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COLOMBIA CLEAN ENERGY PROGRAM

Annual Report:

October 2013 – September 2014



October 2014

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TABLE OF CONTENTS

- 1. Summary of key activities and achievements1**
 - 1.1 Introduction 1
 - 1.2 Main accomplishments and results 3
 - 1.3 Coordination with Colombian implementing partners and other USAID programs 7
 - 1.4 Summary of CCEP project leveraging during second year implementation 7
 - 1.5 Summary of program expenditures 10

- 2. Task 1: Renewable energy and energy efficiency enabling environment and institutional capacity development1**
 - 2.1 Highlights 1
 - 2.2 Activity summary by work stream 1

- 3. Task 2: Expanding access to renewable energy sources in currently unserved areas....13**
 - 3.1 Highlights 13
 - 3.2 Activity summary by work stream 14

- 4. Task 3: Energy efficiency and renewable energy investment promotion22**
 - 4.1 Highlights 22
 - 4.2 Activity summary by work stream 24

- 5. Moving forward in spite of challenges.....32**

- 6. Performance indicator results against targets34**

- 7. Success Stories.....37**
 - 7.1 Sustainable rural energization plan for Nariño 37
 - 7.2 On the road to a cleaner brick production 38
 - 7.3 Solar energy for Utria NationalPark 39

- APPENDIX A: CCEP in the media40**

FIGURES

Figure 1 Map CCEP RE projects in off-grid areas.....	1
Figure 2 CCEP RE solutions and beneficiaries	2
Figure 3 CCEP EE components and avoided CO2	3
Figure 4 Map CCEP EE projects	3
Figure 5 Status of CCEP leveraging as of September 2014	8
Figure 6 Status of CCEP leveraging as of September 2014. Task 1 projects	8
Figure 7 Status of CCEP leveraging as of September 2014. Task 2 projects	9
Figure 8 Status of CCEP leveraging as of September 2014. Task 3 projects	9
Figure 9 Invoiced cumulative program costs January 2012 - September 2014	10
Figure 10 Invoiced monthly average	10
Figure 11 SENA Alternative Energy Forum October 17-18, 2013 – Announcement of PERS Guajira	11
Figure 12 Homer training workshop June 9-12, 2014	11
Figure 13 August 5, 2014. Launching the Renewable Energy Law. From left to right: Jose David Name (senator and author of the Law; Jose Maria Figueres (CEO of Carbon War Room); Amylkar Acosta (Minister of Mines and Energy); Luz Helena Sarmiento (Minister of Enviro	12
Figure 14 This single well provides water to nearly 600 beneficiaries and is scheduled for installation of a solar pump with storage tank system	16
Figure 15 Depiction of water intake for Sabana de Crespo MHP	17
Figure 16 The refurbishment and expansion of this MHP will benefit around 2,000 inhabitants of the bustling town of Palmor	17
Figure 17 CCEP’s organization for developing Task 3 projects	22
Figure 18 One of 300 shops being audited by Garper Energy Solutions in alliance with CCEP and Fenaltiendas to develop and implement efficient refrigeration, lighting and other energy savings technologies through ESCO contracts for 3,000 establishments in Bogota	23
Figure 20 Weighted index of energy consumption, economic, environmental and social aspects by industrial subsector	24
Figure 19 Illustrative summary of the assessment result	24
Figure 21 Sugres brick factory (Supia, Caldas)	26
Figure 22 First poster announcing the CCEP/CAEM/CCB project to optimize combustion in beehive and Hoffman kilns in 20 SME brick manufacturing plants	29

BOXES

Box 1 New Renewable Energy and Energy Efficiency Law	6
Box 2 Main changes to off-grid tariffs regulation – CREG Resolution 004 of 2014	7
Box 3 Progress in implementing renewable energy solution for the Bogotá Botanical Garden	10
Box 4 Details on project completed at Utria National Park (Choco).....	14
Box 5 Details on project progress at Arusi, Termales, Partado (Choco)	15
Box 6 Details on Yucal roadblocks resolution (Choco).....	15
Box 7 Details on RE solutions agreed with Funadacion Cerrejon (Guajira)	16
Box 8 Details on Sabana Crespo efforts to remove roadblocks (Cesar).....	16
Box 9 Clean Energy for the indigenous reserve of Santa Rosa de Guayacan.....	18
Box 10 Details on projects with EPM (Antioquia)	19
Box 11 Details on potential partnership to create rural SME	20

LIST OF ACRONYMS AND ABBREVIATIONS

ACIVA	Asociacion de Cabildos Indigenas del Valle del Cauca
AMVA	Environmental Authority of the Metropolitan Area of the Aburra Valley
ANDI	National Businessmen’s Association (Asociacion Nacional de Empresarios de Colombia)
ANLA	National Environmental Licensing Agency (Agencia Nacional de Licenciamiento Ambiental)
APROTEC	Local renewable energy company
BBG	Bogota Botanical Garden
BIO-REDD	Reduced Emissions from Deforestation and Degradation (USAID Program)
CAEM	Business Environment Corporation
CCB	Camara de Comercio de Bogota
CCEP	Colombia Clean Energy Program (USAID Program)
CE	Clean Energy
CERI	Rural Indigenous Educational Institution
CNPMLTA	National Cleaner Production Center (Centro Nacional de Produccion mas Limpia y Tecnologias Ambientales)
CODECHOCO	Regional Environmental Authority for Choco
COP	Chief of Party
COR	Contracting Officer Representative
CORPOCESAR	Regional Environmental Authority for the Department of Cesar
CORPOGUAJIRA	Regional Environmental Authority for the Department of La Guajira
CP	Cleaner Production
CREG	Power and Gas Regulatory Commission (Comision de Regulacion de Energia y Gas)
CVC	Regional Environmental Authority for Valle del Cauca
DANE	Departamento Administrativo Nacional de Estadistica
DNP	National Planning Department (Departamento Nacional de Planeacion)
EC-LEDS	Enhancing Capacity for Low Emission Development Strategies
EE	Energy Efficiency
EPM	Empresas Publicas de Medellin
EPSA	Empresa de Energia del Pacifico S.A.
ESCO	Energy Service Company
FAER	Support Fund for Rural Electrification (Fondo de Asistencia a Electrificacion Rural)
FAZNI	Support Fund for the Non-Interconnected Zones (Fondo de Apoyo Financiero para la Energizacion de las Zonas No Interconectadas)
FCCI	Fundacion Cerrejon Guajira Indigena
FINDETER	Financial Institution for Development
GHF	Global Heritage Fund
GHG	Greenhouse Gases
GIS	Geographic Information System
GOC	Government of Colombia
IADB	Inter-American Development Bank
IFC	International Finance Corporation (World Bank Group)

IPSE	Institute of Planning and Promotion of Energy Solutions in the ZNI (Instituto de Planificacion y Promocion de Soluciones Energeticas para las ZNI)
LEDS	Low Emission Development Strategies
M&E	Monitoring and Evaluation
MADR	Ministry of Agriculture and Rural Development (Ministerio de Agricultura y Desarrollo Rural)
MADS	Ministry of Environment and Sustainable Development (Ministerio de Ambiente y Desarrollo Sostenible)
MME	Ministry of Mines and Energy (Ministerio de Minas y Energia)
MRV	Monitoring, Reporting and Verification
NAMA	Nationally Appropriate Mitigation Actions
NGO	Non-Governmental Organization
O&M	Operation and Maintenance
PERS	Sustainable Rural Energization Plan
PEZNI	Energization Plan for the Non-Connected Zones
PIEC	Plan Indicativo de Expansion de Cobertura de Energia Electrica
PMP	Performance Management Plan
PPA	Public Private Alliance
PPF	Project Preparation Facility
PROURE	Program of Rational and Efficient Use of Energy and Other Forms of Non-Conventional Energy (Programa de Uso Racional y Eficiente de Energia y Fuentes No Convencionales)
RE	Renewable Energy
RETILAP	Reglamento Tecnico de Iluminacion y Alumbrado Publico
SENA	Servicio Nacional de Aprendizaje
SME	Small and Medium Enterprises
SNSM	Sierra Nevada de Santa Marta
Tt	Tetra Tech (Prime Contractor)
UDENAR	Universidad de Nariño
UNDP	United Nations Development Programme
UPME	Mining and Energy Planning Unit (Unidad de Planeacion Minero Energetica)
USAID	United States Agency for International Development
ZNI	Non-Interconnected Zones (Zonas no Interconectadas)

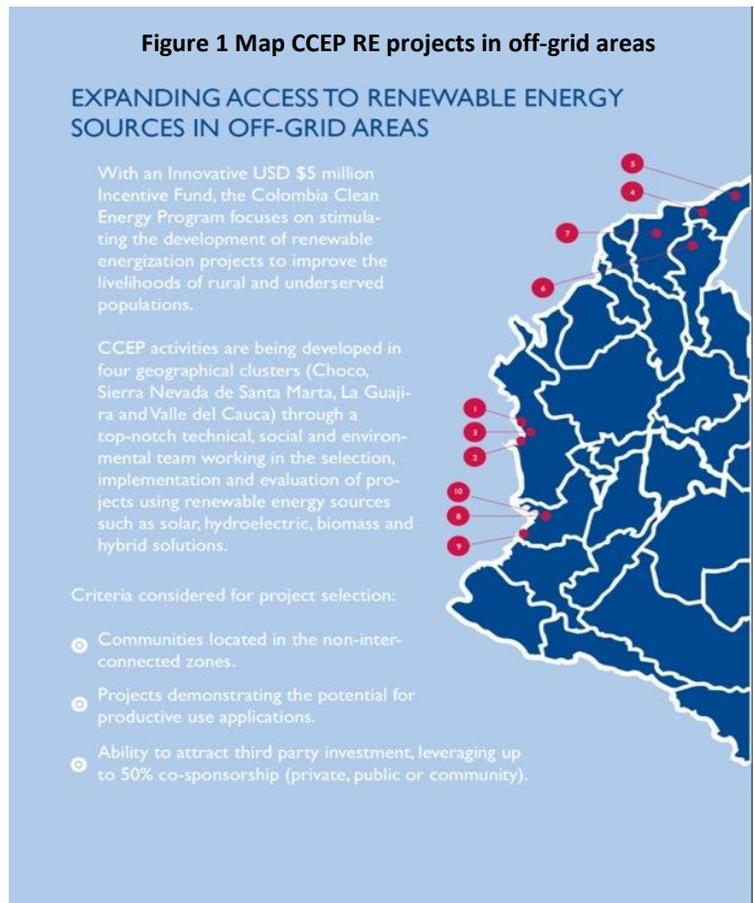
1. SUMMARY OF KEY ACTIVITIES AND ACHIEVEMENTS

1.1 INTRODUCTION

During the last fiscal year September 2013 - 2014, the USAID's Colombia Clean Energy Program (CCEP) strengthened its working relationship with the government of Colombia and has become a key partner in the establishment of a regulatory and legal framework for clean energy that could lead to the consolidation of a stronger, more sustainable energy system. However the Colombian energy system still faces daunting challenges in diversifying its energy mix, increasing access to non-interconnected areas and promoting a more efficient use of available resources. According to UPME's projections, approximately 60% of the country's primary energy is completely wasted in inefficient processes; more than 65% of the energy produced comes exclusively from hydroelectric sources, revealing a latent vulnerability and exposure to extreme climate change phenomena; and the current GOC efforts to provide 24 hour energy to the Non Interconnected municipal seats is still a fragile and costly promise, due to its reliability on diesel based systems.

These challenges and stronger ties with the public sector energy entities have opened the door to new initiatives that will facilitate CCEP's involvement in the creation of an enabling environment for clean energy sources, increase the use of renewable energy in non-connected areas; and strengthen investment in clean energy technologies and uses.

CCEP's contribution to the design and implementation of the EE/EE tax incentive, UPME Resolution 563 of 2012, was just the beginning of a process of technical and policy assistance that led the program to intervene in more significant issues such as: provide Geographical Information System (GIS)-based RE resource mapping and cost analysis methodology to help in the design of the Energy and Gas Regulatory Commission - CREG's tariff resolution for the non - interconnected areas (ZNI); assess the results of the Program of Rational and Efficient Use of Energy and Other Forms of Non-Conventional Energy - PROURE's 2010-2015 Action Plan and support the design of the 2016-2020 Action Plan in critical issues such as efficient energy use in the transport sector and natural gas market; support some items of the technical formulation of the new of Renewable Energy (RE) and Energy Efficiency (EE) Law and provide technical consultancy to the development of some specific policy mechanisms; design a regional and national rural energization



plans and a new strategy for the non-interconnected areas. Most of these activities are ongoing efforts that will surely shape the clean energy policy during the next 10 years.

In addition, the GOC co-financing resources helped us to finally start deploying our clean energy projects in off-grid areas where 11 projects for ethnic communities in Choco, Sierra Nevada de Santa Marta (SNSM), La Guajira and Valle del Cauca are under implementation or on their final designing steps. These projects include the installation of needed public services such as: RE systems to provide reliable energy for education and health centers for the Communities in SNSM, photovoltaic and manual systems to pump clean water for the Wayuu indigenous community – La Guajira, household electrical installations and public lighting in the departments of Choco and Valle del Cauca; these systems are also aimed to promote the development of economic and productive activities such as ecotourism in the Utria National Natural Park, ice production and cold chain solutions for the fishing communities of Nuqui and Buenaventura, rice and corn mill and carpentry workshop for the indigenous Community of El Yucal, and the diverse commercial and agroindustry activities of the larger community of Palmor SNSM.

