Country	Count			Percentages (%)	
	Female	Male	Total	Female	Male
Colombia	40	56	96	42%	58%
Mexico	64	64	128	50%	50%
Philippines	920	840	1760	52%	48%
Vietnam	48	64	112	43%	57%
Global	436	508	944	46%	54%
<b>Total</b>	1,508	1,532	3,040	50%	50%

## SUB-NATIONAL LEGAL AND REGULATORY MEASURES

**GCC Indicator 4.8.2-30 (New 2013):** Number of subnational laws, policies, strategies, plans, agreements, or regulations addressing climate change (mitigation or adaptation) and/or biodiversity conservation officially proposed, or adopted as a result of USG assistance

**Project Output** = five sub-national plans

**Indicator Type:** Output

Sub-national measures proposed include:

- **Colombia—two sub-national plans:** At the Upper Magdalena watershed level, developed the Huila Basin Climate Change Action Plan and the Ministry of Environment environmental PES plans for the *Páramo de Santurbán* region.
- **Guatemala—one sub-national plan:** At a community-governance level, developed a business plan for the development of a timber product and non-timber product.
- **Jamaica—two sub-national plans:** At the community-governance level, endorsed by local officials, the towns of Content and Princessfield adopted and began implementation of individual five-year Community Energy Efficiency and Renewable Energy Action Plans.

## EXPECTED LIFETIME ENERGY SAVINGS

**GCC Indicator 4.8.2-31 (New 2013):** Expected lifetime energy savings from energy efficiency or energy conservation, as a result of USG assistance = 2 MW per year

**Indicator Type:** Not available

All AILEG activities calculated estimated benefits from clean energy projects as GHG emissions avoided, reduced, or sequestered (with the exception of Vietnam). The Bloomberg New Energy Finance analysis of Vietnam’s Livestock Methane Capture and Electricity Production looked at the feasibility and cost of a



**USAID**  
FROM THE AMERICAN PEOPLE



2 MW project; no emissions reduction values were calculated. Table 10 lists additional investments identified that have expected lifetime energy savings, but do not have the expected savings calculated.

## **GENERATION CAPACITY**

**GCC Indicator 4.8.2-32 (New 2013):** Clean energy generation capacity installed or rehabilitated as a result of USG assistance

**Project Output** = 4.2 kW generation capacity

**Indicator Type:** Not available

The Princessfield, Jamaica project will install 4.2 kW of solar photovoltaic panels on a community center in the village. AILEG was a technical assistance project that focused on stakeholder capacity development and financial and economic analysis. Installation and rehabilitation of energy generation infrastructure was not a priority goal or activity under AILEG.

## **ASSESSMENTS AND ANALYSES**

**Custom (Non-GCC) Indicator:** Number of gap assessments and analyses completed on economic analysis and low-emissions investments for climate change

**Product Output** = total of 32 analyses: 8 gap assessments and 24 economic/financial investment analyses

**Indicator Type:** Output

AILEG's main goal was to conduct gap assessments and economic and financial analyses for LEDS. Thanks to its country teams with local coordinators and country managers, AILEG was able to quickly assist partner countries and USAID with developing a total of 34 analyses, including gap and technical assessments.



**USAID**  
FROM THE AMERICAN PEOPLE



Table 15 summarizes the final set of assessments and analyses resulting from this technical assistance, as approved by these counterparts. If the missions and partner country governments did not provide a scope of work directly, AILEG first conducted a scoping mission and provided a gap assessment to define subsequent assessments, analyses, and TA required.



**TABLE 15. ASSESSMENTS AND ANALYSES COMPLETED**

Country	Type	Deliverable/ Date/Description
Colombia	Gap Assessment	<i>AILEG Needs Assessment for EC-LEDS in Colombia</i> , April 2012. Identification and prioritization of Colombia’s EC-LEDS needs for AILEG support.
	Analysis	<i>Marginal Abatement Cost Curve Development for Buildings of the Commercial Sector in Colombia</i> , October 2013. Development of marginal abatement cost curves of energy efficiency mitigation options for Colombia’s commercial building sector.
	Analysis	<i>Hydrological Model Needs/Methodology Report</i> , October 2012. Development of the hydrological model for estimating climate change impacts for a watershed.
	Analysis	<i>Estimation of the Effects of Climate Change on Water Resources in the Suaza River Basin, a Tributary of the Magdalena River</i> , October 2013. Hydrological modeling of climate change impacts on water resources of the Suaza River, a tributary of the Magdalena River.
	Analysis	<i>Environmental Valuation of the Páramo de Santurbán, Colombia</i> , October 2013. Environmental valuation and payment for environmental services (PES) analysis for the Páramo de Santurbán.
Guatemala	Analysis	<i>Cost-Benefit Analysis (CBA) of the USAID Climate, Nature, and Communities in Guatemala (CNCG) Project</i> , October 2013. Cost-benefit analysis of producing the ramón nut and the xaté palm in a USAID project.
Jamaica	Gap Assessment	<i>EC-LEDS Scoping Mission Report for Jamaica</i> , January 2013. AILEG Jamaica EC-LEDS scoping mission and needs assessment with AILEG providing climate finance and modeling assessment support.
	Analysis	<i>Economic Planning and Modeling Assessment Report for Jamaica</i> , October 2013. LEDS data and modeling needs with recommendations.
	Analysis	<i>Jamaica Climate Finance Assessment Report</i> , October 2013. Climate financing assessment of renewable energy opportunities.
	Analysis	<i>Report on National Energy Action Plan 2013-2016 for Jamaica</i> , October 2013. Performance review of the First NEAP to inform the development of the Second NEAP .
	Analysis	<i>Social Marketing Analysis of Renewable and Energy Efficiency Community Attitudes in Jamaica</i> . October 2013. Social marketing analysis to inform a behavior change campaign on usage and attitudes toward EE and RE cooking and lighting.
	Analysis	<i>Jamaica Community Energy Efficiency and Renewable Energy Action Plans Final Report</i> , October 2013. Cost-benefit analysis of two community EE and RE action plans.
Kazakhstan	Analysis	<i>Capacity Building Support for the Emissions Trading Scheme in Kazakhstan: ETS Administrator Capability Mapping Report</i> , October 2013. Capacity mapping assessment of needs for the national ETS.
Mexico	Gap Assessment	<i>Internal Report on the Instituto Nacional de Ecología et Cambio Climático LEDS Macroeconomic Modeling Needs</i> . September 2012. Identification of macroeconomic modeling needs and establishment of the LEDS analytical framework by INECC with USAID and NREL.
	Gap Assessment	<i>Internal Monthly Report on the Status of LEDS Modeling in Mexico</i> . June 2013. Assessment of existing official Mexican documents related to LEDS.



Philippines	Gap Assessment	<i>Trip Report on the Recommended Needs for AILEG in the Philippines</i> , June 2012. AILEG Philippines needs assessment.
	Analysis	<i>Final Report on Energy Data Assessment &amp; Recommendation for an Integrated Energy Database</i> , September 2013. Energy data and integrated energy database assessment on availability, accessibility and quality for over 700 energy data fields.
	Analysis	<i>Scoping and Review of Forestry Data and REDD+ in the Philippines</i> , September 2013. Initial analysis of the forest sector data needs for REDD+ development. Phase I analysis.
	Analysis	<i>Assessment of REDD+ and Forestry Data in the Philippines</i> , September 2013. Phase II analysis with the full assessment and recommendations for strengthening the data systems and reporting processes for REDD+ implementation in the country.
	Analysis	<i>DSM Technology Data for the Philippines</i> , October 2013. Demand-side Management of energy sector data for the Philippines' energy efficiency mitigation improvements.
	Analysis	<i>Marginal Abatement Cost Curves (MACCs) for the Residential, Commercial and Industrial Sectors in the Philippines</i> , October 2013. MACCs of the energy efficiency mitigation options for the residential, commercial, and industrial sectors (16 subsectors) in the Philippines.
	Analysis	<i>Renewable Energy in the Philippines Financial Flows and Barriers to Investment</i> , October 2013. Renewable energy financial flows and barriers analysis for the Philippines.
	Analysis	<i>Training Workshop #1: Using LEAP for Energy and Climate Change Mitigation Assessment—Report of Proceedings</i> , October 2013. Grant to University of the Philippines National Engineering Center (UPNEC) to develop data for the LEAP model, LEAP energy baseline, reference case scenarios, and case studies for future LEDS training.
	Analysis	<i>Training Workshop #2: Using LEAP for Energy and Climate Change Mitigation Assessment—Report of Proceedings</i> , October 2013. Development of case studies by UPNEC for use at the LEAP second training.
Vietnam	Gap Assessment	<i>Background Report on AILEG Data Needs Assessment for EC-LEDS in Vietnam</i> , March 2012. Initial AILEG Vietnam data needs assessment review.
	Gap Assessment	<i>Vietnam EC-LEDS Data Needs Assessment</i> , October 2012. Final AILEG analysis of Vietnam's LEDS needs and activity recommendations for AILEG.
	Gap Assessment	<i>LEDS Data Collection and Legal Mandates Report in Vietnam</i> , October 2013. LEDS legal and policy mandate needs.
	Analysis	<i>Vietnam LEDS Agricultural Survey and Mitigation Analysis Report</i> , October 2013. LEDS agricultural pilot survey and marginal abatement cost analysis of rice production mitigation options in Vietnam.
	Analysis	<i>Rice Emissions MRV Tool Report</i> , October 2013. Pilot-tested web-based rice emissions MRV Tool to assess if it works with survey data to assist in national reporting on GHG emissions, explore emissions trajectories for policymaking, and monitor progress toward mitigation goals.
	Analysis	<i>Livestock Methane Capture and Electricity Production in Vietnam</i> , October 2013. Bloomberg New Energy Finance prepared analysis of using livestock wastes for electricity production for larger bio-digesters.
	Analysis	<i>Vietnam Nationally Appropriate Mitigation Action Policy Options and Workshop Proceedings</i> , October 2013. Prepared and convened NAMA Workshop to build capacity in government ministries to prepare with the Ministry of Planning and Investment in July 2013 with World Resources Institute and National Renewable Energy Laboratory.
Global	Analysis	<i>Clean Energy Lending Toolkit</i> , October 2013. Clean Energy Lending Toolkit prepared by AILEG for banks to conduct market diagnostics of ability to service the renewable energy and energy efficiency markets and create profitable credit products and processes for loaning to small and medium clean energy enterprises.

## PARTNERSHIPS

**Custom (Non-GCC) Indicator:** Number of partnerships established to implement LEDS analyses

**Product Output** = seven partnerships

**Indicator Type:** Output

AILEG directly established or facilitated the establishment of partnerships for project implementation, recognizing the importance of using local institutions to tap available skills and develop expertise. Table 16 shows the partnerships established under AILEG during the project's life.