Figure 2 CCEP RE solutions and beneficiaries

CCEP OFF-GRID PROJECT LOCATION						
For the year 2014						
CLUSTER	Project	Municipality	RE solution	Beneficiaries	Productive Project	Status
Choco	1 Utria Natural Park	Bahia Solano	Photovoltaic systems	12	Ecotourism	Completed
	2 Arusi-Termales Partado	Nuqui	100 kW Mycro Hydro Plant MHP	724	Icefactory for artisanal fishing	Under implementation
	3 El Yucal	Nuqui	MHP, rice and corn mill and public lighting	426	Rice and corn mill	Under implementation
La Guajira	4 San Antonio	Dibulla	MHP, wood plot, improved cook stove, water purification & solar lamps	271	Kogui school and health centers	Completed
	5 Fundacion Cerrejon	Uribia, Manauare, Riohacha	Solar and manual water pumping systems	2500	Drinking water for human consumption, animal husbandry & irrigation	Under implementation
Sierra Nevada de Santa Marta	6 Sabana de Crespo	Valledupar, Sabana de Crespo	10 kW MHP	4000 estimated	Coffee harvesting and processing	Final designs
	7 Palmor	Cienaga, Palmor	130 kW MHP and electricity lines	1895	Coffee harvesting and processing, animal husbandry & local commercial market	Under implementation
Valle del Cauca	8 Santa Rosa	Buenaventura, Santa Rosa de Guayacan	Solar systems and efficient cook stoves	125	Crafts center	Completed
	9 Cajambre PIMPESCA	Buenaventura	Solar refrigeration	313	Artisanal fishing	Final designs
	10 EPSA	Punta Soldado, Bajo Cajambre, Buenaventura	hybrid solar-diesel system P Soldado. Photovoltaic systems in B. Calima	1200 estimated	Artisanal fishing	Final designs

On its clean energy investment promotion endeavor, the USAID’s Colombia Clean Energy Program has also partnered with UPME and the private sector to promote clean energy financial mechanisms that will assist businesses to develop, plan, and finance clean energy initiatives, in order to advance in USAID’s commitment to developing relationships with the private sector to reduce carbon emissions in Colombia. Some of these strategic partnerships are alliances with NGOs and private entities such as: the Bogota Chamber of Commerce and the Environment Business Corporation (CAEM) to implement adequate air-combustion systems for the brick industry in Cundinamarca and Boyaca, local Energy Service Companies - ESCOS to support detailed pre investment studies, and the program initiated with the Regional Environmental Authority for the Department of Valle del Cauca CVC to promote the optimization of combustion in up to 20 manufacturing firms located in the industrial corridor of Yumbo.

The progress made on last year activities bring us closer to the implementation goals set for January 2016, and allow us sufficient time for consolidating and carrying out an orderly exit in January 2017.

Figure 3 Map CCEP EE projects

RENEWABLE ENERGY AND ENERGY EFFICIENCY INVESTMENT PROMOTION

The Program is supporting comprehensive and quantitative analysis of RE/EE opportunities to guide future project investments in strategic sectors in the main industrial and agro-industrial corridors. Projects are being structured in ceramic, glass and brick manufacturing; agro-industrial, food and beverage; metal-mechanic; textile and commercial sub-sectors, in alliance with national business associations and the financial sector. We are identifying investment opportunities, working with several funds, credit lines and Energy Service Companies (ESCOs), and offering training and advisory services on existing financial mechanisms.

Type of eligible projects:

- Waste-to energy: transformation and use of waste, such as: biogas generation, biomass gasification and combustion.
- Projects to increase industrial energy efficiency: improved combustion systems, steam networks, use of residual heat and efficient equipment.
- Heat cogeneration systems reducing fossil fuel consumption.



Figure 4 CCEP EE components and avoided CO2

CCEP INDUSTRIAL RE/EE PROJECT LOCATION					
For the year 2014					
Project	Location	Subsector	Components	Potential tons of CO2e avoided per year	
1	Los Cerros Brick Factory	Planeta Rica, Cordoba	Brick and ceramic	Using residual heat from a neighboring plant to eliminate coal consumption and reduce GHG emissions	1,614
2	Santa Rita Brick Factory	Medellin, Antioquia	Brick and ceramic	Automatization of the feeding and combustion system for the brick drying kiln	3,717
3	Tomy Ice Cream Factory	Urao, Antioquia	Food & beverages	Installation of a new more efficient refrigeration system which reduces 48% of electricity consumption	135,7
4	Energy Efficiency in Artisanal Brick Factories	Sogamoso, Nemocon, Mochuelo	Brick and ceramic	More efficient air-combustion feeding systems for 20 artisanal brick factories	16,680 estimated
5	Sugres Brick Factory	Supia, Caldas	Brick and ceramic	Replacing beehive brick kilns with a more efficient tunnel kiln	3,408 estimated

1.2 MAIN ACCOMPLISHMENTS AND RESULTS

This report covers the period from October 2013 to September 30, 2014 and underscores the main actions and results obtained by the Colombia Clean Energy Program (CCEP) during its second year of operation. The overall objectives are to showcasing the accomplishments achieved in line with contract’s expected results, , analyzing efforts implemented by the Program in establishing alliances for the creation of high-impact RE/EE projects nationwide, and deploying new strategies for stimulating fast track implementation during the following year. Main accomplishments throughout the year are presented below organized by expected results as indicated in the contract:

- **“Enhanced capacity of MME, UPME, IPSE, energy companies and pertinent regional institutions to formulate and implement renewable energy policies, programs and projects”**. - One of the main accomplishments of the project was supporting the design and implementation of a 17-year Sustainable Rural Energization Plan for the department of Nariño (PERS Nariño 2013-2030). This

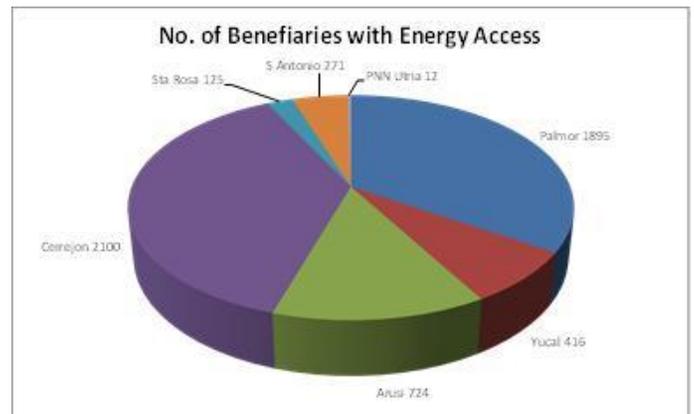
activity was the result of a combined effort among The Mining and Energy Planning Unit (UPME), the Institute for the Planning and Promotion of Energy Solutions for the Non-Interconnected Zones (IPSE), and an interdisciplinary team from the University of Nariño. A rural energization plan consists of developing a comprehensive energy and socioeconomic diagnose of the rural sector of a region, establish focalized energy policy guidelines, and propose an innovative methodology for the formulation of economically, technically, environmentally and socially sustainable productive projects involving the use of clean energy sources. The specific results of PERS Nariño are discussed in section 2.2.1 and are highlighted as a success story in section 7.1. This activity has been replicated in the departments of Tolima and Guajira where the same methodologies and tools have been set to collect information and formulate focalized energy policy guidelines and sustainable energy projects. Based on the success of the approach in spurring long term sustainable rural energy development strategies and commitments in these initial regions, the new RE/EE Law dictated that hybrid energy projects for the ZNI designed through PERS initiatives will receive priority funding from GOC investment budgets. As a consequence, CCEP is assisting UPME and IPSE in developing a national PERS strategy and methodological toolkit.

- **“Revised policies for utilizing public sector rural electrification funds to attract private sector investment”**. CCEP contributed to the successful approval of the new Renewable Energy and Energy Efficiency Law (Law 1715 of 2014). The final Law incorporated recommendations made by UPME and CCEP to overcome the partial veto imposed by the Ministries of Mines and Energy and Finance and Public Credit objecting the inclusion and promotion of shale gas and liquefied petroleum gas within a law initially devised to exclusively promote clean generation. This veto occurred at a critical point because all required congressional approvals and requirements had been completed and years of work could have been lost if a resolution was not achieved. CCEP advised UPME along this process and persuaded UPME to avoid introducing additional comprehensive changes and focus exclusively on modifications to objections or else the bill would fall and have to be reintroduced for another 2-year debate and approval process. The law was finally signed on May 12th 2014 and it will transform the energy landscape over coming years, creating better financial and institutional conditions for the implementation of RE and EE projects. The main aspects include: a) enable the sale of surplus power to the network by self- and co-generators; b) the development of smart grids and net metering; and c) the gradual substitution of diesel generation in off-grid areas with renewable energy. Additional details of the work completed by CCEP are presented in section 2.2.5a.
- **“Financial mechanisms and incentives establish to promote public and private investment in EE/RE project”**. CCEP made substantial progress this year to start-up the Clean Energy Project Preparation Facility (PPF) designed to facilitate the technical and financial structuring studies required to transform good EE/RE project ideas into feasible, bankable, implemented investment projects. The year ended with the consolidation of the commitment of over USD \$300,000 of UPME funds to bankroll by end of 2014 the final engineering and financial designs for the first nine industrial EE/RE projects jointly identified meeting PPF criteria. This achievement built up on the work also completed by CCEP through direct interaction with industrial firms and engineering companies which focused on designing, promoting and assuring a solid pipeline to enable the prompt start-up of the Clean Energy PPF.
- **“Renewable energy and energy efficiency technologies and applications demonstrated and diffused to policymakers and general population through CCEP educational, awareness and outreach program.”** CCEP designed and installed Renewable Energy and Energy Efficiency technologies in several projects as described in the task 2 and task 3 chapters of this document. One project site is of

particular importance because of its significant potential to demonstrate and broadly disseminate the use of RE technologies and is under construction at the Bogota Botanical Garden. The Garden receives a minimum of 600 visitors every day and over 1,500 on week-ends. There policymakers, energy companies, academics, students and the public at large will be able to observe the viability and benefits of incorporating renewable energy solutions within the city and other suitable locations. Additional details of the work completed by CCEP are presented in section 2.2.7a.

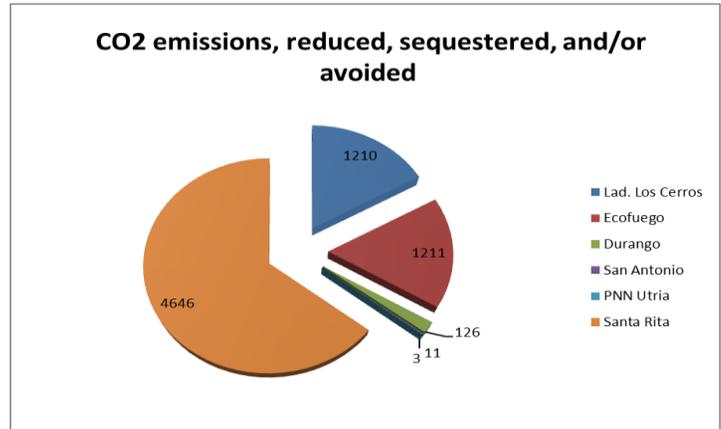
- **“Database of rural renewable resources and population centers established and managed by appropriate government, NGO, or academic institution”.** CCEP completed support and submitted to CREG technical inputs which were used in drafting the ZNI tariff regulation officially issued by CREG (Resolution 004 of 2014) for public consultation along with its supporting regulatory framework (technical document 002 of 2014). Compared to the previous methodology (091 of 2007), this resolution includes new and attractive incentive schemes and regulations adapted to the particularities of energy generation, distribution and commercialization activities in the off-grid zones, for the first time incorporating renewable energy options. The resolution also resonates with the objectives stipulated in the new RE/EE Law aimed at achieving gradual substitution of diesel dependency in the country’s rural areas. CCEP’s technical inputs included all datasets containing the Levelized Cost of Energy (LCOE) as well as interactive geographical data of wind and solar resources across the national territory.

- **“Sustainable community scale rural renewable energy and ZNI municipal seat electrification projects benefiting 16,000 beneficiaries and productive use activities developed in rural areas stimulating rural economic development, for example, cold-chain development or value-added product development utilizing clean energy.”** CCEP completed the renewable energy project at the National Park of Utria improving their ecotourism activities and other natural preservation activities carried out by the National Parks Authority. In addition, the renewable energy solution in Santa Rosa de Guayacan was 90% completed by the end of this FY, and the micro hydro power (MHP) projects of El Yucal, Palmor and Arusi started construction phase implementation with the selection of the engineering contractors. The Fundacion Cerrejon RE water pumping



project also began implementation in September. At the end of the first semester of 2015, these projects and the ones completed last year will provide clean energy access to 5,543 people, and improve the communities’ fishing and agriculture productive businesses. Details of PNN Utria, Santa Rosa de Guayacan and Fundacion Cerrejon projects are included in section 3.2.2.

- **“Projects will facilitate energy savings, energy cost savings and renewable generation.”** All projects completed by CCEP (Task 2 and Task 3), including Durango and CIA, Los Cerros Ecofuego, Ladrillera Santa Rita, San Antonio and Utria have reduced 7,206 tons of CO₂e greenhouse gas (GHG) emissions; generated 13.761 thousand kilowatt-hours equivalent of operational renewable electricity; and saved 344,062 thousands of KWh due to energy efficiency and/or conservation



- **Energy efficiency project transactions facilitated across range of sectors, and significant project impacts in terms of energy and cost savings and improved competitiveness of Colombian industries.”** CCEP made substantial additional progress in several fronts to facilitate investments in energy efficiency that have significant potential in terms of energy and cost savings. These fronts are:

1. Establishing relationships with national banks already offering specific credit lines, particularly the LCA mechanism sponsored by SECO to reimburse up to 25% of credit incurred if projects achieved specific energy savings and emissions reduction targets. The Durango Cia ice cream factory and brick factories Los Cerros Ecofuego, Ladrillera Santa Rita and Ladrillera Sugres implemented EE projects structured by CCEP as part of this mechanism.
2. Partnering with Energy Service Companies (ESCOS), which can directly structure and finance EE/RE projects through energy service contracts in companies otherwise unwilling or unable to invest their own resources outside their core businesses. Investments totaling over USD \$10M are being structured by ESCOS under engineering/financial studies co-financed through CCEP’s Incentive Fund.
3. Partnering with environmental authority CVC to develop a program aimed specifically to reduce pollution through EE/RE investments in the Yumbo industrial corridor. CCEP and CVC joined in an 18-month effort to identify EE/RE projects in up to 20 companies, structure detailed investment projects in up to 7 of these, and reach financial closure and investment decisions by participating companies.
4. Promoting low-cost technological solutions which can significantly reduce fossil fuel consumption and CO₂ emissions per unit of output in brick kilns and industrial boilers. In the case of brick manufacturing, CCEP partnered with CAEM, the environmental business affiliate of the Bogota Chamber of Commerce, to implement pulverized coal dosifiers in 20 SME brick manufacturers inscribed in the program, with the potential of reducing 16,680 Tons of CO₂e a year. Additional details of the work completed by CCEP are discussed in section 4.2.2e.iii and highlighted as success story in section 7.2
5. Identifying the initial PPF portfolio of engineering/financial structuring projects to be developed during year three in partnership with UPME and under a \$685K cooperation agreement between the two parties. 2.2.4a.

1.3 COORDINATION WITH COLOMBIAN IMPLEMENTING PARTNERS AND OTHER USAID PROGRAMS

CCEP has established strategic relationships with key GOC, state, municipal and community agencies and organizations. As in the previous year this is of particular importance because CCEP has being successful thanks to the time and efforts invested to establish these relationships for proper coordination and implementation of all technical, financing and construction aspects of the particular task under execution by CCEP. Some of these alliances materialized in key agreements and Memorandum of Understanding as listed below:

Memorandum of Understanding	Agreements
FONADE	Patrimonio Natural - IPSE
IPSE	PERS Nariño (UDENAR, UPME, IPSE)
UPME	PERS Tolima (Tolima University, UPME)
Chancellery	PERS Guajira (Chancellery, UPME, CORPOGUAJIRA, and SENA Guajira)
CVC	National Natural Parks
MGM	CREG
Garper Energy	USAID - Chamber of Commerce
EPSA (CELSIA)	
EPM	
Botanical Garden of Bogota	
CAEM	

1.4 SUMMARY OF CCEP PROJECT LEVERAGING DURING SECOND YEAR IMPLEMENTATION

By September 2014, projects worth USD \$ 9.6M were completed, are under implementation or have assured budget commitments for implementation by end of year.

Figure 5 details the amount per project and CCEP’s efforts in materializing investments and co-funding agreements for large-scaled initiatives such as the water pumping and brick sector modernization projects with FCGI and CAEM. Projects in the pipeline which have not assured implementation are excluded from this table regardless of state of design and approval.

Figure 5 Status of CCEP leveraging as of September 2014

PROJECTS WITH APPROVED CO-FINANCE BY CCEP TASK		Budgets approved to 30.09.2014	Leverage – GOC/private counterparts & beneficiaries	CCEP technical assistance – in kind	CCEP incentive fund	Total Cost
Task 1	Renewable Energy and Energy Efficiency Enabling Environment, and	USD	\$1.386.035	\$89.901	\$210.363	\$1.686.298
		PERCENTAGE	82,2%	5,3%	12,5%	100,0%
Task 2	Expanding Access to Renewable Energy Sources in Off-grid or Unserved Areas	USD	\$2.215.051	\$0	\$1.543.275	\$3.758.326
		PERCENTAGE	58,9%	0,0%	41,1%	100,0%
Task 3	Renewable Energy and Energy Efficiency Investment Promotion	USD	\$3.104.205	\$12.910	\$1.062.308	\$4.179.423
		PERCENTAGE	74,3%	0,3%	25,4%	100,0%
Portfolio status 30.09.14	TOTAL BUDGETS AND LEVERAGING	USD	\$6.705.291	\$102.810	\$2.815.945	\$9.624.047
		PERCENTAGE	69,7%	1,1%	29,3%	100,0%

In comparison to September 2013 budget, where USD \$1,45M had been committed through the Incentive Fund mechanism, this year CCEP strengthened its financial commitment by assuring above 2.8M. This increment is mainly due to funds channeled for the following projects: CAEM (Thousand USD \$539), Palmor (Thousand USD \$502), and the PPF (Thousand USD \$339).

Leverage co-funding commitments by GOC and private counterparts and beneficiaries averaged 70% of projects, remaining above the contractual commitment of 50% for rural energy projects under Task 2 despite including 2 investments with no contractual counterpart funding (Cajambre and Sabana de Crespo). Additional to these amounts, CCEP has in its "Task 3 project pipeline" 2 new investments worth USD\$ 2.2 million. These amounts are not included in this figure until the projects are completed.

Figure 6 Status of CCEP leveraging as of September 2014. Task 1 projects

CCEP TASK	Cluster / Sector	Project	Final Co-Funding Agreements Reached	Leverage – GOC/private counterparts & beneficiaries	CCEP technical assistance – in kind	CCEP Incentive Fund	Total Cost	
T1 EE/RE Enabling Environment	Nariño	Sustainable Rural Energization Plan - PERS Nariño	December 2012	\$528.806	\$34.527		\$563.333	
	Tolima	Sustainable Rural Energization Plan - PERS Tolima	October 2013	\$263.287	\$16.262		\$279.549	
	Guajira	Sustainable Rural Energization Plan - PERS Guajira	November 2013	\$370.885	\$39.111	\$22.000	\$431.996	
	Education & Outreach		HOMER	ago-14	\$17.484		\$5.000	\$64.336
			Renewable Energy for Bogotá Botanical Garden	June 2014	\$205.573		\$183.363	\$357.252
Subtotal				\$1.354.351	\$89.901	\$210.363	\$1.696.467	

Figure 7 Status of CCEP leveraging as of September 2014. Task 2 projects

CCEP TASK	Cluster / Sector	Project	Final Co-Funding Agreements Reached	Leverage – GOC/private counterparts & beneficiaries	CCEP technical assistance – in kind	CCEP Incentive Fund	Total Cost
T2 Renewable Rural Energization Community Projects	Sierra Nevada Santa Marta	San Antonio	November 2012	\$18.818		\$21.412	\$40.230
		Palmor incluye potenciación redes IPSE	July 2013	\$695.674		\$502.000	\$1.197.674
	Valle (CVC)	Santa Rosa	November 2013	\$1.491		\$59.529	\$61.020
	Nuquí, Chocó	Arusí-Partadó-Termals	Pending	\$1.124.773		\$332.870	\$1.457.643
		El Yucal	July 2013	\$197.312		\$161.979	\$359.291
		Utría	July 2013	\$35.492		\$46.209	\$81.701
	Guajira	El Cerrejon	June 2014	\$141.491		\$125.620	\$267.111
		Sabana de Crespo	Pending	\$ 0		\$293.657	\$293.657
Subtotal				\$2.215.051	\$0	\$1.543.275	\$3.758.326

Figure 8 Status of CCEP leveraging as of September 2014. Task 3 projects

CCEP TASK	Cluster / Sector	Project	Final Co-Funding Agreements Reached	Leverage – GOC/private counterparts & beneficiaries	CCEP technical assistance – in kind	CCEP Incentive Fund	Total Cost
T3 Energy Efficiency & Financial Facilitation	Brick Sector	Ladrillera Los Cerros (Córdoba)	May 2012	\$432.096	\$3.468		\$435.564
	Food/Agro-industry Sector	Helados Tonny (Antioquia)	May 2012	\$691.800	\$3.076		\$694.876
	Brick Sector	Ladrillera Santa Rita (Antioquia)	March 2013	\$123.285	\$3.350		\$126.635
	Brick Sector	Ladrillera Sugres	September 2013	\$747.010			\$126.635
	Food/Agro-industry Sector	Colanta (Antioquia) - ESCO option *	September 2013	\$11.111	\$3.017	\$11.111	\$25.239
	Brick Sector	BCC/CAEM	July 2014	\$635.122		\$538.734	\$1.173.856
	Glass Sector	OI-Peldar (Cundinamarca) - ESCO option **	November 2013	\$22.810		\$21.842	\$44.652
	Ceramics	Ceramica Italia (Santander)		\$47.632		\$48.208	\$95.840
	Services	Centro Comercial Gran	November 2013	\$42.674		\$43.267	\$85.941
	Services	Fenaltiendas		\$59.783		\$59.783	\$119.566
	PPF	Various ***	September 2014	\$290.882		\$339.363	\$630.245
Subtotal				\$3.104.205	\$12.910	\$1.062.308	\$3.559.047

Notes:

* The budget reflects only the cost of studies cofinanced. The investment project approved for implementation in Year 3 amount USD\$490,000 and will be included as leverage once constructions begins

** The budget reflects only the cost of studies cofinanced. Investments structured will be included as leverage only once ESCO contracts are signed and implementation begins

*** This amount is not yet included in the indicators. The budget was committed by UPME but contracts will be signed during the rest of 2014.

1.5 SUMMARY OF PROGRAM EXPENDITURES

USAID has obligated to date a total of \$: \$7,559,788.00 to the contract and Tt has invoiced for \$ \$6,008,978.17 through the period ending September 30, 2014 which is about 80% of the obligated funding. The following figure presents an itemized summary of invoiced cumulative program costs for the January 2012 September 2014 period.

Figure 9 Invoiced cumulative program costs January 2012 - September 2014

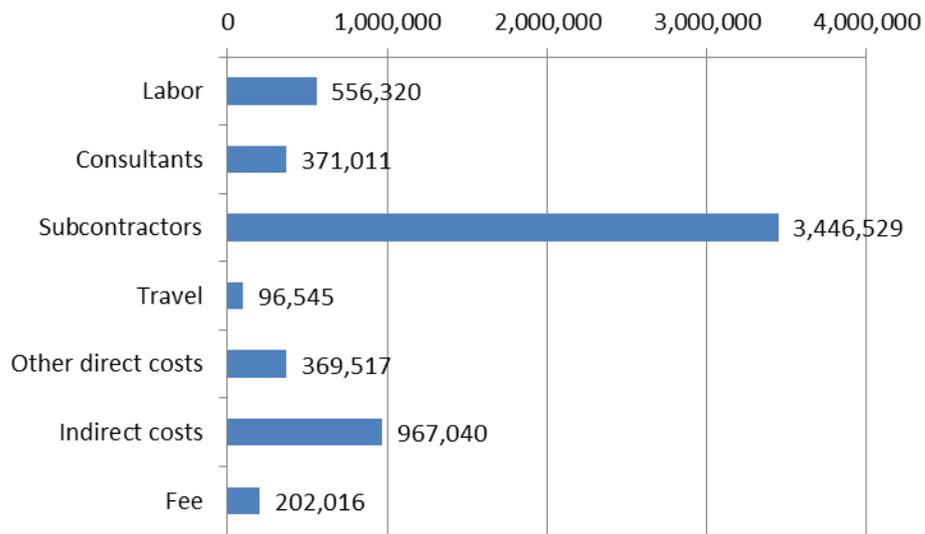
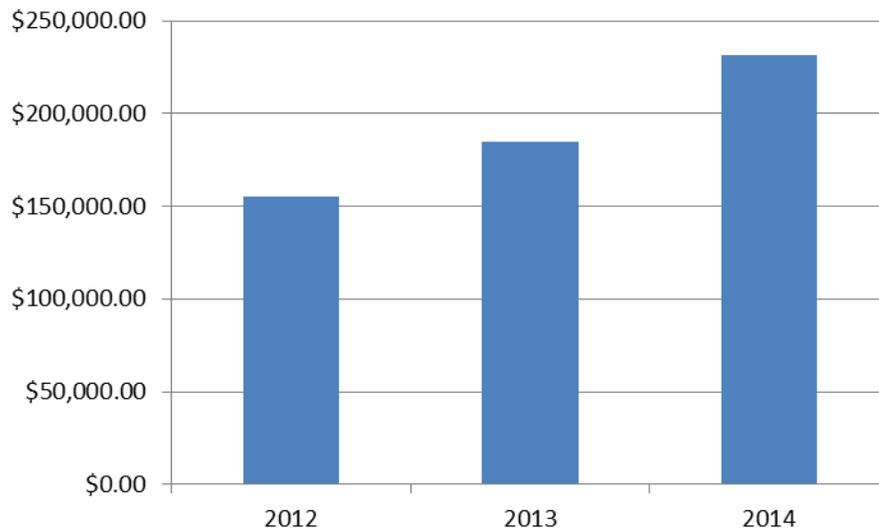


Figure 10 Invoiced monthly average



A contract modification has been submitted to USAID to re-allocate some line item budget amounts within the overall ceiling award and to request additional obligation of funds. Following the trend shown in Figure

10, we anticipate a rapid increase of program expenditures moving forward as numerous RE and EE projects will be under construction / implementation during the coming year.

2. TASK 1: RENEWABLE ENERGY AND ENERGY EFFICIENCY ENABLING ENVIRONMENT AND INSTITUTIONAL CAPACITY DEVELOPMENT

2.1 HIGHLIGHTS

Reflecting the strategic realignments stipulated in our second year work plan, the main thrust of the Program through Task 1 was devoted to support GOC institutions in the creation of policies and methodologies for the promotion of RE/EE penetration at national, regional and strategic energy-intensive sector levels. The new RE/EE Law and the recently modified and enhanced ZNI tariff methodology resolution, formulated with direct participation from our Program, will transform the energy landscape over coming years, creating better financial and institutional conditions for the implementation of RE and EE projects.

In this context, renewable energy instruments designed and completed by CCEP during this second year such as PERS and the RE mapping databases and tools are already being integrated within energy policy planning and power service regulation. Thanks to these actions, the GOC has recognized CCEP's technical expertise and has assigned a central role to our Program in the regulatory development of the Law.

Critical progress was also made in the definition and roll-out of financial mechanisms for EE/RE investment. By December 2013, the tax incentive structured and promoted by GOC with CCEP assistance had helped spur nearly USD \$400M in clean energy investments in industry, public transportation systems and renewable energy projects. By the end of September 2014, CCEP and UPME had signed a formal Association and Technical Assistance Agreement, according to which both entities will coordinate the disbursement of COP 1,300M to co-finance advanced engineering and financial structuring studies for energy efficiency projects in the industrial, transport, commercial and service sectors, and CCEP /UPME also completed the PPF application formats and procedures. Moreover, the impact and scope of the PPF are expected to increase significantly, as discussions with UPME are leading to structure the PPF as an initial operative branch of a much larger GOC national energy efficiency agency currently being designed as part of the next national development plan. In coordination with UPME and our reinforced Task 1 technical team, CCEP has focused on defining an initial list of feasible industrial projects with low implementation barriers and high environmental impacts to be executed throughout year three.