**TABLE 16. PARTNERSHIPS ESTABLISHED UNDER AILEG**

Country	Date	Lead Institution	Implementing Institution	Partnership
Colombia	May-12	AILEG/USAID	University of Los Andes	MACC development for the commercial building sector
	Nov-12	AILEG/USAID	Fedesarrollo	Developed surveys and conduct PES analysis for the <i>Páramo de Santurbán</i>
Jamaica	Mar-13	AILEG/USAID	SACDA	Grant to implement action planning for two community EE and RE action plans
Mexico	May-12	NREL, USEPA	INECC	LEDS macroeconomic modeling of climate change policies and actions
Philippines	Mar-13	Philippines DOE	University of the Philippines National Engineering Center (UP-NEC)	Grant to develop data for the LEAP model, LEAP energy baseline, reference case scenarios, and case studies for future LEDS training
Vietnam	Mar-13	AILEG/USAID	T&C Consulting	Development and implementation of a pilot LEDS agricultural survey
	Oct-13	Applied GeoSolutions	Institute for Agricultural Environment	Development of a pilot rice emissions MRV tool

### 3.3. GENDER AND LOCALIZATION RESULTS

Empowering women to assist in identifying, assessing, and implementing LEDS was a key AILEG objective, as seen in the project's nearly equal representation of female (60%) and male (40%) staff and consultants. Attendees at the GCC trainings were 47% female; stakeholders with increased capacity to adapt to the impacts of climate variability and change as a result of USG assistance were 28% female. This percentage is less than 50% due to the greater representation of men in the Guatemala stakeholder consultations.

AILEG tracked gender and localization of country and global support programs for submission to USAID in April, showing that AILEG teams comprised 98 individuals (53% female), including 52% local staff. At the end of AILEG, final figures total 146 individuals (60% female), including 62% local staff (see Table 17).



**TABLE 17. AILEG STAFF AND CONSULTANTS BY GENDER AND COUNTRY**

AILEG Country and Global Activities Country/GM	Totals			Percentage (%)	
	Female	Male	Total	Female	Male
Global: Training and General Management	20	3	23	87%	13%
Colombia	15	11	26	58%	42%
Guatemala	0	1	1	0%	100%
Jamaica	20	7	27	74%	26%
Kazakhstan	4	4	8	50%	50%
Mexico	1	1	2	50%	50%
Philippines	11	15	26	42%	58%
Vietnam	16	17	33	48%	52%
<b>Totals</b>	<b>87</b>	<b>59</b>	<b>146</b>	<b>60%</b>	<b>40%</b>



AILEG Community Workshop, Jamaica



**USAID**  
FROM THE AMERICAN PEOPLE

**AILEG** Analysis and Investment for  
Low-Emission Growth

## 4. LESSONS LEARNED AND RECOMMENDATIONS FOR THE FUTURE

Without evidenced-based economic and financial analyses, decision makers in countries and at USAID often lack robust information to make efficient, sustainable development decisions to protect against climate change. AILEG was able to rapidly serve such key LEDS data and analytical needs of seven USAID partner countries. In September 2013, AILEG convened a final workshop held in Washington, D.C. at which the results and lessons learned were discussed with the broader climate change and development community. AILEG presented activity summaries at the Workshop along with holding a world café of the project's innovative use of economic or financial assessment methods and tools. A project video and webinar of the Workshop are posted on the USAID Global Climate Change Office website, providing wider dissemination to USAID missions, partner countries and the international community. Senior staff from USAID, U.S. State Department, U.S. Environmental Protection Agency (USEPA), U.S. Department of Agriculture (USDA), World Bank, Asian Development Bank, Inter-American Development Bank, National Renewable Energy Laboratory, many for and non-for-profit firms, and interested stakeholders contributed to the exchange of ideas and insights.

USAID stressed that, while serving highly diverse technical needs across seven countries, AILEG provided substantive TA and LCD support despite the short tenure of the project. The demand-driven nature of the project proved effective in fulfilling underserved economic and financial analysis needs, complementing on-going mission and country LEDS efforts. The AILEG country-based project management model to engage highly-respected local experts and organizations simultaneously across the seven countries allowed deep collaboration and sharing of lessons learned widely within each country. Having USAID Activity Managers from E3/EP and E3/GCC along with E3/GCC EC-LEDS country managers give technical leadership to the Contracting Officer Representative (COR), also led to quite effective engagement with missions and partner countries.

Lessons and recommendations emerging from USAID's AILEG technical assistance included:

- *The demand-driven approach allowed for rapid deployment, clarity of countries' needs, and high local engagement;*
- *Major sector niches for LEDS TA and LCD support show that more resources and enhanced training are needed in mitigation and adaptation economics, multi-criteria decision making, community and national mitigation action planning, and climate change data improvement, sharing and management;*
- *Expanding the application and standardization of best-practices in climate change economics with cost-benefit analyses and marginal abatement cost curve analysis, macroeconomic analysis, and environmental*



**USAID**  
FROM THE AMERICAN PEOPLE



*benefit valuation provided valuable economic growth and welfare information desired by decision makers to make informed climate change and development policies;*

- *Developing transparent, evidenced-based economic and financial investment analyses of mitigation and adaptation options led to cross-ministerial data sharing and dialogue needed to allocate scarce resources;*
- *Monetizing environmental benefits of climate change policies gave policy makers critical but often missing social opportunity costs of development decisions;*
- *Applying simpler, less-data intensive LEDS models and tools often is sufficient for meeting countries' climate change planning needs;*
- *Engaging the government finance and planning agencies in economic and financial analyses up-front provided high buy-in to integrate project findings into broader policy decisions;*
- *Collaborating closely with USAID missions and partner country governments significantly increased the ownership and localization of the project findings; and,*
- *Leveraging central USAID/Washington with mission funding led to greater collaboration and engagement across USAID and by the countries.*

The effort needed to fully integrate climate change into development planning will require longer project support than the two-year AILEG project life. AILEG successfully delivered substantive short-term assistance in low-emission economic and financial investment planning to these countries, but governments and key stakeholders across all countries stressed the desire for additional public and private sources to continue to support developing countries' transformations to climate resilient and prosperous low carbon growth.





**USAID**  
FROM THE AMERICAN PEOPLE

**AILEG** Analysis and Investment for  
Low-Emission Growth

# ANNEX A –AILEG ACTIVITIES



**Colombia • Guatemala • Jamaica • Kazakhstan • Mexico • Philippines • Vietnam • Climate Change Economics Training • Clean Energy Lending Toolkit**



**USAID**  
FROM THE AMERICAN PEOPLE

**AILEG** Analysis and Investment for  
Low-Emission Growth

## **A.1 COLOMBIA**

### **A.1.1 CHALLENGE**

Colombia must balance growing energy needs with the sustainability of its often fragile ecosystems, even as climate change shifts Colombia's resource base. The country relies on hydrological power for 70 percent of its energy, but the country's largest river and a significant energy supplier, the Magdalena, is threatened by deforestation, erosion, reduced rainfall, and other climate change effects. The local government in the Huila district, home to the Upper Magdalena River, needed precise projections to evaluate the impact of climate change on water levels and hydro-energy. Gold mining was proposed in the fragile *Páramo de Santurbán* ecosystem, meaning government officials had to determine environmental and economic tradeoffs. Government officials needed an economic valuation of the moor that took into account not only direct resources, but the value of preserving the land for tourism. Meanwhile, Colombia has been developing its low emission development strategy (LEDS), but has lacked information for the crucial commercial building sector, which is growing by the day. General challenges in Colombia have included lack of data at the regional level; lack of accurate models to assess impacts of climate change, value ecosystems, and assess intervention options; and lack of capacity to interpret model outputs and apply results in policy development.

### **A.1.2 ACTIVITIES, OUTPUTS, AND DELIVERABLES**

A gap analysis was conducted in January 2012 with a report submitted in March 2012 providing eight potential options for TA and LCD. Selected activities included:

- Marginal abatement cost curve (MACC) development for energy efficiency improvements in the commercial building sector
- Hydrological modeling of the Upper Magdalena Watershed as an input to the Huila Climate Change Plan
- Economic valuation of the fragile *Páramo de Santurbán* ecosystem.

#### **ACTIVITY 1. DEVELOPMENT OF THE MACC OF ENERGY EFFICIENCY OPTIONS FOR COMMERCIAL BUILDINGS**

UDLA (*Universidad de Los Andes/University of the Andes*), with AILEG staff oversight and input, developed the MACC of energy efficiency mitigation options for four commercial building subsectors (offices, hotels, hospitals, and shopping malls) based on data from three representative cities: Bogotá, Medellín, and Barranquilla. The UDLA/Abt Associates team prepared an analysis of the cost-effectiveness of the mitigation options based on the MACCs and developed recommendations for government consideration. The report concluded that efficient lighting was the most important mitigation measure in all four subsectors, with large abatement potential and negative net costs. In general, mitigation potential in the office subsector was the largest of the four subsectors.



## **ACTIVITY 2. HYDROLOGICAL MODELING OF THE UPPER MAGDALENA WATERSHED FOR CLIMATE CHANGE PLANNING**

AILEG assistance to the Huila River Basin climate change planning and CAM (*Corporación del Alto Magdalena/Upper Magdalena Corporation*) resulted in the development of a robust hydrological model that estimated reductions of water availability of 10–20 percent by 2050 under various regional climate change scenarios. AILEG prepared the model and trained CAM technical staff on the application of the customized hydrological models to assess the impact of climate change and land use changes on water resources and sedimentation of reservoirs for hydropower generation in the Upper Magdalena watershed. The team also advised the CAM Technical Committee on the development of the climate change plan for Huila, the basin in the Upper Magdalena under study.

## **ACTIVITY 3. ECONOMIC VALUATION OF THE PÁRAMO DE SANTURBÁN**

Fedesarrollo, a leading Colombian non-profit economic research institute (with technical support from Abt Associates staff), developed an economic valuation of the *Páramo de Santurbán*, taking into account a number of critical environmental services provided by the fragile but highly important high-altitude ecosystem such as clean water and biodiversity. Sustainability of the area is threatened by an expansion of gold mining and other industrial development options. The environmental valuation report was presented to the *Ministerio de Ambiente y Desarrollo Sostenible/Ministry of Environment and Sustainable Development (MADS)*. Policy

recommendations include developing a payment for environmental services (PES) mechanism through which urban water users pay for the conservation of the *páramo*, which plays a key role in regulating the water they consume. The study stressed the importance of ensuring that resources generated through this mechanism are transparently managed and recommended using a portion of them to finance campaigns to raise awareness about the *páramo*'s ecosystem services. The study is to be used as a basis for assessing economic options for the region. MADS is reviewing options for expanding the study, with a first step being the need to properly define the boundaries of the *páramo*.



*Páramo ecosystem in Colombia*



### **A.1.3 ACHIEVEMENTS**

#### **MACC ANALYSIS OF THE ENERGY EFFICIENCY IMPROVEMENTS IN THE COMMERCIAL BUILDING SECTOR**

AILEG supported Colombia's MADS through MACC development and analysis that focused on the commercial building sector and complemented a series of MACC analyses being prepared for other sectors. MACCs can help identify mitigation measures that save money by reducing energy consumption, production inefficiencies, and costs of environmental damage. They highlight GHG mitigation measures that can produce net cost savings over the project lifetime (win-win options); have higher abatement potentials; and are more cost-effective than alternatives.