2.2 ACTIVITY SUMMARY BY WORK STREAM

2.2.1 Work Stream 1.1: Renewable energy planning, policy and project evaluation and development methodologies.

Significant progress was made by CCEP under this work stream by advancing and completing various activities as described below:

- Development of Departmental Sustainable Rural Energization Plans (PERS). Efforts during this year were focused on refining, submitting and socializing final versions of the PERS methodology, results, databases and socio-economic/energy diagnoses. PERS partners particularly focused on achieving financial support to guarantee sustainability for the 13 RE projects structured through PERS, and investment budgets of USD \$3M were obtained for implementation of some of them during 2014.

CCEP also provided technical assistance and logistical support for the implementation of the PERS projects in Guajira and Tolima. Specific details on work accomplished this year are presented in Table 1 and presented as a success story in section 7.1.

- RE resource, technology and economic cost evaluation tools. In January 2014, CCEP finalized the consultancy contracted through the company WESTEVA S.A.S to support CREG in the design of a better focalized ZNI tariff methodology resolution. Through this consultancy, CCEP delivered to CREG high resolution RE (solar and wind) resource mapping across the national territory, analyzed the levelized costs of providing a 24-hour energy service with different technological configurations in 4 ZNI scenarios (microsites, small villages, large villages and municipalities), and recommended hybrid solutions as the most economic and viable option for most ZNI localities. The results presented also raised CREG’s awareness of the need to revise its 18.9% discount rates, which strongly biased diesel participation in stand-alone or hybrid solutions. The methodology under public consultation in CREG’s website adopts a 6% discount rate, which will encourage more RE participation in off-grid power systems.
- RE project screening and evaluation tools (Homer, RetScreen, others). CCEP helped to move forward understanding and local use of RE evaluation tools within the Colombian context which will facilitate analysis and adoption of RE solutions including hybrid systems in off-grid areas. This was accomplished in part by the application of these tools by CCEP teams in projects under development with GOC and private energy company partners, and in part through formal training events co-sponsored by CCEP. Stemming from the ZNI tariff consultancy for CREG, CCEP identified the need to provide formal training in the HOMER energy modeling software used by WESTEVA, in order to facilitate and assure the integration and usage of the RE mapping information and data layers. In June CCEP co-sponsored the 4-days training workshop “Introduction to Modeling Colombian Non-Interconnected Zones with the HOMER Modeling Software” attended by more than 20 staff members from MME, UPME, CREG, IPSE and CCEP itself. The workshop was led by RE experts John Glassmire (Senior Engineer at HOMER Energy, LLC) and Ken Westrick (WESTEVA’s CEO), and was focused on: familiarizing participants with the HOMER interface; running simulations for small and large-scaled systems; and modeling Colombia’s ZNI specific case-scenarios using data from some of CCEP/IPSE off-grid current and possible project locations, such as the Arusi-Termalea-Partado (Choco), and a hybrid (solar-diesel) project for the municipality of Caruru (Vaupes).). In addition, CCEP sponsored training on Homer and RE project formulation methodologies by UPME modeling expert Liset Chaves to the PERS Guajira and Tolima teams.

Table 1 Accomplishments regarding: Development of Departmental Sustainable Rural Energization Plans (PERS)

Sub-activity	Progress / accomplishment
Sustainable Rural Energization Plan for the Department of Nariño 2013-2030 – PERS Nariño (Association Agreement No. 110-2012)	<ul style="list-style-type: none"> • CCEP, UPME, IPSE and UDENAR finalized the design of this 17-year rural sustainable development plan • Completed 3,187 surveys in the 13 administrative sub-regions of the department • Refined, submitted and socialized final versions of the PERS methodology, results, databases and socio-economic/energy diagnoses, and particularly, in achieving financial support to guarantee sustainability for the 13 RE projects structured through PERS.

Sub-activity	Progress / accomplishment
Sustainable Rural Energization Plan for the Department of Tolima 2013-2030 – PERS Tolima (Association Agreement No. 0001 -2013)	<ul style="list-style-type: none"> • Signed PERS Tolima inter-institutional agreement on October 2013 (CCEP, UPME, University of Tolima, the Governorship of Tolima and SENA) • Completed first phase of the project (from December 2013 to March 2014) including setting up the PERS team, approving initial work schedules and designing and adjusting data collection instruments based on lessons learned and technical expertise transferred from PERS Nariño staff. • CCEP / UPME addressed and removed administrative barriers that caused initial delays due to administrative problems with the University of Tolima. • As a result all rural and urban surveys were finalized on August 22nd including 1,830 surveys gathered from households, commercial and industrial/institutional establishments located in 17 municipalities of the department • CCEP started survey processing and analyzing primary and secondary data for the design of RE projects.
Sustainable Rural Energization Plan for the Department of Guajira 2013-2030 – PERS Guajira (Association Agreement signed November 8, 2013)	<ul style="list-style-type: none"> • Signed inter-institutional agreement for the design of a sustainable rural energization plan for the department of La Guajira (CCEP, UPME, Chancellery, SENA and CORPOGUAJIRA) • Completed initial phase including gathering secondary data and performing GIS training activities • CCEP / UPME addressed and removed administrative barriers that caused initial delays due to bans imposed by “Ley de Garantias” under which funds initially allocated by the GOC for PERS were reassigned to other projects, and CCEP had to adjust its own budgetary commitment through the Incentive Fund mechanism to purchase necessary equipment. • Completed field visits to 15 municipalities to select survey routes and coordinate fieldwork logistics and performed pilot tests in three localities of the department (April to May). • Postponed the implementation of final survey questionnaires due to new bottlenecks in guaranteeing travel costs and finalizing contractual arrangements for survey personnel.

2.2.2 Work Stream 1.2 RE Resource assessment mapping and technological tools for information management.

a. GIS support – regional scale

CCEP actively participated in establishing the methodologies and geo-referenced datasets for rural energy planning and project design in the framework of PERS. In PERS Nariño, geo-referenced surveys were incorporated in an interactive GIS system integrated by an ArcGIS platform and a GIS online visor available (by copying this link into explorer <http://sipersn.udenar.edu.co:90/sipersn/>) that displays information gathered during field work and incorporated from previously existing data layers. This system contains key information for energy policy planning such as: the department’s municipalities, populated centers, distribution network, transportation infrastructure, hydric resources, and location of ethnic communities, among others. Based on these inputs, CCEP is supporting technology transfer from PERS Nariño to Tolima and Guajira PERS implementers in developing their own geo-referenced information systems.

b. GIS support – national scale

The main highlight within this activity was the construction between CCEP and UPME of the unified geodatabase “UPME Population Centers” to support UPME’s energy planning and information management capacities, particularly in the context of the Indicative (Electricity) Coverage Expansion Plan (PIEC 2013-2017). CCEP coordinated the integration of a database including 18,479 geo-referenced points integrating and improving DANE, IPSE and UPME localities by common geographic coordinates and focusing on electricity coverage in underserved sites as well as attributes indicating types of populations, degree of dispersion, dates and degree of reliability of the information, etc. During this year CCEP delivered to UPME under this activity the following products: geographic databases for personal and corporative applications; ArcGIS data diagram manager; xml information exchange schemes; and the supporting document “Aproximación al Diseño Conceptual de la Capa de Información de ‘Centros Poblados UPME”, which explains the methodology and conceptual framework used to construct the geodatabase.

2.2.3 Work Stream 1.3 Technical assistance in achieving, complementing and monitoring PROURE energy efficiency targets

a. Technical Support to UPME on PROURE EE & RE targets, impacts and MRV.

CCEP focused during this year on evaluating advances and limitations in UPME’s 2010-2015 Indicative Action Plan (PAI) for the Program of Rational and Efficient Use of Energy and Other Forms of Non-Conventional Energy (PROURE), and supporting the design of the next Indicative Action Plan (2015-2020).

CCEP designed and launched a nation-wide on-line survey targeted at gaining insight into the perceived impact of the PAI-PROURE 2010-2015 from several policy, academic, business and other energy-related sectors, and delivered the following two documents to UPME: “Seguimiento al Plan de Acción Indicativo del PROURE (PAI-PROURE)” and “Evaluación del Estado Actual de la Eficiencia Energética en Colombia en el Marco del Plan de Acción Indicativo del PROURE (PAI-PROURE)”. In these documents, CCEP spotlights the results of the survey applied from October to November 2013 to more than 320 respondents, proposes monitoring and evaluation schemes of the PAI-PROURE 2010-2015 energy efficiency goals by sub-programs and sectors, and underscores guidelines and recommendations for the design of PAI-PROURE 2015-2020.

Regarding the activity associated with the next PAI (2015-2020), UPME requested technical support to expand PROURE actions to two critical sectors excluded from the original PAI despite their importance in the national energy balance. In response, CCEP hired a senior energy specialist to develop the components of energy efficiency in the transportation sector and an energy modeler to develop the components associated with efficient use of natural gas. Through these consultancies, CCEP finalized a study on the “Definition and Analysis of the Technological Drivers that Determine the Evolution of Natural Gas Demand” and assisted UPME in analyzing the potential of natural gas consumption reduction and defining alternative demand scenarios to be included in the Natural Gas Supply Plan and the PAI-PROURE 2015-2020. Additionally, CCEP’s new senior energy specialist has been providing ongoing advice to UPME in the definition of EE goals for the transport sector by projecting long-term planning models based on the introduction of clean energy technologies in the automotive cargo and transportation fleets.

2.2.4 Work Stream 1.4 Support in establishing financial mechanisms for EE/RE investments in industrial, commercial or other strategic sectors

a. Definition of financial mechanisms for EE/RE investment

During this year, CCEP moved forward with specific activities for achieving full implementation of the PPF operational unit during the next fiscal year as listed below:

- Achieved institutional and financial support from the GOC
- Drafted legal and contractual documentation
- Accelerated the identification of EE projects eligible for engineering and financial structuring via the PPF mechanism in the in the industrial sector

The most important 2014 CCEP achievement was the signature of an inter-institutional agreement with UPME in February, entailing joint responsibilities and actions for the promotion and initial implementation of this mechanism as a transitional operational unit that could evolve to form part of a larger national energy efficiency agency expected to be created by the GOC through the next National Development Plan.

As a result of this agreement with CCEP, UPME announced in August its decision to endow the PPF with approximately USD \$311,000, to be allocated and executed before the end of 2014, for which purpose the two parties completed and signed in September “Association Agreement No. CV-006 of 2014,” establishing general guidelines for PPF management and defining the contractual mechanisms and operational phases for the disbursement and execution of PPF funds. In parallel to legal and administrative designs, CCEP and UPME developed a pipeline of eligible EE/RE projects requiring technical and financial structuring with interested industrial and engineering companies.

2.2.5 Work Stream 1.5 Support in overcoming regulatory and financial barriers to EE/RE power generation and distribution

a. The new RE/EE Law.

CCEP contributed to the successful approval of the new Renewable Energy and Energy Efficiency Law (Law 1715 of 2014). The final Law incorporated recommendations made by UPME and CCEP to overcome the partial veto imposed by the Ministries of Mines and Energy and Finance and Public Credit objecting the inclusion and promotion of shale gas and liquefied petroleum gas within a law initially devised to exclusively promote clean generation. This veto occurred at a critical point because all required congressional approvals and requirements had been completed and years of work could had been lost if a resolution was not achieved¹. CCEP and UPME, after a comprehensive review and internal discussion, recommended avoiding further gridlocks by excluding all mention of LPG and shale gas throughout the bill, but not attempting to modify anything else lest the final law fail to pass constitutional review. The final

¹ The bill was presented in Congress in August 2012 and approved after eight debates by the Senate and the House of Representatives in December 2013. Additional congressional discussions were deferred for March 2014, and a special committee was named in Congress to take a stance on the Executive’s partial veto.

text incorporated CCEP's recommendations and was approved and signed by president Santos and responsible ministers and heads of GOC departments on May 13th 2014.

CCEP immediately received requests from key GOC energy agencies responsible for implementing the reforms and regulatory developments called for by this new law. This has led to direct support from our Program in three spheres:

- 1) MME submitted a consultancy proposal requesting CCEP's technical and institutional assistance in the modernization and unification of the illumination and public lighting regulation (RETILAP). Through this consultancy, CCEP assist in constructing and analyzing a comprehensive inventory of previous modifications to the rule in order to propose a final and improved upgrade.
- 2) MME also submitted a consultancy proposal to develop the regulatory decree for the feeding and sale of surplus power from RE self- and co-generators to the distribution grids. This critical consultancy will focus on defining technical requirements and parameters for the operation of small-scaled solar, wind and hydro generators, setting the maximum power limit and guaranteeing the stability and quality standards of the energy fed into the national grid.
- 3) CCEP is also involved with IPSE in the design of an "Energization Plan for the Non-Connected Zones" (PEZNI), a document to be structured as an expansion of our current MoU and incorporated within the Law's regulatory decrees. The plan seeks to frame IPSE's rural energization strategies and goals within a wider normative and regulatory context, including the new RE/EE Law, the National Development and Energy Plans, UPME's Indicative (Electricity) Coverage Expansion Plan – PIEC, PROURE, PERS, CREG's off-grid tariff methodology resolution and others, and sets forth an Improvement and Expansion Plan through which IPSE will define and prioritize investments for energy generation, distribution and commercialization projects in the ZNI over the coming five to seven years..

Box 1 New Renewable Energy and Energy Efficiency Law

On May 13th 2014, President Juan Manuel Santos signed the new Renewable Energy and Energy Efficiency Law (Law 1715 of 2014), which promotes and regulates the integration of clean energies in the National Energy System.