The commercial building MACC study focused on MACCs for the commercial building sector in three Colombian cities—Bogotá, Medellín, and Barranquilla—for four subsectors: offices, hotels, hospitals, and shopping malls. Sixty different options were analyzed for each subsector and individual MACCs were prepared for the 36 options that would not dramatically increase in the cost-per-ton index. Efficient lighting was the most important option in all four subsectors, with large abatement potential and negative net costs. Meanwhile, design-related measures, such as window glazing, have the highest capital or operating costs per ton of carbon equivalent. Office buildings have the largest mitigation potential by far among the four subsectors, and adopting energy efficiency measures in new construction may have more significant emission reduction impact than retrofits. However, retrofitting existing construction may have important co-benefits including improving the comfort, health, and productivity of inhabitants. The results of the MAC curve analysis are informing Colombia's LEDS by demonstrating which energy efficiency actions reduce GHG emissions in a cost-effective manner and by presenting recommendations for policies that can reduce GHG emissions between 2010 and 2040.



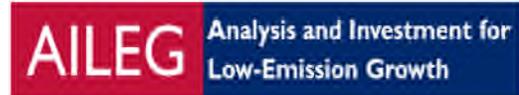
Energy efficiency improvements in Colombia's commercial building sector hold significant GHG emission reduction opportunities

#### **HYDROLOGICAL MODELING OF THE MAGDALENA WATERSHED**

AILEG calibrated the Soil Water Assessment Tool (SWAT) hydrological model for a tributary watershed to the Magdalena River. Working with the meteorological office of Colombia, AILEG selected climate change scenarios to adjust weather stations' rainfall and temperature daily time series to simulate weather conditions in 2040–2060 and compared daily time step SWAT model results with other monthly hydrological models. AILEG concluded that water resources would be reduced by 10–20 percent. These results are informing the Huila government's 2050 Climate Change Plan.



**USAID**  
FROM THE AMERICAN PEOPLE



## **ECONOMIC VALUATION OF THE PÁRAMO DE SANTURBÁN**

The study provided a first approximation to the total economic value of five of the *páramo*'s ecosystem services: water provision and regulation, recreation, existence, bequest, and carbon capture. Colombia lacks similar studies, even though moors are critical for the country and found in few countries around the world. The study informed the Government of Colombia's decision on the establishment of a national park in the *Páramo de Santurbán*, particularly as it provided an analysis of the groups who would benefit and those who would be adversely affected by the creation of the park.

### **A.1.4 LESSONS LEARNED AND RECOMMENDATIONS**

#### **MAC CURVE ANALYSIS OF THE COMMERCIAL BUILDING SECTOR**

Some lessons learned from the MAC curve analysis include:

- Future regulatory efforts for carbon mitigation should consider emission baselines. It takes considerable effort to set GHG emission baselines, due to the lack of data and data inconsistencies across cities and subsectors. Data were particularly difficult to obtain for cities, such as Barranquilla.
- A MACC is a useful tool to set general priorities for mitigation actions. However, the Government of Colombia should undertake a more detailed study to examine specific options.
- Sustainability of the built environment is part of the agenda of multiple public agencies. The Government of Colombia should make efforts to unify and integrate the many national and local initiatives.
- There should be clear metrics to evaluate the compliance and performance of GHG mitigation regulations. Nationally Appropriate Mitigation Actions (NAMAs) should include substantial stakeholder involvement, which will require increasing stakeholders' understanding of roles, expected performance, and measurement. Many discussions have been held in Colombia on actions and incentives, but relatively few on how to motivate and measure compliance.

#### **HYDROLOGICAL MODELING OF THE MAGDALENA WATERSHED**

For LEDS, government planners must analyze climate change impacts on water resources using downscaled data from global climate change models for a key watershed, the Suaza River Basin. This model overcomes past limitations by using local data and downscaling methods. The technical advisory team for the Upper Magdalena Basin Authority used this model to incorporate water resource impacts into regional climate change planning.

## **ECONOMIC VALUATION OF THE PÁRAMO DE SANTURBÁN**

The *páramo* study demonstrated the importance of economic analysis to inform decision making by the Government of Colombia. In particular, it estimated the willingness to pay (WTP) of urban water users to provide funds that would be used for the conservation of the moor ecosystem, and thus would help preserve the quality of their water. The study also found that there are important opportunities to capture the economic value of the ecosystem while also protecting it; for example, through ecotourism development.



The econometric analysis estimated the variables most closely associated with an individual’s WTP, including education, knowledge about the services provided by the moor, and environmental awareness (s measured by an index developed for the study). The study thus gives evidence of the important role of education and awareness campaigns to mobilize people and resources for ecosystem conservation.

The study’s scope was limited due to time and resource constraints. It could be expanded in the future to include more urban and rural populations that benefit from the moor’s services, as well as to include additional services that were not considered in this assessment, such as the use of water for agriculture, energy generation, and fisheries.

### **A.1.5 AILEG TEAM AND PARTNERS**

Abt Associates AILEG team members (Michèle Laird, Dr. Rodolfo Camacho, Santiago Enriquez, José Rafael Cordova, and Salomon Barragan) provided technical support on the three major activities in Colombia. Additional partners included UDLA (Engineering College) and Fedesarrollo (private NGO research institute).

## **A.2 GUATEMALA**

### **A.2.1 CHALLENGE**

Guatemala faces a series of development challenges to its environment. Improved management of natural resources is needed to mitigate the impacts of global climate change (GCC). The country faces a high deforestation rate associated with weak environmental enforcement and compliance. The degradation of natural resources, such as the deforestation of hill slopes, leaves Guatemala more vulnerable to climate change impacts. Focusing on improved management of natural resources will not only reduce environmental degradation, it will also mitigate the impacts of climate change.

The Climate, Nature, and Communities in Guatemala (CNCG) Cooperative Agreement, implemented by a consortium led by the Rainforest Alliance with USAID support is promoting sustainable natural resources management, based on certification, and a series of rules for the exploitation of these resources. These activities aim to support forest-based livelihoods, and thus, strengthen incentives for forest conservation.

### **A.2.2 ACTIVITIES, OUTPUTS, AND DELIVERABLES**

As part of the project development analysis by USAID, AILEG supported USAID/Guatemala to conduct an internal cost-benefit analysis (CBA) of a project under



Production of xaté palm and ramón nut add income, jobs and carbon sequestration



**USAID**  
FROM THE AMERICAN PEOPLE



the CNCG. The project will support the development of sustainable landscape improvements and economic contributions of timber and non-timber projects in the Petén region.

The CBA model developed by Abt Associates estimated the discounted net present value of costs and benefits over the project lifetime of commercializing (especially for women entrepreneurs) potential timber and non-timber forest products in the Mayan Biosphere Reserve. Development of markets for such projects will lead to increased rural incomes for women and enhanced sequestration of GHG emissions by maintaining or expanding vegetative cover in the areas.

As requested by USAID/Guatemala, the CBA modeling analysis examined: (1) *xaté* palm exported to the United States and used to decorate churches; and, (2) *ramón* nut exported to the United States and used locally as a natural product with high nutritional value. The AILEG team led by Dr. Marcelo Olivera conducted the analysis from May to June 2013 by interviewing rural households and producers of these non-timber forest products to provide detailed cost and benefit estimates for the study. The study found that the net present value of the project was significantly higher than the without project case (US\$15.1 million vs. US\$4 million). The project would result in increased annual greenhouse sequestration due to improved management and avoided deforestation. The analysis also demonstrated that promoting these non-timber products benefits and generates rural employment opportunities, particularly for women.

Given that any CBA is sensitive to a number of parameters, such as social discount rates and timeframes, AILEG also provided an Excel-based tool that enables the consideration of different scenarios and further sensitivity analysis.

### **A.2.3 ACHIEVEMENTS**

The activity demonstrated the usefulness of CBA by demonstrating that the project's projected benefits outweigh its costs, and thus is a sound investment for USAID and its implementing partners. The analysis also indicated that activities supported by the project will be economically sustainable after five years, and thus have a high probability of continuing after USAID assistance phases out.

### **A.2.4 LESSONS LEARNED AND RECOMMENDATIONS**

The analysis found untapped opportunities for non-timber forests. Current buyers would be interested in buying larger quantities of both *xaté* palm and *ramón* nut. However, to increase the volume of these products, they should constitute separate business lines, with their own accounting structure. This calls for technical assistance to support participating forest enterprises in the management and commercialization of these business lines.

### **A.2.5 AILEG TEAM AND PARTNERS**

The AILEG team included Dr. Marcia Trump (AILEG Project Manager), Santiago Enriquez (Technical Advisor), and Dr. Marcelo Olivera (Consultant) from Abt Associates. The team coordinated the CBA analysis with Jennifer Tikka from USAID/Guatemala and staff from the Rainforest Alliance, who manage the CNCG Project for USAID.



**USAID**  
FROM THE AMERICAN PEOPLE



## A.3 JAMAICA

### A.3.1 CHALLENGE

Jamaica suffers from high retail electricity tariffs, vulnerability to natural disasters, unemployment, (mainly in the agriculture and tourism sectors), and a lack of security. Despite high tariffs and policies to promote investment in renewable energy and energy efficiency, Jamaica is a high-consumption society, energy intensity is high, and investment in renewable energy (RE) and energy efficiency (EE) is low. Solving these multiple problems through an integrated approach is hampered by inadequate and uncoordinated economic development planning, models, and data.



AILEG Activities in Jamaica

### A.3.2 ACTIVITIES, OUTPUTS, AND DELIVERABLES

AILEG support to Jamaica fortuitously coincided with a Climate Change Forum in July 2012 in which AILEG staff (Dr. Michael Westphal) participated to help the Government of Jamaica (GOJ), USAID/Jamaica (Suzanne Ebert), and E3/GCC (Dr. Michael Hanowsky) to identify and advance key climate change LEDS needs. From the fall of 2012, AILEG assistance helped expand governance, economic, and financial analytics for the primary government agencies (the Ministry of Science, Technology, Energy and Mining (MSTEM) and the Ministry of Water, Land, Environment, and Climate Change (MWLECC)), the Planning Institute of Jamaica (PIOJ), and the emerging climate change department under MWLECC. Despite a very brief operational phase (May to July 2013), the AILEG team accomplished significant activities by setting up an excellent Jamaica team, led by Dr. Alicia Hayman, with Janet Bedasse and others and managed by AILEG's Jamaica Country Manager (Dana Kenney) with support from Dianna Gillespie of Abt Associates.

AILEG activities in Jamaica included four major areas of technical assistance:

1. Support to a USG LEDS scoping mission
2. Analysis of climate financing needs for clean energy development and climate resilience
3. LEDS data, modeling, and capacity-building assessment
4. Integration of LEDS into national energy planning through development of (a) the national energy policy action plan for 2013-2016 and (b) two community-based EE/RE action plans.

#### **ACTIVITY 1. LEDS SCOPING ANALYSIS MISSION**

Abt staff and consultants participated in the USG's EC-LEDS scoping mission trips in October, November and December 2012. The scoping mission included participants from USAID, USDA, USFS, the U.S. State Department, NREL, and several contractors. The goal of the mission was to determine



the specific LEDS needs from interviews and participation in meetings with the GOJ and key stakeholders in climate change in the country.

AILEG assisted USAID in preparation of the Economic Modeling and Climate Finance sections of the EC-LEDS scoping mission report, as requested by USAID/Jamaica and approved by USAID E3/EP. The final scoping report remains internal to USG, but recommended moving forward with help from AILEG in climate change financing of clean energy and providing leadership on evaluating appropriate, standard models for climate change planning that is viable across Ministries and applicable to various emitting sectors.

### **ACTIVITY 2. CLIMATE FINANCING NEEDS ASSESSMENT**

- The climate finance needs assessment focused on reviewing existing climate finance flows and access to climate finance flows and markets, transformative financing options, and requirements to increase bank lending for small-scale EE/RE projects.
- The needs assessment identified current climate financing, mostly for adaptation, at US\$202 million, 97 percent from public funding. The needs assessment also identified climate mitigation funding options, and sources not normally identified as climate financing, that would concurrently accomplish both climate change mitigation and adaptation.
- AILEG held a stakeholder focus group in June and presented findings for discussion at the final symposium.

### **ACTIVITY 3. LEDS MODELING ANALYSIS AND TRAINING**

- This activity focused on assessment of planning processes for LEDS, economic modeling and data capabilities and needs, and development of recommendations for future capacity-building
- In April 2013, the AILEG team met with the energy policy and modeling experts and the PIOJ focal point for the modeling assessment, and presented the AILEG Project to the Climate Change Commission.
- AILEG held a stakeholder focus group in June and presented findings for discussion at the final symposium.

### **ACTIVITY 4. INTEGRATION OF LEDS INTO NATIONAL ENERGY AND DEVELOPMENT PLANNING**

GOJ set forth the goal of more fully integrating its mitigation and adaptation planning into the country's economic development and planning process. Upon GOJ requesting such assistance, AILEG developed sub-activities in collaboration with MSTEM and MWLECC. This activity included two tasks (sub-activities), described below.



Climate Change Community Action Planning in Jamaica



**USAID**  
FROM THE AMERICAN PEOPLE



### *MSTEM SECOND NATIONAL ENERGY PLAN (NEAP) 2013-2016*

Jamaica was developing a Second NEAP for the next period when MSTEM requested technical support from AILEG. To facilitate NEAP development, AILEG:

- Developed and held two Action Impact Matrix (AIM) stakeholder workshops to prioritize 16 projects for the NEAP
- Recommended the Second NEAP for 2013-2016, presented to the focus group of key stakeholders and at the AILEG Project Symposium in July 2013.

### *INTEGRATING CLEAN ENERGY AND LIVELIHOODS IN COMMUNITY ACTION PLANS*

Taking climate change planning to the community level, AILEG supported assistance to two communities to develop EE and RE action plans by conducting a baseline energy assessment, developing a vision and goals, and developing a plan for livelihood-generating renewable energy projects and cost-saving energy efficiency actions. The plan development was supported by a community-based organization and led by community energy action committees with broad community involvement. AILEG supported the communities' focus groups to prepare behavior change (BC) and socioeconomic impact analysis of flagship climate change mitigation projects in each community; conducted research on knowledge, attitudes, and perceived barriers and benefits of EE actions; and developed a social marketing campaign design. AILEG also created a gender analysis using the focus groups to ascertain differences between women and men in adopting alternative EE and/or RE measures.

The process and results of their action planning process were presented to both communities and select GOJ and other stakeholders at a joint stakeholder workshop held in June 2013. Final results and recommendations for the community-based climate change action planning process and plans were presented at the AILEG Jamaica Final Symposium in July 2013.

### **AILEG PROJECT FINAL SYMPOSIUM**

The results of the four activities were presented by the AILEG team to the GOJ, local experts, organizations and other participants at the Final Symposium in July 2013 to solicit input and feedback on LEDS priorities for Jamaica. The symposium established strong input and involvement across all major climate change partners and agencies by engaging broad stakeholder group discussion and commitment. The symposium and its proceedings provided:

- Presentations of findings for the four AILEG Jamaica tasks
- Panel discussions on community engagement in climate change and addressing climate change in Jamaica
- Recommendations on the proposed NEAP and community action plans.



AILEG Project Symposium in Jamaica, July 2013



**USAID**  
FROM THE AMERICAN PEOPLE



### A.3.3 ACHIEVEMENTS

The AILEG Philippines activities led to four areas of achievements:

- **Climate Finance Assessment:** Developed a framework for the Climate Finance Strategy, and MWLECC committed to finalize the Climate Financing Strategy.
- **Economic Modeling Assessment:** GOJ gained an understanding of modeling needs to support LEDS and capacity development required for GPH staff and a modeling Center of Excellence.
- **NEAP 2013-2016:** MSTEM committed to continue implementation through stakeholder engagement and completing the implementation plan.
- **Community EE and RE Action Plans**
  - Prepared project funding proposals and submitted projects to funding agencies
  - Developed benefit/cost guidelines for the community to evaluate future projects
  - Incorporated the design of the EE social marketing behavior change campaign into community plans

### A.3.4 LESSONS LEARNED AND RECOMMENDATIONS

As with achievements, the lessons learned and recommendations from the activities in partnership with local teams and organizations fall under the four major activities.

#### **CLIMATE FINANCING ASSESSMENT**

- AILEG recommended a developers' guidebook and virtual support center (web portal).
- The Framework Climate Finance Strategy recommends developing climate finance readiness through the United Nations' Climate Public Expenditure and Institutional Review (CPEIR) framework, developing a NAMA policy and strategy by sectors, and MWLECC hiring a climate financing and mobilization expert.
- Linking mitigation to adaptation and accessing less traditional sources of funds for climate financing will enable funding additional adaptation actions (since existing funding sources are exhausted).

#### **LEDS ECONOMIC MODELING ASSESSMENT**

AILEG's recommendations are to:

- Sensitize agency managers to the importance of economic modeling and centralized data coordination.
- Expand modeling expertise at MSTEM and introduce LEAP economy-wide due to its ability to integrate across sectors and link with other tools.
- Establish an Economic Modeling Center at University of the West Indies (UWI), develop cooperation between UWI and University of Technology (U-Tech) to take advantage of complementary expertise, and provide academia with access to T-21, the economy-wide modeling tool used exclusively by PIOJ.



### **NATIONAL ENERGY POLICY ACTION PLAN 2013-2016**

- Involving implementing agencies and stakeholders through a participatory process is critical to ensuring that all knowledge is brought to the table and that plans are implemented.

### **COMMUNITY-BASED EE AND RE ACTION PLANS**

- When CBOs and communities are given access to technical information, they will embrace it and integrate it into their economic development plans.
- The potential to scale up community-driven EE and RE plans exists, yet will require significant capacity development of CBOs and communities in Jamaica.

### **A.3.5 AILEG TEAM AND PARTNERS**

- AILEG staff in Jamaica included the Jamaica Country Manager (Dana Kenney), Country Coordinator (Dr. Alicia Hayman), Community Facilitator (Janet Bedasse), and Climate Change Specialist (Dianna Gillespie, Abt Associates), supported by an energy policy expert and economic modeling consultant. Local partners included subcontractors Greenmax Consulting, implementer of the climate finance assessment, and a female-led NGO, Environmental Foundation of Jamaica, which provided logistics and facilitation services and a grantee community-based organization (CBO), St. Catherine's Development Agency (SACDA).
- GOJ counterparts included MSTEM, MWLECC, PIOJ, and the Ministry of Local Government and Community Development.

## **A.4 KAZAKHSTAN**

### **A.4.1 CHALLENGE**

Kazakhstan started Phase I of an Emissions Trading Scheme in 2013, covering power generation, mining and metallurgical activities, oil and gas extraction and processing, and chemicals manufacturing, or about 77 percent of the country's GHG emissions. A detailed USAID study in 2012 found that much capacity development was still needed, especially for the Kazakhstan ETS Administrator (KETSA) and the business community.



The oil industry is a major contributor to GHG emissions in Kazakhstan.

### **A.4.2 ACTIVITIES, OUTPUTS, AND DELIVERABLES**

Based on the findings of the Phase I report by USAID, Ashley King from USAID/Central Asia asked AILEG in December 2012 to help develop a SOW to provide TA to enhance the capacity of KETSA, by mapping the needed capabilities for implementation of the ETS. The activity that emerged and that



**USAID**  
FROM THE AMERICAN PEOPLE



USAID approved for the Government of Kazakhstan was the AILEG ETS Administrator Capability Mapping Project, which had three goals:

- Provide a clear picture of capabilities that the KETSA needs
- Develop the KETSA operating model
- Help the Ministry of Environment Protection (the KETSA) and its joint stock company, Zhasyl Damu, better understand the timing when different capabilities will be required, risks involved, and resources needed to successfully operate the ETS from 2014 onward.

Led by Dr. Michael Westphal (AILEG Technical Director, Kazakhstan Country Manager, Abt Associates) and a set of international consultants familiar with ETS and Kazakhstan, the team was deployed to the field in April 2013 to begin the ETS capability mapping analysis.

### **A.4.3 ACCOMPLISHMENTS**

The outputs of the activity included KETSA capability maps that show eight high-level and 38 specific capabilities needed; an operating model that proposes an internal structure with seven different technical and management teams; and a list of recommendations and next steps.

### **A.4.4 LESSONS LEARNED AND RECOMMENDATIONS**

A few lessons can be learned from AILEG's brief activity in Kazakhstan. First, legislation for an ETS is the relatively easy part; implementation can be difficult, and much capacity development is needed. Second, Kazakhstan is certainly benefitting from the lessons learned from other ETSs around the world. The capabilities mapping and KETSA operating model are based on the experiences of how ETSs have operated in Europe, Australia, California, and New Zealand. Kazakhstan is learning about how to deal with price volatility; for example, by keeping a reserve of quotas. Finally, this capability mapping really is the first step, and before Phase 2 of the system commences, further support is needed to refine and update the legislation and decrees underlying the system; develop a robust verification framework; support the inspection process by the regulator; accelerate registry deployment; develop background technical documents; and, importantly, increase the number of personnel and their capacity.

### **A.4.5 AILEG TEAM AND PARTNERS**

The main counterparts for the AILEG work in Kazakhstan included the Ministry of Environment Protection, in particular the Low Carbon Development Department, and its joint stock company Zhasyl Damu ("Green Development Company"). The AILEG team consisted of Dr. Michael Westphal (AILEG Country Manager); Ashley King (USAID/Central Asia); Rob Fowler and Sally Burns (international ETS Experts); and Dr. Sasha Golub (international environmental economist).