The enactment of this Law is a huge step in the transformation of Colombia's institutional framework and the promotion of economic incentives needed to stimulate private sector investment in clean energy projects. The Law also enables the sale of surplus power to the network by self- and co-generators, the development of smart grids and net metering and the gradual substitution of diesel generation in off-grid areas with renewable energy.

USAID played a critical role in the passing of this Law through its continued technical support of key GoC stakeholders directly involved, such as its work with the Power and Gas Regulatory Commission (CREG) towards including renewable energy sources and reducing diesel generation dependency in the new electricity tariff methodology for off-grid areas and providing direct assistance to the Colombia's Mining and Energy Planning Unit (UPME) in adjusting the technical formulation and assuring a successful rollout of the Law in Congress and the different Executive branch agencies involved. Additionally, to guarantee the effective implementation of the Law, USAID is providing further support and technical assistance to the Ministry of Mines and Energy and its agencies in the development of regulatory decrees.

b. Technical support to GOC regarding ZNI tariffs and subsidies

CCEP completed support and submitted to CREG technical inputs which were used in drafting the regulation officially issued by CREG (Resolution 004 of 2014) for public consultation along with its supporting regulatory framework (technical document 002 of 2014). Compared to the previous methodology (091 of 2007), this resolution includes new and attractive incentive schemes and regulations adapted to the particularities of energy generation, distribution and commercialization activities in the off-grid zones. The resolution also resonates with the objectives stipulated in the new RE/EE Law aimed at achieving gradual substitution of diesel dependency in the country's off-grid areas.

Box 2 Main changes to off-grid tariffs regulation – CREG Resolution 004 of 2014

1. It expands subsidy schemes, which were primarily directed at diesel fuel, in order to promote the creation of economic incentives for energy generation with clean sources such as solar, biomass, hydro, etc., thus balancing competitiveness between clean energy sources and fossil fuels.
2. It promotes incorporation of energy efficiency standards and practices, by rewarding the implementation of plans for the reduction of non-technical losses in energy distribution and commercialization activities, and remunerating the provision of reliable and timely information by suppliers to support the GOC's monitoring purposes.
3. It remunerates kilowatt-hours generated instead of capacity installed, modifies diesel discount rates used in the previous tariff scheme (now established at 6%), and takes into account all transportation, operation and maintenance costs associated with providing energy from supply centers to end-users, creating a methodology much more attuned to the rural, off-grid context.
4. Most importantly, the methodology to calculate reference costs for energy generation in the ZNI, takes as a model the hybrid solar-diesel scheme, which was recommended and constructed with information and data submitted by CCEP's RE mapping and economic cost valuation consultancy.

CCEP's work specifically focused on the Levelized Cost of Energy (LCOE) for solar, wind and hybrid solutions to supplement the diesel systems currently included in the ZNI tariff scheme. CCEP technical inputs delivered included all datasets containing the LCOE as well as interactive geographical data of wind and solar resources covering the whole country. Resolution 004 of 2014 has a strategic value because it establishes regionally focalized energy tariff methodology for the Non Connected Zones (ZNI). A brief description of some of the most important changes introduced by the new off-grid tariffs regulation is presented in Box 2.

c. Transaction support to development of large scale RE power generation projects for the National Interconnected System (SIN)²

During our second year, CCEP facilitated private energy sector initiatives to develop large scale wind, biomass or hybrid power generation projects for the national grid with interested investors and international finance institutions. Specifically, CCEP was instrumental in initiating project identification by Enel Green Power and a 30,000-hectare forest plantation for a hybrid biomass/solar generation project in

² Transaction support refers to the advisory assistance provided to drive increased investment in renewable energy by helping investors identify worthy deals, making the right investment decisions (securing required returns) and managing commercial, regulatory and government risks.

La Primavera, Vichada. Initially conceived as a 1 MW plant for this ZNI municipal seat, the technical economic viability of a 10 MW or larger plant is being evaluated to take advantage that IPSE is extending the national grid to this municipality by the end of 2014, and the plant would be able to feed the extra power to the national grid.

Major barriers to project development included not only the existing and foreseeable regulatory climate – which until Law 1715 discouraged development of RE systems above 20 MW – but the lack of transmission lines or transmission projects from prime wind and solar sites such as Upper Guajira to the national interconnected grid. However, during the course of the year the new law was passed and companies such as EPM and CELSIA/EPISA shifted their focus to developing smaller scale pilot hybrid systems to gain experience with the technologies involved and prepare for new developments once it is regulated and market rules stabilize. With these two companies, CCEP ended the second year developing hybrid solar/diesel project designs in its Task 2 pipeline.

d. *Overcome barriers to EE/RE by promoting policies and institutional arrangements through Public Private Alliances.*

CCEP initiated assistance to UPME for the design of a public-private alliance between the National Business Association (ANDI) and the MME. CCEP has been assisting UPME in the design of this public-private alliance as a stepping stone that could lead to the creation of an agency promoting EE investments in the industrial sector. Although the alliance has not been materialized in a formal agreement, it has enabled the creation of a USD \$70M project pipeline with nearly 80 feasible project opportunities, several of which are being evaluated to be co-financed by UPME and CCEP for final technical and financial structuring through the PPF mechanism.

Additionally, CCEP established a partnership with the Bogota Chamber of Commerce (BCC) and its affiliate Environment Business Corporation (CAEM). The purpose of this partnering is to involve private/public sector partners and institutions in the development of high-impact SME energy efficiency projects. BCC and CAEM are two entities with renowned technical expertise in providing clean solutions to the national brick sector. In July, CCEP issued a USD \$539,000 standard grant to CAEM in order to co-finance the project “Energy Efficiency for 20 small and medium sized artisanal brick factories in the departments of Cundinamarca and Boyaca,” to which the participating SMEs have signed commitments to invest USD \$532,000 and CAEM USD \$103,000. Details of this USD \$1,2M initiative and its current state are included in Task 3 activities below.

2.2.6 Work Stream 1.6 Support to GOC’s capacity to develop LEDS process

a. *Continued support to EC-LEDS energy-related consultants, workshops and activities.*

CCEP’s support through this work stream has focused primarily in participating in the following seminars, workshops and activities organized by the EC-LEDS team:

- CCEP presented EE/RE models through PPAs at the EC-LEDS and DNP workshop "Exploring the low-carbon development through public-private partnerships". In this occasion.
- CCEP was invited and contributed to the event “Development and implementation of an evaluation methodology pilot of the co-benefits generated by climate change mitigation actions in Colombia”, organized by EC-LEDS, the Ministry of Environment and Sustainable Development (MADS), the United

Nations Development Program (UNDP), MAPS and the Low Emission Development Capacity Program, with support from USAID and the National Planning Department (DNP).

- At the request of USAID’s MME advisor (Fanny Gomez) and in the context of developing a national NAMA on renewable energy for the ZNI, CCEP also provided methodological input to the consultant team on how to estimate socioeconomic externalities and co-benefits for off-grid communities by assimilating their energy consumption and economic behavior to interconnected communities of otherwise similar environmental, social, climate and cultural patterns.

2.2.7 Work Stream 1.7 Renewable energy and energy efficiency educational, awareness and outreach program.

a. RE and EE educational projects

CCEP made significant progress in the initial construction phase of various components of the renewable energy project for the Bogota Botanical Garden (BBG). As described in detail in Box 3, CCEP made progress in the following fronts:

- CCEP signed a MoU in October 2013 to co-finance the installation of clean energy solutions at the Bogota Botanical Garden. The original work plan included a biomass residue gasification system (40kW), a solar water heating system for the “Tropicario” greenhouse, and an isolated solar water pump for a small interactive fountain at the Pergola exhibit. However, in March 2014, the BBG announced its decision of starting an 18-month remodeling process to replace the old Tropicario with an enhanced and bigger greenhouse. In light of this modification, CCEP and BBG decided to substitute the Tropicario heating component with a 39 solar panel energy system to be interconnected to the grid and reduce the energy consumption on the water pumping system.
- The Garden finished construction of civil works for the biomass gasification area in August 2014, while the gasifier supplier was finishing construction of the two 20 kW units to be shipped from USA to Colombia in October/November.
- CCEP initiated public bidding and installation activities for the solar components to be installed.

Box 3 Progress in implementing renewable energy solution for the Bogotá Botanical Garden

In October 2013, the USAID/Colombia Clean Energy Program signed a Memorandum of Understanding for the implementation of clean energy solutions in the Bogota Botanical Garden Jose Celestino Mutis (BBG). Through this project, CCEP and BBG are co-financing the installation of a 40 kW gasifier system to process residual biomass and supply approximately 30% of the Garden’s total energy demand; 39 solar panels (9.6 kW) to provide energy for the water pumping system in the Garden’s new “Paramo ecosystem”; and an isolated solar water pump for a small interactive fountain at the “Pergola” exhibit.



Construction works of the “area for the transformation and use of residual biomass”

During August 2014, the BBG finalized construction works of the theme area for the “transformation and use of residual biomass”, a space where the gasifier and the solar water pumping system funded by USAID will be placed, including other applications such as compost of mulch not fed into the gasifier and vermiculture. Once this project is completed, a minimum of 600 people who visit the Garden every day and the public at large will be able to observe the feasibility and benefits of incorporating renewable energy solutions within the city. The project will also serve to showcase renewable energy technologies to Colombian policy makers, energy companies, technology suppliers, academic circles, students and USG visitors in a highly visible and idyllic setting in the middle of the capital city.



Finalized “area for the transformation and use of residual biomass”

b. RE and EE heightened awareness and outreach activities

During this year, CCEP hosted and participated in the following national, regional and sub-sectoral workshops and events. Many of CCEP’s interventions have been focused on promoting EE/RE investment opportunities, CCEP’s approach and RE project pipeline in ZNI communities, the PERS methodology and results as well as generating awareness on the expected impacts of the new Law.

- CCEP presented EE/RE models through PPAs at the workshop "Exploring the low-carbon development through public-private partnerships", organized by EC-LEDS and DNP.
- CCEP attended IPSE Symposium on ZNI projects.
- CCEP presented the program’s projects as well as experience with RE systems in rural settings during the workshop on "Social prosperity with renewable energy" organized by SENA Guajira.
- CCEP presented its portfolio of current and proposed projects in Choco at the ZNI Mayor’s forum on “Energy solutions, quality of life and governance”, organized by IPSE and the Federation of Colombian Municipalities.
- “Regional Workshop on Sustainable Biomass Production in Latin America”, organized by the Ministry of Agriculture and the NL Agency from Netherlands.
- Workshop: “Towards the participation of non-conventional renewable energy in the Colombian market”, organized by UPME and the Inter-American Development Bank to announce results of joint studies on geothermal and wind energy potential.
- Workshop organized by BFL Energy Services to discuss technological advances and investment opportunities for the promotion of Small Hydro Plants in Colombia.
- Workshop organized by UPME and ANDI to announce their agreement to analyze joint action towards establishing an energy efficiency agency or public private alliance, as well as back the development of a portfolio of EE/RE investment projects by large industrial power and gas consumers.
- “Development and implementation of an evaluation methodology pilot of the co-benefits generated by climate change mitigation actions in Colombia”, organized by EC-LEDS, MADS, UNDP, MAPS and the Low Emission Development Capacity Program, with support from USAID and DNP.

Figure 11 SENA Alternative Energy Forum October 17-18, 2013 – Announcement of PERS Guajira



Figure 12 Homer training workshop June 9-12, 2014

- Cycle of workshops in Cali, Medellin and Barranquilla, organized by the partnering ESCO MGM Energy Services with support from CCEP and KfW to present and promote the ESCO model in Colombia.
- CCEP hosted the workshop “Introduction to Modeling Colombian Non Connected Zones with the HOMER Modeling Software”, organized by CCEP and UPME with co-sponsorship from the IADB.



- “First National Workshop to Promote the Exchange of Experiences towards the Construction of a National Wood-Fuel Base Line”, organized by UPME.
- Regional Integration Forums in Choco and Valle del Cauca to promote the new RE/EE Law, organized by IPSE.
- “Lanzamiento de la Ley de Energías Renovables 1715 de 2014”, organized by the GOC with support from the Inter-American Development Bank (IADB) and the Financial Institution for Development (FINDETER).
- “Jornada de Encuentro 20 Años”, organized to commemorate UPME’s 20th anniversary.



Figure 13 August 5, 2014. Launching the Renewable Energy Law. From left to right: Jose David Name (senator and author of the Law; Jose Maria Figueres (CEO of Carbon War Room); Amylkar Acosta (Minister of Mines and Energy); Luz Helena Sarmiento (Minister of Enviro

3. TASK 2: EXPANDING ACCESS TO RENEWABLE ENERGY SOURCES IN CURRENTLY UNSERVED AREAS

3.1 HIGHLIGHTS

During the second year under this component, CCEP focused its main efforts on three fronts:

- 1) Achieving the financial closure, budgetary commitments environmental and social consultation permits necessary for implementation of the community level renewable energy projects designed with co-sponsorship from GOC entities during the first year;
- 2) Seeking partnerships for additional off-grid RE projects with private sector foundations and energy companies with social responsibility or other long-term community development interests in regions of focus, such as Pacific coast, Sierra Nevada de Santa Marta and La Guajira.
- 3) Shifting focus to the identification, design and development of larger-impact projects targeting greater numbers of beneficiaries in ZNI municipal seats or other populations, which was in line with the strategic realignment and contract modification approved in January 2014 to benefit 16,000 off-grid rural inhabitants instead of 80 communities.

CCEP advanced its co-financing strategy by reaching financial closure and budgetary commitments and contracts from GOC agencies. GOC resources totaling USD \$1.8M were assured for the following six projects previously fully designed projects: Arusi-Partado-Termale, Utria, Palmor, Bunkwimake, El Yucal and Santa Rosa. Out of these projects Utria and Santa Rosa were completed and delivered. However, it took much effort on the part of the technical teams involved, particularly CCEP and IPSE, to put pressure on public funding administrators to complete contractor bidding processes and adjudicate GOC contracts for its share of funding for the Arusi-Partado-Termale project and the Palmor project. In the case of El Yucal, the final forest license was issued only in late August and contractor bidding process was initiated. In the case of Bunkwimake a solution to the requirements for an environmental license is in the hands of the GOC and the community and CCEP has put this project on a stand-by while the GOC resolves this matter.