**USAID**  
FROM THE AMERICAN PEOPLE



## **A.5 MEXICO**

### **A.5.1 CHALLENGE**

Although Mexico is advanced in its effort to address climate change, it faces challenges as the country develops a LEDS. Some of these challenges include a lack of centralized data; a lack of accurate models within the key climate change institution needed to assess impacts of LEDS actions and policies; and a lack of capacity to interpret model outputs and apply results in policy development.

### **A.5.2 ACTIVITIES, OUTPUTS, AND DELIVERABLES**

AILEG provided assistance through the development of tools, capacity building, and analytics. Working within the *Instituto de Ecología y Cambio Climático (INECC)*, a key government think tank charged with analyzing and developing climate change policy, AILEG began the development of a computable general equilibrium (CGE) model to analyze implications of alternative climate change mitigation strategies; trained government staff and university graduate students in development and use of CGE models; and analyzed synergies and trade-offs among mitigation, adaptation, and social policies.

The foundation of the CGE model is a bottom-up land-use model. Steps included using disaggregated data, considering various agencies involved in the sectors, offering geographic disaggregation, and developing a Social Accounting Matrix (SAM). Next steps for INECC are the systematic collection of data on energy and transport sectors in order to produce a SAM that disaggregates these sectors for use in subsequent sectoral model, and the integration of a biophysical model.

Capacity development included training workshops on the construction of SAMs and their use in multiplier models, theory of CGE modeling, and policy analysis based on the INECC land-based CGE model; day-to-day advising of the INECC technical team on construction and use of the CGE model; and nurturing an on-going exchange among leading climate change modelers across the government, research, academia and private sector, i.e. setting up a “culture of practice” that meets regularly.

AILEG also supported a number of analytical efforts. These included an econometric analysis of determinants of land-use change and labor use in land-based sectors; a vulnerability analysis looking at climate change and poverty traps; an analysis of synergies and trade-offs among mitigation, adaptation, and social policies; and the construction of an energy/transport sector-disaggregated SAM.

### **A.5.3 ACHIEVEMENTS**

The primary outcome of AILEG assistance in Mexico is leaving a stronger government institution, INECC, more capable of analyzing the effects of proposed climate change policies. AILEG completed the following:

- Placed a long-term climate change CGE modeling expert within INECC to develop a model and provide capacity-building assistance.
- Provided capacity building in the construction of SAMs and their use in multiplier models; theory of CGE modeling; and policy analysis based on the INECC land-based CGE model.



**USAID**  
FROM THE AMERICAN PEOPLE



- Developed SAMs with five regional accounts and community and household levels.
- Provided ongoing development of bottom-up land-use, biophysical, energy, and transport models.

#### **A.5.4 LESSONS LEARNED AND RECOMMENDATIONS**

The National Renewable Energy Laboratory (NREL) will support the Mexico activity after the end of AILEG, and worked with Abt Associates on the transition. As the activity will run through October 2014, there are no lessons learned or recommendations for the modeling effort at this point.

#### **A.5.5 AILEG TEAM AND PARTNERS**

The AILEG Mexico team comprised Dr. George Dyer of Abt Associates as the macroeconomic modeling expert seconded to INECC and Michele Laird of Abt Associates as the AILEG Country Director. The team worked closely with NREL (Andrea Watson) and USAID/Mexico (Kevin McGlothlin and Gina Cady) to develop assistance meeting EC-LEDS commitments and the goals of the team's counterpart, INECC. AILEG also collaborated with other USAID/Mexico projects on the ground, including the Mexico Low-Emissions Development Program and the Mexico Reduced Emissions from Deforestation and Degradation Program (MREDD), to ensure coordination of LEDS technical assistance. Finally, AILEG trained graduate students of local universities, who are contributing to side analyses.

### **A.6 THE PHILIPPINES**

#### **A.6.1 CHALLENGE**

The Philippines has the most expensive electricity in Asia, with the average wholesale electricity price in the spot market of \$0.16/kWh in 2012. Electricity supply is inadequate to meet growing demand, yet the Philippines has a wealth of renewable energy resources. Despite the GPH's favorable policies for expanding renewable energy development, there is inadequate investment to achieve the GPH's goal of 15.3 GW by 2030, or to enable the GPH's objective of 100 percent electrification. Forest degradation continues due to development pressures, including agricultural conversion and illegal logging.

Addressing these energy issues requires strong analytical tools plus expertise and data to use the tools. Expertise in using economic assessment models is limited. Also, data required for analyses are lacking and distributed in disjointed databases, with a large percentage held by the private sector. A large amount of energy and data resides with private companies and local electric cooperatives, and REDD+ projects are managed largely at the local level, thus requiring integration of local data and planning into national planning processes.

#### **A.6.2 ACTIVITIES, OUTPUTS, AND DELIVERABLES**

A significant exploratory LEDS needs assessment was completed in 2011 by E3/GCC and USAID/Philippines in collaboration with the Government of the Philippines (GPH). The *EC-LEDS*



**USAID**  
FROM THE AMERICAN PEOPLE

**AILEG** Analysis and Investment for  
Low-Emission Growth

*Scoping Report for the Philippines* focused country needs on several key areas, with data improvements and technical analysis as most appropriate for AILEG TA and LCD. As a result, AILEG worked with USAID staff including staff from E3/GCC (Dr. Jennifer Leisch) and USAID/Philippines (Rolf Anderson, Joseph Foltz, and Lily Gutierrez) along with national climate change leaders from the Climate Change Commission (CCC), Departments of Energy and Forestry, and other experts to prioritize AILEG's contributions. AILEG set up a Philippines Country Coordinator, Felicidad Narvaez, and local team of experts (Ray Goco, Dr. Guillermo Mendoza, and Dr. Ernesto Guiang) along with local organizations to capitalize on the country's excellent technical and management capabilities in climate change planning and LEDS.

The four AILEG activities that USAID selected for TA and LCD in the Philippines were:

1. Training on modeling the impacts of climate change and options for the energy sector using the Long-Range Energy Alternatives Planning (LEAP) software
2. Conducting an energy sector data management assessment and demand-side management (DSM) MACC analysis of least-cost options
3. Developing a forestry sector data management assessment
4. Performing the Renewable Energy Financial Flows and Barriers to Investment study.

#### **ACTIVITY 1. LEAP TRAINING FOR LEDS PLANNING**

The LEAP training included two training events. The first, held January 28–February 1, 2013, included an overview on LEDS and LEAP for 38 policy makers and trainees, as well as a four-day technical training covering multi-criteria attribute analysis and using the LEAP energy modules. The second, held May 14–17, 2013, introduced the transport module and development of baseline and alternative energy scenarios using Philippine data, with presentations by participant groups.



LEAP Training in the Philippines

Abt Associates worked with the University of the Philippines National Engineering Center (UP-NEC) by providing a grant to build a simplified LEAP model and baseline scenario, as well as documenting alternative scenarios in case studies to use in future LEAP trainings.

#### **ACTIVITY 2. ENERGY SECTOR DATA AND INTEGRATED DATABASE ASSESSMENT AND DEVELOPMENT OF A MACC FOR DEMAND-SIDE MANAGEMENT MITIGATION OPTIONS**

AILEG conducted a thorough assessment of the collection, management, and analytical capacity for energy data as well as providing a roadmap for an integrated energy database. The team assessed the availability, accessibility, and quality of the data collected based on the Philippine Energy Balance Table and analytical tools used by DOE for low-emission strategies and energy planning.



**USAID**  
FROM THE AMERICAN PEOPLE



### *ENERGY SECTOR DATA AND INTEGRATED DATABASE ASSESSMENT*

- There are inconsistencies in some of the supply data, and disaggregated consumption data are sometimes unavailable and often inaccessible by outside entities and among bureaus in the DOE. A lack of a standardized, uniform reporting format and assumptions impacts data quality.
- A workshop attended by 58 participants from the GPH, non-governmental organizations (NGOs), private and public utilities, and academia was held on April 10, 2013. Participants noted the need to establish an inter-agency, multiple-stakeholder coordination mechanism to ensure that cross-sectoral issues are addressed and recommended a cost-benefit analysis on data harmonization.

### *MARGINAL ABATEMENT COST CURVES FOR DSM TECHNOLOGIES*

- Developed MAC curves for the residential, commercial, and industrial sectors in the Philippines, as well as a combined MAC curve for all three sectors. The MAC curves were based on data compiled on current and emerging end-use technologies. In addition, AILEG developed MAC curves for 11 industrial subsectors, using the Philippine Energy Plan (PEP) 2012–2030 as the base case for carbon emissions in the sectors and subsectors.
- Held an informal workshop with GPH agencies on May 21, 2013, and incorporated discussion results into the draft report.

### **ACTIVITY 3. FORESTRY SECTOR DATA AND REDD+ ASSESSMENT**

The forestry sector data assessment was implemented in two phases to ensure coordination and non-duplication of other USG and donor efforts. In Phase I (Scoping and Review), AILEG reviewed data requirements, summarized REDD+ initiatives and the history and status of Philippines forestry data, and recommended focus areas for the more detailed assessment to be conducted during Phase II.

Phase II focused on data needs for establishing reference emission level/reference level (REL/RL) data to provide a baseline and designing an MRV system to support REDD+ projects. A stakeholder workshop was held on June 21, 2013, to present the findings to 33 participants. Representatives from national government agencies, non-governmental organizations, and other donor agencies involved in various aspects of forestry and low-emission development attended the workshop. The stakeholder workshop presented the progress of the assessment report for forestry data in view of REDD+ requirements, as the country plans for and moves toward implementing the Philippine National REDD-Plus Strategy and improving management of forested lands. During the workshop, stakeholders had the opportunity to provide input and feedback on the assessment report and its findings. Following the workshop, this input was incorporated into the *Final Forestry Sector Data and REDD+ Assessment Report* submitted to USAID.

### **ACTIVITY 4. RENEWABLE ENERGY FINANCIAL FLOWS AND BARRIERS TO INVESTMENT ANALYSIS**

The study evaluated the renewable energy mix in the Philippines, financing sources, incentives and barriers to investment, and the potential for scaling up investment to meet the GPH's target of 15.3 GW by 2030. Over \$24 billion of debt and equity investment will be required to meet the GPH's aggressive RE target. The funds for this level of investment are expected to be available, due to investors' expected returns—with the approved feed-in tariffs (FiTs)—of 12–17 percent.



**USAID**  
FROM THE AMERICAN PEOPLE

**AILEG** Analysis and Investment for  
Low-Emission Growth

Delayed implementation of renewable policies—in particular the FiTs in the short term and the renewable portfolio standard in the longer term—are the main investment barriers to achieving the GPH RE targets, although some existing renewable energy policies undermine the FiT pricing incentives. A multi-stakeholder workshop with more than 60 representatives of the GPH, private companies, NGOs, and donors (52% female) was held on April 5, 2013. At this event, Mr. Milo Sjardin of Bloomberg New Energy Finance presented his draft findings and moderated a panel discussion of GPH, private sector, and NGO representatives to further discuss the findings and recommendations. Participants prepared and presented action plans responding to the question “What supportive actions will be needed to address the identified barriers?” Mr. Daniel Ariaso, Senior Assistant Secretary of the DOE, closed the event by stressing that his department is committed to RE investment and accepted the challenge for DOE to take the lead in promoting RE investment based on the stakeholders’ action plans.

### **CULMINATING ACTIVITY**

The culminating activity of the AILEG Philippines program, titled “Lessons Learned in Low Emission Development Strategies (LEDS) and Renewable Energy Analysis: Promoting Sustainability through Partnership,” was held on June 18, 2013, to document the partnership between the DOE and academia; share AILEG lessons learned; and discuss policy issues and options, particularly for sustainable renewable energy development.

At this event, an MOU was signed between the DOE and six Philippine universities. Representatives of the GPH and the universities shared progress on implementing AILEG recommendations, and participants made individual commitments to LEDS actions and to stay in contact with other participants.

### **A.6.3 ACHIEVEMENTS**

The primary achievements of AILEG support to the Philippines were:

- **Signing an MOU** between DOE and six leading universities to cooperate on LEDS, and specifically to cooperate on improving energy data and incorporating LEAP into their curricula
- **Overcoming barriers to scaling up RE Investments**
- **Developing an action plan for addressing barriers to RE investment**
- **Identifying the need for improving data availability, accessibility, and quality**
  - Assessed more than 700 energy data fields; stakeholders developed an action plan
  - Multi-stakeholder working group established to address data gaps and management
- **Developing DSM MACCs to inform DSM/EE policies**
  - Compiled standard and efficient DSM technology data and developed MACCs for 15 residential, 7 commercial, and 11 industrial technologies
  - Trained more than 30 people in developing MACCs
  - Evaluated policy issues to overcome barriers to achieving identified potential
- **Completing a forestry data and REDD+ assessment**
  - Defined data required for REL/RL for forestry and REDD+ data



**USAID**  
FROM THE AMERICAN PEOPLE

**AILEG** Analysis and Investment for  
Low-Emission Growth

- Identified governance issues to address to increase investment in REDD+ projects
- Assessment findings were incorporated into national GHG inventory workshops
- **LEAP training**
  - Built capacity of DOE and other key stakeholders including staff from the National Economic Development Authority (NEDA), utilities, and academia to use LEAP in developing alternative energy scenarios. DOE's planning process was altered to involve stakeholders in a more iterative planning process.
  - Case studies developed for use by academics in future LEAP training.



Signing the LEDS Data Sharing and Collaboration MOU among the Government and Universities in the Philippines, June 2013.

#### **A.6.4 LESSONS LEARNED AND RECOMMENDATIONS**

- **A key benefit of LEAP is its low initial data requirements.** LEAP allows modelers to rapidly create analyses using pilot data sets and proxy data from globally reputable sources, with complexity and more robust analyses added when country-specific data are available. The training has not only strengthened planners' understanding of LEAP, it has also empowered them to not wait for perfect data to incorporate LEAP more fully into their planning processes.
- **Strengthening policy analysis/modeling requires support from academicians and other local experts,** partly because even simple models require a strong level of expertise. Also, coordination within and across agencies in economic planning is critical for plan buy-in and implementation.
- **Data quality and consistency are more important than modeling sophistication.** The energy data assessment report made several recommendations for improving data availability, accessibility, and quality through improved data collection methods and data management,



**USAID**  
FROM THE AMERICAN PEOPLE

**AILEG** Analysis and Investment for  
Low-Emission Growth

including addressing inconsistencies in supply data, improving end-use consumption data, establishing regulatory/institutional frameworks to regulate and standardize reporting, and developing an integrated energy database.

- **MACCs provide a general introduction to the potential of DSM technologies.** However, lack of updated data on end-use consumption means further analysis is required of various energy efficiency policy scenarios based on updated and improved data.
- **Methodologies, partnerships, and a national forestry database are needed.** The forestry data and REDD+ assessment identified the need to develop REL/RL and MRV methodologies, establish partnerships between national agencies and provincial governments, and develop a REDD+ national forestry database.
- **FiT policies included in the Renewable Energy Act must be implemented to scale up RE investment.** To realize the investment levels possible through available funding, the GPH must implement FiT policies as required by RE Act and address key barriers in the draft policy and other issues raised by developers, including elimination of the first commissioned, first served policy included in the draft FiT, clarifying agency responsibilities under the RE Act, developing a one-stop shop, and improving quality of data on renewable energy potential and investments.

#### **A.6.5 AILEG TEAM AND PARTNERS**

The AILEG staff and partners included a range of local experts, institutes, and international experts:

##### **U.S. STAFF**

Philippines Country Manager (Dana Kenney), AILEG Technical Director (Dr. Michael Westphal), and Climate Change Specialist (Lindsay Kohlhoff)

##### **LOCAL**

The Philippines Country Coordinator (Felicidad Narvaez) was instrumental as a local focal point. Other local partners included subcontractor Asian Institute of Management—International Movement of Development Managers (IMDM, which implemented the energy data assessment and MAC curves tasks, and the University of the Philippines-National Engineering Center, grantee for developing the LEAP model and case study documentation. Local energy, forestry, REDD+ and economic modeling consultants supported the team; these included Ray Goco, Dr. Guillermo Mendoza, and Dr. Ernesto Guiang.

##### **PARTNERS**

Counterparts from the Government of the Philippines (GPH) include the Climate Change Commission (CCC), DOE, NEDA, and Department of Natural Resources/Forest Management Bureau.



**USAID**  
FROM THE AMERICAN PEOPLE



## A.7 VIETNAM

### A.7.1 CHALLENGE

AILEG started in Vietnam in December 2011 with an EC-LEDS data needs assessment, which focused on LEDES data collection, management, and analysis needs in the energy, agriculture, and waste sectors, as well as economy-wide. This process, led by AILEG Country Manager, Dr. Michael Westphal, and team (R. Anna Belova, Jette Findsen, and Dr. Tulika Narayan), included more than 35 meetings with Government of Vietnam (GVN) and donor stakeholders and two consultative workshops in March and June. These culminated in a report in October 2012, which laid the foundation for implementation activities in Vietnam.



Initial AILEG EC-LEDS Workshop May 2012

Based on this assessment, AILEG identified a number of challenges:

- Minimal LEDES modeling and analysis exists outside of the energy sector (e.g., waste, agriculture).
- Ministerial roles in data collection are unclear, and legal mandates for data collection are uncertain. Moreover, the existing National Statistical Indicator System is incomplete for LEDES.
- Country-specific emission factors (e.g., rice cultivation) are lacking in Vietnam.

### A.7.2 ACTIVITIES, OUTPUTS, AND DELIVERABLES

Phase 2 activities in Vietnam consisted of:

1. Analysis of livestock methane capture and electricity generation
2. NAMAs workshop
3. Analysis of legal mandates and LEDES data collection gaps
4. Pilot monitoring, reporting, and verification (MRV) tool for rice emissions
5. Pilot LEDES agricultural survey and mitigation options analysis

#### **ACTIVITY 1. ANALYSIS OF LIVESTOCK METHANE CAPTURE AND ELECTRICITY GENERATION**

Along with its AILEG partner Bloomberg New Energy Finance, Abt Associates conducted an analysis of the viability of large-scale livestock methane capture for electricity production in Vietnam, resulting in the report titled *Livestock Methane Capture and Electricity Production in Vietnam: Status, Feasibility, Economics, and Potential*. Important conclusions from the analysis include: While there is a large potential for electricity generation from livestock biogas in Vietnam (3.0 GW in 2020), biogas is more



**USAID**  
FROM THE AMERICAN PEOPLE

**AILEG** Analysis and Investment for  
Low-Emission Growth

capital-intensive than other types of electricity generation (both fossil fuels and renewables). Moreover, the levelized cost of electricity from biogas is higher than the current wholesale price of electricity; additional financing (outside of the Clean Development Mechanism) will be needed to make it profitable. However, household-scale biodigesters are already important for heating and cooking, and the biogas sector brings a number of co-benefits, including health, environment, and rural development beyond the economics of electricity generation.

### **ACTIVITY 2. NAMAS WORKSHOP**

The AILEG team (Dr. Shanika Amarakoon, Jette Findsen, and Lindsay Kohlhoff) with the General Statistics Office of the Ministry of Planning and Investment co-partner ed a 1.5 day workshop for the GVN and other stakeholders on Nationally Appropriate Mitigation Actions (NAMAs), specifically focused on livestock biogas and wind power. AILEG partnered with Matt Ogonowski of USAID/GCC, the World Resources Institute, and National Renewable Energy Laboratory to lead the workshop. Outputs included workshop proceedings and a policy brief on potential NAMA designs for biogas in Vietnam, including opportunities, barriers to penetration, and scaling-up.



NAMA Workshop in Vietnam, July 2013.

### **ACTIVITY 3. ANALYSIS OF LEGAL MANDATES AND LEDS DATA COLLECTION GAPS**

This work, led by AILEG's local consultant Nguyen Phong and Shanika Amarakoon, followed the EC-LEDS data needs assessment and consisted of an analysis of existing legal mandates and institutional data collection gaps for the agriculture and waste sectors. Key results and recommendations found in the report *Addressing Institutional and Data Gaps to Support LEDS in Vietnam: Agriculture and Waste Sectors* include:

- The Ministry of Natural Resources and Environment has sufficient legal authority for LEDS data collection. No new legal mandates are needed.
- There is a need for an inter-ministerial LEDS working group on data collection and analysis.

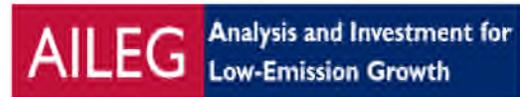
Only 24 of the 350 indicators of the National Statistical Indicator System are relevant to LEDS, and the GVN should enhance data collection by developing LEDS indicators, supplementing existing surveys to collect these indicators (as AILEG recommends for rice and livestock management), and implementing a routine reporting system.

### **ACTIVITY 4. PILOT RICE EMISSION MRV TOOL**

AILEG's partner Applied GeoSolutions, in collaboration with Vietnam's Institute for Agricultural Environment, developed a prototype, web-based rice emissions MRV tool that combines a crop



**USAID**  
FROM THE AMERICAN PEOPLE



growth and biochemistry model (DeNitrification-DeComposition, DNDC) with activity data from AILEG’s survey, remote sensing data and other spatial datasets to model GHG emissions under different rice management practices in Thai Binh Province. The tool will need to be refined and scaled up to other provinces in Vietnam with donor support, but it could be useful for:

- National reporting on GHG emissions
- Exploring emissions trajectories for policymaking
- Monitoring the goals of Vietnam’s Green Growth Strategy.