Regarding new partnerships, the most important ones achieved during this year are the following:

- Partnership with Fundacion Cerrejon. In September 2014 CCEP reached a grant agreement with Fundacion Cerrejon Guajira Indigena (FCGI) to install solar, manual and bicycle pumps in wells and dams to improve access to water for about of 2,500 beneficiaries and thousands of livestock in over 30 indigenous Wayuu communities in the department of La Guajira.
- Partnerships with environmental authority CVC and private power company CELSIA/EPSA. CCEP reached an agreement to implement RE projects and hybrid solar/diesel systems in indigenous and Afro-Colombian communities in the Pacific coast of the department of Valle del Cauca, where CCEP also finalized design for a solar refrigeration system for fishing cooperative PIMPESCA being strengthened through USAID's BIOREDD+ project.

Regarding the development of larger impact projects, CCEP engaged EPM in the engineering designs and financial structuring of hybrid solar/diesel systems for the ZNI municipal seats of Bojaya and Vigia del Fuerte, with joint populations of approximately 4,000 inhabitants. In parallel to these designs, efforts on the part of EPM, Governorship of Antioquia, IPSE and Ministry of Mines and Energy were under way to

include these projects in the next national development plan and obtain the financial resources required for implementation.

3.2 ACTIVITY SUMMARY BY WORK STREAM

3.2.1 Work Stream 2.1: Cost analysis of renewable and hybrid options

a. *Cost analysis models*

For all the Task 2 micro-level projects under implementation or design phases, CCEP has compiled dozens of commercial quotes, nationally and internationally, on the different components of renewable and hybrid systems – such as solar batteries of different brands, lifetimes and technical specifications –, leading to up-to-date “Unit Price Analysis (APU)” spreadsheets and unit cost databases. A similar cost compilation of unitary components was carried out by CREG and WESTEVA for the ZNI macro-level tariff methodology discussed in Task 1.

A common ground for the macro level efforts and the micro level project cost analysis of renewable and hybrid options has been the use of the HOMER model, developed by Homer Energy, LLC, of Boulder, Colorado, which by the end of year two had become the standard modeling tool used by CCEP, and increasingly by its partner teams, in analyzing different configurations of renewable and hybrid systems for each particular case. During year two, CCEP’s technical RE team not only adopted the use of this tool to its fullest extent for these purposes, but through both formal training (see Task 1) and on-the-job work sessions with counterpart teams at EPM, CELSIA/EPSA and IPSE.

3.2.2 Work Stream 2.2: Project identification, implementation and sustainability

The specific achievements by project are summarized below grouped by geographic location.

a. *Department of Choco*

Utria National Park- CCEP finalized the installation and delivery of solar photovoltaic systems for the generation of clean energy at the Utria National Natural Park (Bahia Solano, Choco). This was the first project to be completed within our agreement with IPSE to co-finance and implement sustainable renewable energy solutions.

Thanks to this project, CCEP has provided a reliable energy infrastructure with reduced operational and maintenance costs, fostering energy efficient practices and supporting the park’s administrative staff and

Box 4 Details on project completed at Utria National Park (Choco)

CCEP installed and handed over the following components: photovoltaic systems to provide LED illumination in 3 tourist bungalows and 1 administrative bungalow for Unidad de Parques; two photovoltaic systems for LED illumination in the Auditorium and the Interpretation Center; two solar refrigeration systems to ensure proper food conservation in restaurant facilities; and the optimization of the park’s telecommunications infrastructure through the refurbishment of a damaged solar system.

the NGO Mano Cambiada in their endeavor to stimulate ecotourism in the region. Additional details on the main componets delivered are described in Box 4 and presented as a success story in section 7.2.

Communities Arusi, Termales, Partado_ During this second year, CCEP signed contract with wining engineering contractor to carry-out construction of this 100 kW MCP project. In order to achieve this, CCEP completed and submitted this year all project design and bidding documents associated with the development of this project. CCEP also pushed for a resolution and helped to move forward a complicated

bidding process to achieve a successful engagement of a contractor which culminated with the signature of the contract with the engineering contractor. Additional details on progress made are described in Box 5.

Box 5 Details on project progress at Arusi, Termales, Partado (Choco)

CCEP completed project studies and budget details and all environmental requirements were obtained. However, the implementation of this project was delayed due to impasses in finding a suitable contractor for the construction of the MHP. Two public bidding processes were launched by FONADE – the agency responsible for managing GOC funds from DPS and IPSE–, one in December 2013 and the other on January 2014, but both of them were declared void. After several meetings with implementing partners and engineering bidders, the parties started analyzing the possibility of performing a direct contracting procedure to be carried out after Ley de Garantías. In June, CCEP was informed by FONADE that DPS would commit additional public funding to cover the additional costs identified in this phase of negotiations for the construction and installation of the Micro Hydro Plant (over COLP \$400M or USD 200,000), and in August, FONADE finally signed the USD \$1M contract for the implementation of the GOC component of this MHP project. The project was socialized in Arusi on September 25th in a meeting attended by CCEP, DPS, IPSE, FONADE, the engineering contractor (Consortio Arusi), the engineering auditor company and the beneficiary community. Construction is expected to be completed in six months according to contract

Community of El Yucal- In September 2014, CCEP signed contract with wining consortium (engineering contractor) to carry-out construction of the project. In order to achieve this CCEP had removed a significant road block associated with the issuance of a forestry permit originally caused by an unexpected landownership issue affecting a portion of the land designated for the project location. Issuance of this forestry permit allowed CCEP to select the winning contractor that signed its contract in September 2014. As part of this process CCEP started and completed the bidding and selection process of the engineering contractor that will carry-out actual construction of the project. CCEP efforts to successfully remove this roadblock have paved the way to move quickly to the construction phase of this RE project that will benefit about 450 people in this indigenous community. As

Box 6 Details on Yucal roadblocks resolution (Choco)

After CCEP had completed and issued the Terms of Reference for public bidding and execution of this MHP project, the local environmental authority detected that the project site was circumscribed within a territory officially held by the Afro-Colombian Community Council of Los Riscales. As a result difficulties arose in certifying part of the land ownership to the beneficiary indigenous community of Rio Pangui, thus delaying issuance of the required forestry permit by the Regional Environmental Authority of Choco (CODECHOCO). After a failed attempt to solve the impasse by using an internal agreement in which the Afro-Colombian community had agreed to cede in bailment the use of the land in question, a final solution was reached by CCEP, IPSE, the director and technical/legal staff of CODECHOCO and involved ethnic authorities, who drafted a new agreement in which the legal indigenous representative of Rio Pangui handed over the continuation of the forest permit process to the Afro-Colombian Community Council, legally entitled to deal with environmental procedures for this project site. Based on this document, CODECHOCO finally issued the Resolution 1167/14 in August, granting the long expected forestry permit and allowing CCEP to resume halted bidding activities. It is expected that that the project will be completed no later than February 2015.

describe in Box 6 CCEP participated in several attempts to find a solution until forestry permit was issued in August 2014 and construction contract was signed in September 2104.

b. Departments of Guajira and Cesar

Fundacion Cerrejon Guajira

Indigena- During this second year, CCEP started-up our project with Fundacion Cerrejon Guajira Indigena (FCGI) to provide RE solutions to indigenous communities located in the municipalities of Riohacha, Manaure and Maicao (middle and upper Guajira). In December 2013, CCEP and FCGI signed the MoU to jointly promote clean energy

projects and support productive activities by these communities. Implementation activities for the water pumping project officially started in July 2014 and are expected to be completed by first quarter 2015.

Thanks to this project, a minimum of 1,500 direct beneficiaries and more than 4,600 indirect beneficiaries from more than 30 Wayuu indigenous communities will be empowered with clean and effective technologies, enabling them to optimize inefficient methods of water extraction as well as to avoid diseases associated to the contamination of hydric resources. Specific details on the systems under construction are included in Box 7.

Sabana de Crespo - During this second year, CCEP reached a final agreement with the Arhuaco indigenous community and the Solar Electric Fund (SELF) for the installation of a hybrid MHP and solar photovoltaic system (1Q 2014). Though the project to be implemented by CCEP is completely designed, the engineering contractor selection process has been delayed due to difficulties in obtaining the water use permits, since the environmental authority CORPOCESAR issued an order to temporarily suspend issuance of new water use permits within its jurisdiction as part of the measures taken to help mitigate possible

Box 7 Details on RE solutions agreed with Funadacion Cerrejon (Guajira)

The agreement with FCGI comprises the installation of solar, manual and bicycle water pumps to provide permanent access to clean water for regular household consumption and agricultural activities, as well as the same type of systems at the foundation's demonstration and training farm. With the active participation of the community, CCEP proposed to install solar systems and storage tanks in communal water wells, rope & washer manual pumps and bicycle pumps in household wells, manual pumps in rain water tanks, and submersible solar pumps in earthen dikes.

Figure 14 This single well provides water to nearly 600 beneficiaries and is scheduled for installation of a solar pump with storage tank system



Box 8 Details on Sabana Crespo efforts to remove roadblocks (Cesar)

The agreement with Arhuaco indigenous community comprises the installation of hybrid 10 kW MHP and 8 kW solar photovoltaic system to provide energy for the town's health center and school and support the operation of the coffee drying "silo" facility. CCEP is to install the MHP and SELF the photovoltaic system. During initial field visits for project formulation, CCEP established that the spot selected by GOC for the construction of the existing water intake for the town's current faulty water distribution system presented several technical and logistical difficulties, and identified a new site downstream with more adequate conditions for the installation of the MHP's water intake. In April the community expressly requested our Program to perform construction works at this new site, but the environmental authority CORPOCESAR recommended CCEP to apply for an expansion of the water intake at the initial upstream location to avoid starting a new environmental process. However this could not be done because in July CORPOCESAR informed CCEP that on June 20th, the entity had issued an order to temporarily suspend issuance of new water use permits within its jurisdiction as part of the measures taken to help mitigate possible environmental impacts caused by El Niño.

environmental impacts caused by El Niño. In September CCEP visited the site with CORPOCESAR’s forest engineer and water use permits engineer and reached agreement with the authority’s director and staff that might spur a decision addressing environmental obstacles to allow CCEP to start implementation of this project early 2015, pending issuance of social consultation waiver by the Ministry of Interior given that the project has been prioritized and requested by the Arhuaco indigenous authorities. Additional details on Sabana Crespo roadblocks which have forced us to put off implementation activities until early 2015 are presented in Box 8.

Figure 15 Depiction of water intake for Sabana de Crespo MHP



c. Department of Magdalena

Department of Magdalena – Palmor – The engineering contractor was selected in September for the refurbishment and expansion of the 23 year-old MHP in the community of Palmor to supply the town’s increasing energy demand. The contractor includes in its consortium the same company that built and installed the original equipment at Palmor and it is expected construction should begin shortly. CCEP successfully reached this stage by completing and delivering to Patrimonio Natural all the final project studies, detailed engineering designs and budget (approved by IPSE and CCEP), technical specifications and Terms of Reference required to carry out the successful public bidding process. It is worth noting the fact that because this project was not a “green field” type of project, it did not require burdensome procedures regarding environmental licenses and Consulta Previa.



Figure 16 The refurbishment and expansion of this MHP will benefit around 2,000 inhabitants of the bustling town of Palmor

Bunkwimake – CCEP made every attempt to resolve the last hurdle before construction phase can be initiated for this 8 kW MHP project which has been affected by an environmental license issue that has

disrupted its implementation. IPSE is currently in charge of reaching a solution to this impasse by the GOC (through the National Environmental Licensing Agency - ANLA). This year CCEP with support from the community and IPSE provided ANLA an exhaustive technical document justifying the selection of the project as the best alternative in terms of expected environmental impacts. ANLA exempted CCEP and IPSE from further study of alternatives, but requested IPSE to complete an Environmental Impact Assessment (EIA) to measure possible impacts of the project in the natural park area where it is located. IPSE took charge of carrying –out the study, but ran into an impasse because of the degree of analysis required by ANLA which is applicable for much larger hydroelectric power plants (above 10 MW, not this 8 kW MHP). IPSE-CCEP requested ANLA to visit Bunkwimake and re-dimension its EIA requirements to the micro scale of the project, and IPSE took charge of reaching a solution to this impasse by the GOC.

d. Department of Valle del Cauca, Public and Private Potential Partners

Santa Rosa de Guayacán - CCEP completed the installation of individual household solar panel installations, solar panel installations for the community school and handicrafts center, modular efficient cook stoves for homes and school, and a wood plot (3ha) to benefit the indigenous community of Santa Rosa de Guayacan as agreed within the framework of the MoU signed with the Indigenous Association for Valle del Cauca (ACIVA) and the Regional Environmental Authority for Valle del Cauca (CVC). Activities are underway to finalize construction of the handicrafts tool shop and installation of all photovoltaic systems before the end of 2014.

Box 9 Clean Energy for the indigenous reserve of Santa Rosa de Guayacan

In alliance with the Autonomous Regional Environmental Authority for Valle del Cauca (CVC) and Asociacion de Cabildos Indigenas del Valle del Cauca (ACIVA), the USAID/Colombia Clean Energy Program is implementing the project “Photovoltaic systems and Biomass Use in the Indigenous Reservation of Santa Rosa de Guayacan, municipality of Buenaventura – Valle del Cauca”. The project comprises the installation of solar energy solutions for households and educational facilities; the implementation of efficient cook stoves for households and the school’s restaurant, to be fed by a 2-hectare biomass crop supply with different timber species; and the construction of a crafts workshop to support local productive activities. Besides providing clean energy solutions for 125 people belonging to the off-grid indigenous community of Wounaan Nona, the biomass component will reduce environmental impacts caused by forest logging. As of September 2014, CCEP completed the installation of the efficient cook stove for the school’s restaurant and the 20 modular cook stoves for households, the implementation of the fuel-wood plot and the construction of the crafts workshop. The solar component is scheduled to finalize by mid-November, and project closure in December.