### **ACTIVITY 5. PILOT LEDS AGRICULTURAL SURVEY AND MITIGATION OPTIONS ANALYSIS**

The AILEG team (Drs. Michael Westphal, Tulika Narayan, and Anna Belova) worked with various representatives of the GVN, including the General Statistics Office, Ministry of Agriculture and Rural Development, and Ministry of Natural Resources and Environment to develop a set of questions for a pilot LEDS agricultural survey for rice and livestock management in three provinces in Vietnam in both the Mekong and Red River Deltas. AILEG hired a local Vietnamese firm, T&C Consulting, to administer the survey to 1,040 farm households in Thai Binh Province (384 rice households in seven districts), Vinh Phuc Province (336 livestock households in seven districts), and An Giang Province (320 rice households in eight districts). The results of the survey are presented in the final report, *Vietnam Data Collection to Support LEDS in the Agriculture Sector*. In general, the AILEG team found that the questions were not too difficult to administer in a survey. Indeed, the report presents recommendations to the GVN on how to incorporate these rice and livestock management surveys into existing national surveys, including end-of-season surveys and the Agricultural Census. Lastly, the report displays the results of the marginal abatement cost curve analysis for rice production in the two provinces. In the North, low fertilizer and short-duration variety were determined to be negative cost mitigation option, but do not have as much emissions reduction potential as reduced water use (alternate wetting and drying, AWD). However, AWD is quite costly and difficult for farmers to implement. Consequently, if the GVN wants to promote this option, it will need to be combined with additional financing for farmers. In the South, the only viable mitigation was AWD, because short-duration rice results in higher GHG emissions. These results underscore the need to evaluate mitigation options in the field and explore cost and non-cost barriers to adoption.



Rice Farming in Vietnam releases Greenhouse Gas Emissions (GHG): AILEG’s survey and Pilot MRV tool will assist in better estimation for the National GHG

### **A.7.3 ACHIEVEMENTS**

AILEG’s major achievement in Vietnam was conducting the country’s first LEDS agricultural survey that gathered needed data on rice and livestock management to generate robust estimates of GHG emissions and to understand the current status, potential, and barriers to mitigation practices for rice



**USAID**  
FROM THE AMERICAN PEOPLE

**AILEG** Analysis and Investment for  
Low-Emission Growth

cultivation. Moreover, AILEG performed Vietnam’s most complete modeling of emissions from rice cultivation across management practices to date and developed the first prototype rice emissions MRV tool.

#### **A.7.4 LESSONS LEARNED AND RECOMMENDATIONS**

The AILEG team in Vietnam gleaned a number of important lessons on LEDS data collection and analytics. First, an initial needs assessment for LEDS is critical. In a country such as Vietnam with a heavy donor presence, it is important to first assess existing programs and gaps and find niches for work to avoid redundancy. Moreover, countries like Vietnam have complex ministerial roles and responsibilities, and it is essential to spend some time on the ground elucidating this structure. Second, data collection is rarely high-profile and can often seem banal, but it remains an essential foundation for LEDS. Working within the existing data collection structure to encourage gathering new types of data and indicators for LEDS can take a long time; consequently, donor engagement for LEDS must be a long-term process. Because LEDS by their nature are multi-sectoral, they require inter-ministerial cooperation. One valuable role for USAID (and other donors) is as a neutral party that brings various ministries and other stakeholder groups together to discuss issues of LEDS data collection and policy. Furthermore, LEDS donor programs require a champion within a country to succeed; AILEG worked closely with the GSO, without whose help and advice implementation would have been impossible. Last, which might be particular to Vietnam, direct funding of Government ministries to implement projects is the preferred mode of engagement. AILEG did not provide direct funding because of the time it would take to get approval, but future LEDS programs in Vietnam should pursue this financial arrangement.

Based on the results of the project activities in Vietnam, AILEG has several recommendations:

- GSO could easily incorporate the pilot rice and livestock questionnaires into existing surveys and adopt the proposed sampling procedures.
- The rice emissions MRV tool should be expanded to more provinces with donor support.
- An inter-ministerial working group on LEDS data collection and analysis would be beneficial.

#### **A.7.5 AILEG TEAM AND PARTNERS**

Main counterparts in the GVN included the General Statistics Office (GSO), Ministry of Agriculture and Rural Development, Ministry of Natural Resources and Environment, and Ministry of Planning and Investment. AILEG worked with several local and international partners in Vietnam:

##### **U.S. STAFF**

- Michael Westphal (Country Manager), Shanika Amarakoon, Anna Belova, Jette Findsen, Lindsay Kohlhoff, Tulika Narayan, Dan McMartin (all of Abt Associates)

##### **LOCAL CONSULTANTS**

- Trang Nguyen (Local Coordinator), Nguyen Lanh (Local Coordinator), Mai Van Trinh (agriculture), Nguyen Phong (LEDS data and legal mandates)



**LOCAL FIRMS**

- T&C Consulting (agricultural survey)
- CEFACOM/Research Center for Family Health and Community (logistics)

**INTERNATIONAL FIRMS**

- Bloomberg New Energy Finance (biogas for electricity generation study)

Applied GeoSolutions (rice emissions MRV tool)

## **A.8 COST-BENEFIT ANALYSIS OF GLOBAL CLIMATE CHANGE MITIGATION: AN AILEG USAID UNIVERSITY COURSE**

### **A.8.1 CHALLENGE**

There is a lack of standardized practices and tools for analysts and other decision makers to use when preparing, comparing, and prioritizing net economic costs and benefits derived from climate change mitigation projects. Such information is essential to countries when prioritizing and allocating scarce national, sub-national, local, and private sector resources to the mitigation options with the highest welfare. A set of potential best practices exist for assessing such economic impacts of mitigation actions, but few training courses or materials have been prepared and presented to USAID and other USG representatives.

### **A.8.2 ACTIVITIES**

With capacity building as a core objective, AILEG provided training to USAID and developing country participants during March 2013 in the following climate change economic assessment areas: (1) **Cost-Benefit Analysis and Global Climate Change Mitigation** and (2) **Economic Analysis of Climate Change Adaptation**. Each course presented the best practice methods and tools for conducting mitigation and adaptation cost assessments through a set of lectures, field project discussions, case studies, and interactive feedback. These courses helped USAID and developing countries formulate a standardized set of proven guidelines for assessing the economics of climate change mitigation and adaptation efforts around the world.



CBA for Global Climate Change Mitigation Training, March 2013

USAID’s commitment to expanding the use and understanding of CBA for evaluating food security and other project initiatives was expanded by the E3/EP Office in 2012 to climate change programs and projects. Based on an internal survey, this Office determined that AILEG should prepare and present a



**USAID**  
FROM THE AMERICAN PEOPLE

**AILEG** Analysis and Investment for  
Low-Emission Growth

USAID University course combining the use of CBA and other best practices in economics of climate change mitigation. AILEG held the USAID University course at the Abt office in Bethesda, Maryland, with nearby access to Metrorail and major hotels. The Cost-Benefit Analysis for Global Climate Change Mitigation course was held March 4-7, 2013, with an unscheduled “snow day” on March 6 due to the federal shutdown. Some of the economic methods presented include:

- **Financial and Economic Cost-Benefit Analysis** of renewable energy, energy efficiency, and sustainable landscape projects
- **Co-benefit and/or Environmental Valuation** techniques commonly used in developing countries’ CBA and other assessments to incorporate important, measurable ecosystem costs/benefits associated with high- and low-carbon technologies
- **Marginal Abatement Cost Curve Analysis** to determine the net benefits of a mitigation option per unit of GHG emission reduced compared to the business-as-usual baseline scenario
- **Decision Criteria for Selecting Mitigation Projects** to review the various potential decision criteria recommended by USAID to assist in making funding and programmatic choices about supporting mitigation projects.

Case studies of CBA for renewable energy, energy efficiency, and sustainable landscape projects were used as exercises along with extensive discussions of the methods presented. Time was also allocated throughout the course for discussions to tap the depth and rich knowledge that all participants brought to the courses. Reading materials were assigned, along with homework, and break-out sessions held for participants by areas of mitigation focus: renewable energy, energy efficiency, and sustainable landscapes.

### A.8.3 ACHIEVEMENTS

The course presented a continuum of economic analysis methods with tools to move from preparing market-based financial analyses to more complex social-opportunity costs, or economic, assessments and comparative analyses of mitigation projects. The ability to value and include secondary benefits such as ecosystem services, emission reductions, and cost-effectiveness for many clean energy and sustainable landscape projects was explored extensively during the course. Some of the results of the training include



CBA Exercises of Mitigation Projects, March 2013

- **Total participation:** A total of 21 participants were in the Mitigation Economics Training, most mid to senior-level government professionals. This number excludes the four individuals who were both participants and presenters.
- **Organizations:** About 86% or 18 participants were from USAID; nine from USAID missions in Brazil, Dominican Republic, Ecuador, Georgia, Ghana, Haiti, Honduras and Russia. Other training participants included two Georgian Government representatives from the Ministry of Environment and the Ministry of Finance, and a U.S. Department of State representative.



**USAID**  
FROM THE AMERICAN PEOPLE



- **Gender balance of participants and presenters:** Overall the gender balance was near even, with 43% women and 57% male participants. Six of the twelve presenters were women, which gives a perfectly split gender balance of 50% female presenters and 50% male presenters. Some presenters also were enrolled as workshop participants, but not double counted in these totals.

#### A.8.4 LESSONS LEARNED AND RECOMMENDATIONS

Participants in the courses reported high levels of satisfaction with the course’s content, materials, and most lectures. Clearly, USAID and USG personnel along with partner country participants have a strong need and desire to increase their professional knowledge and application of the range of practical micro- and macroeconomic analysis approaches to evaluate the monetary values of mitigation. Several key lessons and recommendations include:

- **Lengthen the course:** Participants expressed a need to have more time to discuss relevancy to their programs, hold peer-to-peer exchanges, and go over exercises (need 5 days)
- **Start with an optional “CBA Basics” pre-course:** The varied mix of professional economic and climate change analysis skills in this course showed a need for an optional prior “CBA basics” refresher course to bring non-economists and economists up to speed in the application of CBA within USAID and on developing country project evaluation.
- **Expand sessions and case studies on environmental and co-benefit valuation:** Evaluations from participants pointed to a strong interest and need among USAID personnel to dedicate more materials, lectures, and case studies to valuation techniques for estimating market and non-market benefits from mitigation.
- **Create case studies based on actual or planned USAID or in-country mitigation projects:** AILEG’s mitigation case studies, while applicable and useful to the subject, had limited resources and availability to USAID missions or the GCC Office staff. Future courses could be improved by dedicating more resources up-front to preparing exercises and case studies based on and in consultation with real (ongoing or planned) USAID or partner country government efforts to customize learning for the field.
- **Expand discussion of environmental benefit valuation:** Allocate multiple segments to covering co-benefits and environmental valuation methods, which are important to mainstreaming climate change analysis.
- **Expand the course to include more comparative analysis and decision-making methods and tools:** Throughout the course, participants recommended expanding the decision-making process and analytical tools, as program managers and government officials must prioritize scarce public resources for potential mitigation options. AILEG recommends expanding this session and tools regarding multiple criteria and multi-attribute decision making so that the most efficient and sustainable options may be selected in climate change programs.