Additional details on beneficiaries and components of this project are presented in Box 9

EPSA E.S.P- CCEP reached an agreement with CELSIA and Empresa de Energia del Pacifico EPSA S.A. E.S.P. to provide renewable energy solutions to communities located in the lower Calima river basin (municipality of Buenaventura, Valle del Cauca). It took more than a year of discussions on alternative RE systems, beneficiary communities, and budgetary commitments to reach this agreement. Initially, EPSA officials submitted for consideration 32 off-grid communities, but after several site visits and technical meetings, the proposal was narrowed down to the installation of a hybrid solar-diesel system to benefit approximately 140 users (120 households and 20 institutional/commercial users) in the town of Punta Soldado, and 106 individual solar photovoltaic systems for up to 5 smaller communities under consideration (75-150 households). CCEP and EPSA are currently performing social, environmental and energy assessments of the communities selected and expect to start implementation of this this jointly co-financed project on 4Q 2014.

BIOREDD+ Cajambre - CCEP concluded and presented to BIODREDD+ final designs of the solar refrigeration project for the fisheries cooperative PINPESCA in Buenaventura (Valle del Cauca). This project comprises the installation of 32 solar panels and 10 solar freezers supporting a cold chain scheme to gather an estimated production of 500 kg of fish. With support from BIODREDD+, CCEP performed socialization activities and completed the construction of the base line, setting up implementation for 4Q 2014.

Empresas Publicas de Medellin (EPM) - During 2Q 2014, CCEP sealed an alliance with EPM (Colombia’s largest utility group) and moved forward with several technical tasks to support EPM in providing energy solutions to off-grid communities in Antioquia. CCEP in direct coordination with EPM³ established two projects with significant energy and social impacts as the main focus of this alliance:

- The first project involves the neighboring towns of Vigia del Fuerte (Antioquia) and Bojaya (Choco) - In April, EPM contacted CCEP to request support during project’s technical and economic prefeasibility analysis. CCEPs’ Initial assistance was targeted: at refining initial HOMER models projected by EPM, measuring and adjusting power load curves and providing inputs for the final design of the RFP for detailed engineering studies of the hybrid system. Final project designs were contracted by EPM in September and will be completed by December 2014. This year CCEP also initiated a door-to-door household, commercial and institutional census to determine not only beneficiary populations but also current loads and demand patterns. Support will shift in 4Q 2014 and 2015 to aid EPM in developing the project base line and identifying possible national sources to achieve financial closure and project implementation
- The second project involves 18 educational centers belonging Rural Indigenous Educational Institutions Program (CERIs). The project is being fully financed and managed by the Governorship of Antioquia and EPM which requested CCEP assistance in developing the project. Therefore CCEP’s assistance was defined to provide technical and social assistance and training to indigenous teachers and students and adjust technical dimensions of EPM’s solar designs.

Box 10 Details on projects with EPM (Antioquia)

- *Project at Vigia del Fuerte (Antioquia) and Bojaya (Choco)*- It involves the installation of a hybrid solar-diesel project to benefit more than 3,800 people in those two neighboring towns. Although the interconnection of these two towns has been on the GOC agenda since the reconstruction of Bojaya in 2007, this has been found not to be technically, economically or environmentally viable. Despite current efforts undertaken by departmental authorities to improve their social and physical infrastructure, the lack of permanent access to electricity remains one of the key challenges hampering economic and social development of these two ZNI municipal seats.
- *Project with Rural Indigenous Educational Institutions Program (CERIs).* This is a project conceived and financed by the Antioquia Governorship’s Public Utilities and Indigenous Management Office and will be implemented through an association agreement with EPM. The project contemplates a public investment of approximately USD \$388,000 for the installation of solar kits and additional solar components for the educational infrastructure in up to 18 educational centers belonging to the Rural Indigenous Educational Institutions Program (CERIs). Visits were made to the municipalities of Urrao, Chigorodo, Dabeiba, Turbo and Necocli to gather socioeconomic and energy information of beneficiary CERIs. CCEP will provide technical assistance and training as next quarter..

³ Through EPM’s the Research and Development of Energy Business Opportunities division (Subdireccion de Investigacion y Desarrollo de Negocios de Energia)

3.2.3 Work Stream 2.3: Capacity building for rural energy SMEs

Capacity building of rural SME is an activity the CCEP prepares and carries out from the beginning of the definition of the projects, and during implementation and construction of the projects in order to ensure commercial viability and sustainability of rural energy solutions in these generally isolated and poor communities of the ZNI. Emphasis is placed on strengthening technical, managerial and commercialization capacities of local SMEs that will operate and maintain the RE and productive use installations. Capacity building is generally undertaken directly by CCEP's socio-economic team during project design and through specialist consultants or organizations hired to work on site with communities during implementation and construction.

Another area identified for capacity building of rural SMEs' this year was focused on defining partnerships to develop pilot pico-light commercialization scheme amongst farming, indigenous or Afro-Colombian communities in the areas where CCEP has been developing its community projects, such as the Sierra Nevada de Santa Marta (SNSM), La Guajira and the Pacific region. With disperse population in the tens of thousands, cohesive indigenous and farming communities, and interested public, private and community organizations willing to embark on this type of initiative, the SNSM attracted most of CCEP's attention during the year.

For this region, CCEP carried out the following actions:

- CCEP and Hybrytec started discussions in Q2 2014 to define partnership including business model, and conditions for implementing pilot project. CCEP discarded participating in the pilot project formulated due to excessive administrative costs and other technical and logistical issues.
- Hybrytec and the NGO Global Heritage Fund (GHF) re-approached CCEP in August with a more detailed project proposal for the creation of an indigenous-run pico light commercialization program in the Sierra Nevada de Santa Marta. Box 11 presents details on this new proposed program.
- CCEP's participation in this project is still pending the meeting with GHF and Hybrytec to discuss possible financial and technical participation from CCEP.

Box 11 Details on potential partnership to create rural SME

The potential project involves the creation of an indigenous-run pico light commercialization program in the Sierra Nevada de Santa Marta. The project encompasses the design of a business mechanism and payment schemes enabling 5 small rural entrepreneurs to acquire and commercialize 300 pico light systems (solar lamps, 3W solar panels and solar cell chargers), with the purpose of providing easy-to-implement energy and lighting solutions for 300 families in the Kogui-Malayo-Arhuaco corridors of the Buritaca and Don Diego rivers and the Arhuaco zones of Yingaka, Tiguirichama and Sogrome. Regarding local payment capacity, GHF and Hybrytec identified that a typical indigenous household in the SNSM spends about USD \$713 each year in batteries for flashlights, fuel burners and cell phone charges, an investment that could be redirected to cover the costs of the approximately USD \$100 solar solution.

In the framework of ongoing discussions with Arhuaco communities and authorities regarding RE projects (such as Bunkwimake and Sabana de Crespo), inclusion of pico-light components and possible commercialization schemes were validated by their authorities but postponed for year three pending anticipated changes in their governance structure by end of 2014. In the case of Wayuu communities in La Guajira, a pico-light commercialization scheme is under design as part of a potential second phase of the CCEP/FCGI MOU.

3.2.4 Work Stream 2.4: Impact evaluations

During the second year CCEP accompanied and monitored the impacts of the completed San Antonio and Utria projects, completed the Fundacion Cerrejon water pumping project baseline study, and accompanied and assisted communities awaiting project initiation in community organization and participation in the projects. Most projects in the RE pipeline were either still under design or awaiting permits and administrative contracts to initiate implementation.

In order to evaluate the socioeconomic and energy use impact of each RE project, CCEP first establishes a baseline study in order to determine existing living conditions, number of beneficiaries, energy use patterns and productive activities in each community, and then accompanies and monitors changes in these patterns and conditions throughout project implementation and six months after project completion in order to verify whether the changes sought during project formulation were actually accomplished with its execution.

4. TASK 3: ENERGY EFFICIENCY AND RENEWABLE ENERGY INVESTMENT PROMOTION

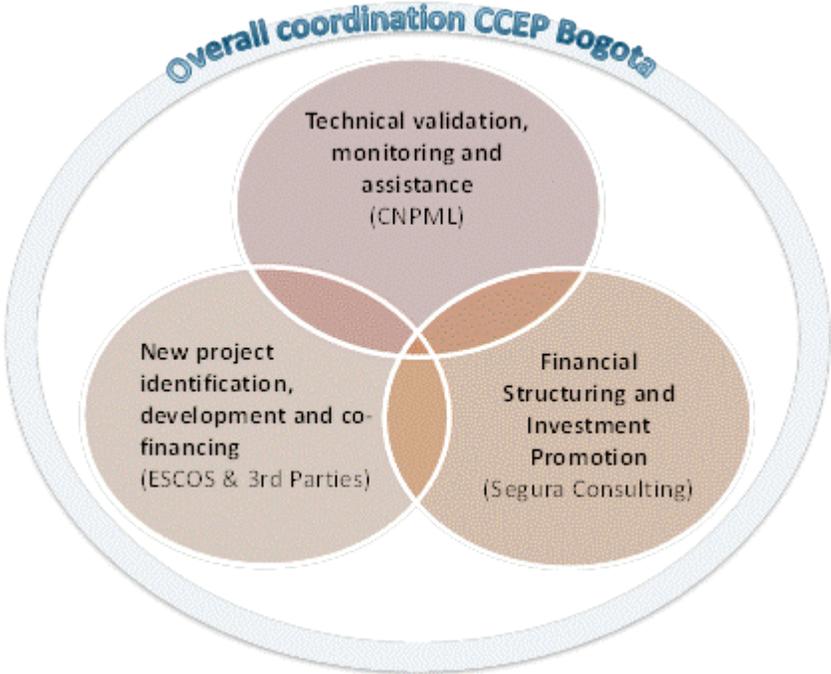
4.1 HIGHLIGHTS

As proposed in our second year work plan, under this component CCEP diversified its approach to project identification and development by expanding on the case by case pipeline which we had developed through direct technical assistance by our Medellin team, to seek new partnerships with potential project developers such as ESCOS, engineering companies, business associations, foundations, etc., as well as strategic partners such as regional environmental authorities pursuing GHG emissions reductions.

CCEP also identified the need for stronger financial structuring and investment promotion services in attracting participation of major industrial and commercial enterprises to invest in energy efficiency, and decided to mobilize the business development services of subcontractor Segura Consulting to complement the engineering expertise of CNPML and participating ESCOS. Thus, the Segura team helped assure top management decisions to undertake EE project designs in glass manufacturer O-I Peldar through MGM Energy Services, Gran Estacion shopping mall through Garper Energy Solutions, brick manufacturer Arcillas de Colombia through CNPML and steel manufacturer ACESCO for the PPF pipeline to begin in year three.

Under the overall coordination of CCEP in Bogota, the roles assumed by each organization in developing Task 3 projects during year two are depicted in Figure 17.

Figure 17 CCEP’s organization for developing Task 3 projects



CCEP’s team at CNPML continued developing individual projects and initiated a 2-year program involving up to 20 industrial companies in the Yumbo industrial corridor in partnership with environmental authority

CVC, and took on the role of monitoring, evaluating and reporting not only on projects in its own pipeline but in ESCO and third party pipelines.

During year two, CCEP's team monitored the energy and environmental performance of the two industrial projects finalized by year 1 (Ladrillera Los Cerros and Helados Tonny), assisted three companies in achieving technical and financial closure and loan approvals by Bancolombia and Banco de Bogota (Ladrillera Sugres, Ladrillera Pueblo Viejo and metallurgical firm IDEA), maintained a one-by-one project development pipeline with several other companies at different stages of formulation and approval processes, and served as technical evaluators, auditors and information system reporters to Task 3 projects developed through third party alliances.

A second line of work by CCEP's team was devoted to establishing alliances for spearheading the Yumbo industrial corridor program in partnership with environmental authority CVC, focusing specifically on reducing CO2 emissions affecting public health in the region. As of September 2014, 37 industries in Yumbo had been convened by CCEP and CVC to participate in the program, 24 confirmed interest, and 17 were considered for carrying out in-depth energy consumption evaluations. Taking this initiative one step further, CCEP signed an agreement with Carvajal Pulpa y Papel, a company focused on the production of paper and pulp from sugarcane bagasse, for the implementation of co-generation and paper dust drying interventions in both its Yumbo and Caloto (Cauca) plants. Projects are also being structured for Comestibles Aldor, Centelsa, Smurfit Kappa Carton de Colombia and Cartones del Valle. In a similar approach, CCEP entered dialogues with Medellin Metropolitan Area Environmental Authority AMVA, to possibly focus joint efforts during our third year on the identification of feasible opportunities for the optimization of thermal and steam systems in boilers for industries of the Aburra Valley, with the option of expanding to other strategic regions.

CCEP also continued to push forward third party initiatives through ESCO partners MGM Energy Services and Garper Energy Solutions, seeking to finalize technical and financial studies and ESCO proposals for projects previously identified. As a result, the ESCO offer presented by MGM was accepted by Colanta to start the residual biogas use project; final engineering studies for PELDAR, Ceramica Italia and Gran Estacion were completed and ESCO offers presented were under negotiation for possible implementation in coming months; and a project is underway with Garper and FENALTIENDAS encompassing detailed energy analysis at 300 small and medium sized stores and commercial establishments in order decrease energy consumption in refrigeration, lighting and other applications in a target of 3,000 of these establishments in Bogota through ESCO contracts.

Figure 18 One of 300 shops being audited by Garper Energy Solutions in alliance with CCEP and Fenalttiendas to develop and implement efficient refrigeration, lighting and other energy savings technologies through ESCO contracts for 3,000 establishments in Bogota



Significant progress was also made in leveraging funds for and assuring implementation of one of CCEP's flagship industrial sector initiatives: the CCEP/CCB/CAEM brick sector project. In this case, 20 beneficiary

brick manufacturers pledged to co-finance part of the endeavor with USD \$531,000, adding up to USD \$538,000 committed by CCEP and \$103,000 by a private sector foundation (CAEM). Once a standard grant agreement was signed with CAEM, which will manage both CCEP and SME counterpart funds, this project began activities in August and will install coal dosification systems in the first three SMEs by December 2014, implementing the rest during 2015. Consolidation, monitoring and dissemination activities will continue through project termination in mid-2016.