**USAID**  
FROM THE AMERICAN PEOPLE

**AILEG** Analysis and Investment for  
Low-Emission Growth

### **A.8.5 AILEG TEAM AND PARTNERS**

The AILEG team included Dr. Marcia Trump (AILEG Project Manager), who managed the course, along with many leading climate change experts and economists, including:

#### **AILEG STAFF**

Dr. Michael Westphal, Dr. Tulika Narayan, Dr. Anna Belova, and Dr. Elena Besedin (Abt Associates), and Dr. Brian Murray (Duke University), as well as Dana Kenney, Lindsay Kohlhoff, Dianna Gillespie, and Reed Allen (Abt Associates).

#### **USAID STAFF**

Dr. Eric Hyman, Dr. William Ward, Juan Belt, Dr. Yoon Lee, and Dr. Jennifer Leisch from E3/EP and GCC Offices helped lead and moderate sessions.

## **A.9 ECONOMICS OF CLIMATE CHANGE ADAPTATION: AN AILEG USAID UNIVERSITY COURSE**

### **A.9.1 CHALLENGE**

Building resilience to adapt to climate change involves significant investments in and protection of all major productive sectors, vulnerable populations and places, and the natural resource base. Only in the past few years has the climate change community—and hence climate change planners—begun to seriously address the methodological needs to fully estimate the costs and benefits of adaptation. Few organizations have applied the methods and processes for the economics of adaptation to climate change, which have been pioneered by the World Bank and further refined by the Asian Development Bank (ADB) and other leading research organizations.

### **A.9.2 ACTIVITIES**

USAID requested AILEG to develop the first USAID University course on the economics of climate change adaptation. The purpose is to inform future USAID projects in key economic sectors, such as infrastructure, water resources, and agriculture. Incremental cost analysis or cost-effectiveness analysis is the methodological basis used at present for estimating the costs and benefits of adaptation. Hence, the costs of a baseline over time of events under business-as-usual conditions without adaptation must be compared to the costs of adaptation where the baseline or reference case conditions change after various adaptation measures.

Given the paucity of experience in this field and limited applications, the course material and case studies developed by AILEG drew mostly from country case studies developed by the ADB and experiences from the World Bank, rather than USAID where limited applications exist. The course presented methodologies used for estimating incremental costs of adapting the energy, agriculture, infrastructure, water, and transport sectors. The course discussed how to set up adaptation studies; data availability issues; lessons learned and recommendations; and the impacts of the studies in terms of policymaking, funding, country programs, and awareness-raising.



**USAID**  
FROM THE AMERICAN PEOPLE



### A.9.3 ACHIEVEMENTS

The course was very well attended with a mix of senior and mid-level staff from USAID, State Department, and other USG agencies. The specific training details by metrics are

- **Total participation:** There were 22 participants at the course, with 11 having attended the previous week's Mitigation Economics Training. This number excludes three individuals who were both participants and presenters.
- **Organizations:** Of the 20 participants from USAID, nine were from USAID missions in the Dominican Republic, Ecuador, Guatemala, Ghana, Haiti and Honduras. Other participants included a U.S. Department of State representative and a staff member of Development & Training Services, Inc.
- **Gender balance of participants and presenters:** Eleven of the participants were women, which gives a gender balance of 50% female participants and 50% male participants for the second course, slightly different from the first course. Two of the eleven presenters were women, which gives a gender breakdown of 18% female presenters and 82% male presenters. There was an overlap of four participants between the two GCC economics trainings.

### A.9.4 LESSONS LEARNED AND RECOMMENDATIONS

Important lessons and recommendations emerged from the workshop that can inform future adaptation economic trainings by USAID. These include

- **Base case studies and exercises on on-going or planned USAID adaptation projects.** This will require USAID offices, missions and projects to share project data and decision making processes of their agencies and countries to ground the exercises with real information and experiences by collaborating closely with the GCC and major adaptation mission efforts.
- **Bring participant leaders into the courses:** Involve leading experts who are participating in a course with exercise development, preparation, and delivery to broaden knowledge base and applications.
- **Provide concurrent break-out discussions by sectors:** Have more materials and time for concurrent sessions on the use of adaptation economics in the water, energy, transport, agriculture, infrastructure, vs. forestry sectors.
- **Offer pre-requisites on basics of adaptation and economic assessment:** Consider requiring participation in the GCC adaptation (or mitigation) courses and or CBA training courses—or offer 1-day refresher courses prior to any mitigation and adaptation training.
- **Expand the days of training:** To have more time for USAID or country project discussions and exercises, the length of the course needs to be lengthened to 5 days.

### A.9.5 AILEG TEAM AND PARTNERS

The AILEG course was led by Dr. Michael Westphal with leading experts in the emerging field of adaptation economics.



**USAID**  
FROM THE AMERICAN PEOPLE



## **AILEG STAFF**

Drs. Michael Westphal (AILEG Technical Director), Dr. Gordon Hughes, Dr. Paul Chinowsky, Dr. Dr. Ken Strzepek, Dr. James Neumann, Lindsay Kohlhoff, and Dianna Gillespie, as well as Dr. Urvashi Narain and Dr. Ana Bucher of the World Bank as quest speakers.

## **A.10 CLEAN ENERGY LENDING TOOLKIT**

### **A.10.1 CHALLENGE**

Financial institutions (FIs) in many developing countries often lack the customized credit products, systems, and market knowledge needed to enter the clean energy (CE) lending market. Lenders need the ability to understand CE market opportunities and develop the systems and products to effectively lend to consumers, small and medium enterprises (SMEs), Energy Service Companies, and clean energy providers. Clean energy includes renewable energy and energy efficiency system investments. Such CE financing has not been a priority of the FIs or the capital markets in most developing countries for several reasons: past competitiveness and relative ease of financing conventional fuels and large-scale power systems; energy pricing disincentives; difficulties in contract enforcement and a generally weak policy and regulatory environment; and high transaction costs in reaching small or remote borrowers. Developing country FIs often lack the credit products, systems, and market knowledge to serve the CE lending market effectively and efficiently.

### **A.10.2 ACTIVITIES**

Clean energy investments require sufficient financing and rigorous lending capabilities to help ensure their sustainability and profitability. AILEG created a Clean Energy Lending Toolkit that offers FIs a practical guide to launching a clean energy lending line of business. The Clean Energy Lending Toolkit was developed by AILEG—with leadership from Enclude (formerly ShoreBank International and Triodos Facet) and Abt Associates management—to help FIs gain a greater understanding of clean energy market opportunities and the systems and products needed for effective lending in this sector. This Toolkit describes a straightforward process and set of implementation tools to guide the financial industry in:

- Determining the profitability and viability of lending to clean energy SMEs
- Conducting an audit of internal capabilities and needs to successfully service this market
- Creating the credit products and processes for lending to clean energy companies
- Providing an understanding and case studies of clean energy systems and lending structures.

The Toolkit explains the steps involved in deciding whether and how to finance clean energy technologies via six sequential modules to guide users in the decision-making process and structuring products and systems to minimize risks and maximize profitability.



**USAID**  
FROM THE AMERICAN PEOPLE



### **A.10.3 ACHIEVEMENTS**

The AILEG team developed a six-module Clean Energy Lending Toolkit manual to support FIs as they determine whether, and if so how, to lend to the clean energy industry. AILEG prepared the Toolkit in partnership with and under the leadership of the USAID/E3 Offices of Micro-Enterprise and Private Enterprise Promotion (MPEP), EP, and GCC in addition to receiving input from USAID Development Credit Agency (DCA). AILEG send an initial draft of the manual with six modules to USAID for input and feedback in June 2013, with recommendations from USAID to combine the separate modules into one reference manual. The final draft was reviewed by several USAID Offices and banks, which helped prepare input on case studies.

**Module 1 IMPLEMENTER'S GUIDE:** Toolkit overview and content summary

**Module 2 MARKET DIAGNOSTIC:** What are profitable clean energy lending markets?

**Module 3 INSTITUTIONAL READINESS:** How to assess an FI's lending ability and needs

**Module 4 CREDIT PRODUCT DEVELOPMENT:** What are credit products to develop?

**Module 5 TECHNOLOGY OPTIONS:** A short primer on potential clean energy systems

**Module 6 CASE STUDIES:** Successful clean energy lending by selected banks

The market mapping tools and institutional readiness modules (Modules 2 and 3), the credit product and process development to prepare a FI for lending to CE customers (Module 4), and the CE technology and country case studies sections (Modules 5 and 6) all together help lenders adapt to and invest in this energy growth industry.

### **A.10.4 LESSONS LEARNED AND RECOMMENDATIONS**

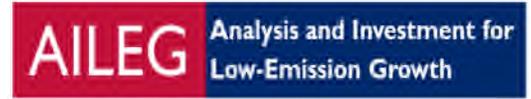
The Clean Energy Lending Toolkit needs pilot testing and market diagnostic field application as the next step of development. Several banks in Africa, notably in Uganda, Liberia, Ghana, and Nigeria (Power Africa countries), have expressed interest in working with USAID in this next pilot testing phase. AILEG recommends taking the Toolkit to the field to test its effectiveness and revising it accordingly by conducting trainings with interested missions and banks, on a cost-share basis.

### **A.10.5 AILEG TEAM AND PARTNERS**

Staff from Enclude, a newly merged firm consisting of U.S.-based ShoreBank International and Netherlands-based Triodos Facet, including Lauren Moser Counts, Nienke Stam, Katherine Vilnrotter, Manuel Alegre, Arjan Visser, and Alex Blake, provided the substantive technical support to USAID on the activity along with significant technical input and authorship from Dr. Eric Hyman (E3/EP) and supervision by the AILEG Project Manager (Dr. Marcia Trump). Support and collaboration on the document from USAID included input and directions from Lawrence Camp and Bernai Velarde



**USAID**  
FROM THE AMERICAN PEOPLE



(E3/MPEP), Dr. Eric Hyman (E3/EP), Zephyr Taylor (E3/GCC), Kristen Madler (E3/Energy), and DCA representatives.



**USAID**  
FROM THE AMERICAN PEOPLE

**AILEG** Analysis and Investment for  
Low-Emission Growth

# ANNEX B – POST-PROJECT AILEG KNOWLEDGE DISSEMINATION

After the official closure of AILEG, the staff has been asked to provide additional information and knowledge dissemination activities. These include:

- Brown-bag seminars of the results of the AILEG project will be presented to the Inter-American Development Bank and Asian Development Bank in 2014.
- Presentation of the methodology for hydrological modeling of the Upper Magdalena Watershed in Colombia was made by Rodolfo Camacho and Jose Rafael Cordova, at the *1<sup>st</sup> Symposium on Climate Change* sponsored by the U.S. National Academy of Sciences and the Venezuelan Academy in Caracas, Venezuela (Nov 28-29, 2013). The presentation was “*Estimación del efecto del cambio climático sobre la disponibilidad del recurso hídrico en una cuenca hidrográfica.*”