Throughout the year, CCEP also consolidated an exhaustive inventory of financial instruments, mechanisms and incentives which will contribute to enhance future project development and implementation.

4.2 ACTIVITY SUMMARY BY WORK STREAM

4.2.1 Work Stream 3.1 -Industrial subsector and/or technology assessment

In order to determine which industrial subsectors and cross-cutting technologies to focus Task 3 project development activities, during its first year CCEP carried out an assessment of the energy consumption, environmental impacts, and economic and social aspects such as contribution to GDP, employment and other factors by all industries – based on available, secondary sources. This assessment, included as an Annex in our second quarterly report (April-June 2012), is summarized in the accompanying graphs

Figure 20 Illustrative summary of the assessment result

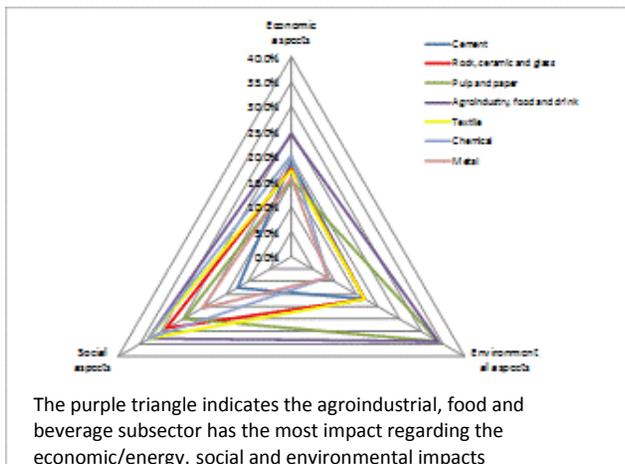
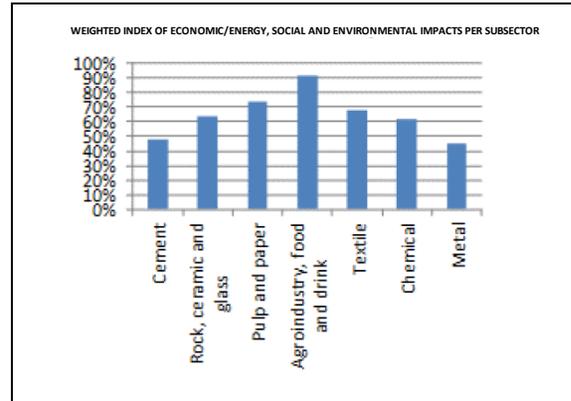


Figure 19 Weighted index of energy consumption, economic, environmental and social aspects by industrial subsector



That assessment led to Task 3's initial priority focus on agroindustrial, food and beverage projects as well as brick manufacturing (part of the rock, ceramics and glass subsector), which were susceptible to direct technical assistance and financial structuring through CCEP's field team and existing credit lines. In terms of cross-cutting technologies, CCEP focused on thermal energy technologies (such as heat recovery systems, cogeneration including combined heat and power, or tri-generation – combined cooling, heat and power systems). As CCEP evolved, larger scale industries such as glass and paper & pulp have been incorporated in our work streams through ESCOS and new instruments such as the PPF and the UPME/ANDI public private alliance.

During the second year, CCEP did not update this assessment pending the results of a series of in-depth industrial energy use studies financed by UPME which, for the first time since the 1990's, would shed light on current, more specific energy use technologies and patterns in key economic subsectors. A study by the "Incombustion" consortium of universities, based on surveys and measurements in over 200 industries in 10 subsectors, was finalized in September, while a similar study undertaken through energy firm CORPOEMA will cover another 10 subsectors by mid-2015. The results of these studies, undertaken as part of the effort to design the next PROURE Action Plan, will be used by CCEP to update and expand the initial subsector and technology assessment during our third year, as well as to detect EE/RE opportunities for implementation under the PPF agreement reached by CCEP with UPME.

4.2.2 Work Stream 3.2 - Identification of target industries/companies and project development

During the second year, CCEP focused primarily on structuring and consolidating technical and financial assistance for projects included in T3 pipeline. Additionally, a thrust of the program was aimed at promoting the creation of two industrial project clusters in Yumbo (Valle del Cauca) and the Aburra Valley (Antioquia), where EE opportunities with significant CO₂e reduction potentials were pinpointed. By end of the reported fiscal year, of the 16 projects under consideration, 3 received financial support from Bancolombia/Banco de Bogota and started implementation activities (brick manufacturers Sugres and Pueblo Viejo and IDEA); 5 were developing technical and financial studies; 3 were in identification phases; and 5 more were discarded due to lack of interest, non-existent financial capacity by beneficiary companies and/or insufficient CO₂e reduction potential. Additionally, CCEP received formal requests from three companies (Granos y Cereales, ACESCO S.A.S., and IMAL S.A.) for the implementation of co-generation and heat recovery projects.

By the end of this fiscal year, the status of project identification and development activities by project pipeline was:

a. Direct assistance on Case by Case Basis

i. Finalized projects – ex post Monitoring and Evaluation

- **Ladrillera Los Cerros.** This project was finalized during 2013. According to ex-post measurements, the project will achieve a reduction of 16,140 tonCO₂e and 48,585 kW/h within its lifespan (10 years).
- **Durango & CIA Helados Tonny.** This project was finalized during 2013. According to ex-post measurements, the project will achieve a reduction of 994.5 tonCO₂e and 4,084 kW/h within its lifespan (10 years).
- **Ladrillera Santa Rita.** This project was finalized during 2013. According to ex-post measurements, the project will achieve a reduction of 37,167 tonCO₂e and 111,845 kW/h within its lifespan (10 years).

b. Second Year Projects under Implementation or Ready to Implement

- **Sugres** This project comprises the replacement of the company's brick beehive kilns with a more efficient tunnel oven, which will optimize productive standards and product quality, reduce furnace cycles and significantly improve working and living conditions. As a result of CCEP's technical and financial assistance through Bancolombia's Green Credit Line, the company received USD \$508,000 and finalized construction works to start initial burning tests of the kiln on July. The total investment leveraged, including company resources, reached USD \$747,000. According to the base line, CCEP estimates a reduction of 3,408 of tCO₂e per year, and expects to reduce mineral coal consumption per finished ton of product from 208k to 60k. In addition, as the project has accomplished a reduction of more than 60% in the consumption of coal per finished product, improvement of the air quality is evident and has been perceived as a major benefit by factory workers.

Figure 21 Sugres brick factory (Supia, Caldas)



- **Pueblo Viejo CCEP** has assisted this company in the installation of an efficient tunnel kiln, targeting a reduction of 2,287 tCO₂e per year. Soil studies showed that the land destined to build the kiln was unstable and required additional civil works to assure terrain adequacy to mount the kiln. These works have already been implemented by the company and is being monitored for a few months to go forth with the new kiln. The project reached financial closure and received pre-approval by the Green Credit Line for USD \$736,666, which will be disbursed once the company finishes terrain adaptation and monitoring activities.
- **IDEA.** CCEP is supporting the company Insumos y Equipos para Fundicion S.A.S. in implementing electric induction furnace instead of the cupola furnace used for metal casting. The project was approved by Banco de Bogota through the Environmental Credit Line mechanism in June, and is awaiting the relocation of the production plant to the municipality of Piedecuesta (Santander). Furnace construction works will start once the new site is adapted.

c. Status of Other Projects

i. Discarded Projects

At different points during the second year, projects actively being designed or pre-approved for credits by the banking system were discarded by CCEP due to lack of progress and commitment by the companies being assisted. Such were the cases of

- **Ladrillera Alcarraza**, which decided to finance the design and construction of a new drier system through another program ("Innpulsa Colombia").
- **American Candy**, discarded because the potential tCO₂e/year reduction did not meet the minimum required by the Program.

- **Ganados y Porcinos.** The developer firm Terrazonet presented final designs of the anaerobic digestion system on March. However, no formal response was received from the company and the initiative was discarded from project pipeline in August.
- **Emcobables.** Despite efforts advanced by CCEP in diagnosing and evaluating project opportunities, no concrete interest was expressed by this company. CCEP decided to exclude the project from pipeline.

ii. Projects under formulation or evaluation

CCEP decided to limit its own project development efforts to a low number of two or three case-by-case projects under consideration by financial allies, primarily because – despite the lengthy processes involved –, to date these are the only projects yielding measureable energy savings and emissions reductions in Task 3. Also, because the companies involved have been pre-filtered by the banking system for financial viability and have requested pre-approval of loans to help finance the resulting investments. Nonetheless, most efforts by the CCEP team were shifted to working on the Yumbo industrial corridor (and spin-offs), other third party alliances and the PPF pipeline.

d. Direct Assistance to Industrial Corridors in Alliance with Environmental Authorities

i. Yumbo Industrial Corridor program with CVC

Within the agreement signed with the Regional Environmental Authority for Valle del Cauca (CVC) and with support from the National Business Association and the Association of SMEs (ACOPÍ), CCEP has accelerated selection of the 20 prospective companies in which to run energy audits for the configuration of the Yumbo industrial corridor program. From project start-up, contacts were established with 37 industries, demonstration of interest was expressed by 24 of them, 5 were discarded, and energy diagnoses were performed in 17, including: Industria Colombiana de Maderas (Inducolma), Diaco S.A., Carvajal Pulpa y Papel, Comestibles Aldor S.A., Cobres de Colombia LTDA, Cables de Energia y Telecomunicaciones S.A. (Centelsa), Cerveceria del Valle S.A., Itacol Alimentos Concentrados, Smurfit Kappa Carton de Colombia, Alimentos Finca S.A., Incineradores Industriales S.A., Cartones del Valle, Cajas Colombianas (CajasCol), and MAC Johnson Controls.

As a result of this identification stage, CCEP has structured and signed an agreement with the paper and pulp production company Carvajal Pulpa y Papel to co-finance and develop engineering studies for a “spin-off” USD \$12-\$15M co-generation project in their Caloto (Cauca) plant – under consideration through ESCO partner MGM Energy Services, – and a paper dust drying project in Yumbo, under consideration for the PPF pipeline. Opportunities were also identified in the confectionery producer Comestibles Aldor S.A. (generation of steam or electricity in the company’s boiler area from biogas produced in the waste water treatment plant), Centelsa (installing high-efficient engines and magnetic induction heating systems to improve the performance of plastic extrusion machines), and Smurfit Kappa Carton de Colombia. Site visits and opportunity identification will continue through 4Q 2014 and 1Q 2015, expecting to complete project formulation by July 2015.

ii. AMVA

A second project cluster is being structured with the Environmental Authority of the Metropolitan Area of the Aburra Valley (AMVA) in Antioquia, focalized in the identification of rapid implementation projects to improve combustion processes in boilers. Based on a list of the top emitters in the region submitted by AMVA, T3 conducted assessments for 16 industries and identified significant fuel consumption reduction

potentials in 5 of them: Colanta Medellin, Estampamos, Nubiola, Balalaika and Tincol. Additionally, CCEP and UPME are planning to expand the scope of this project to include other regions such as Valle del Cauca (in synergy with the Yumbo cluster), focusing interventions in boilers ranging from 200 to 900 BHP. Discussions are underway to promote technical and financial facilitation of this program.

e. *Projects through Third Party Alliances*

i. MGM Energy Services

- **COLANTA.** A business proposal by which MGM Energy Services will build, operate and transfer property of the steam plant under an 8-year energy service contract was sent to the company's board of directors. Colanta accepted in July the USD \$525,000 ESCO offer to start implementation of this residual biogas conditioning project on the next fiscal year. A final contract is expected to be subscribed by November for implementation within 6 months.
- **O-I PELDAR.** The deadline for the completion of financial and technical studies was extended due to requirements by MGM and delays in the identification of suppliers for the heat recovery system. The final proposal for a heat recovery project in glass furnaces and a co-generation project in the company's sand dryer plant was presented by MGM in September, and negotiations on the offer are under way.

ii. Garper Energy

- **Centro Comercial Gran Estacion.** In April, the ESCO Garper Energy Solutions delivered to CCEP the engineering studies and the technical/economic proposal to perform energy diagnoses in the Gran Estacion shopping mall. CCEP analyzed the proposal and recommended to make technical and financial adjustments before requesting investment from the company. Garper has incorporated these recommendations in a modified report delivered to the client, expecting to reach agreement on an energy savings contract in 4Q 2014.
- **Ceramica Italia.** Garper Energy completed engineering studies and financial model for the optimization of thermal-energy systems in this tile producer company. After reviewing the proposal, CCEP and Garper made a technical visit to the company with the purpose of gathering information required for performing an assessment of the company's electric and thermal energy base line. Both parties are evaluating the possibility of reducing emissions and increasing energy efficiency by incorporating generation systems with gas turbines. Garper presented an ESCO contract offer to this firm, expecting to reach agreement on an energy savings contract in 4Q 2014. In a spin-off initiative, CCEP and Ceramica Italia have identified an opportunity and are formulating a heat recovery project to be submitted to the PPF mechanism by November.
- **FENALTIENDAS.** Progress was made this year in leveraging financial support to expand the scope of the Garper/Fenaltiedades/CCEP project for the installation of more efficient refrigeration and illumination equipment in traditional stores and minimarkets in Bogota. Initially planned for 300 individual stores, the project has incorporated several medium-sized supermarket and drugstore chains (Surtimax, Romi, Farmasanitas and Drogas La Rebaja) and has been extended through December 2014 to include implementation in some pilot stores and develop a business model for the implementation of identified EE measures in 3,000 commercial establishments. The project has an annual energy savings potential of over 13 million Kwh, and an estimated reduction of more than 5,000 tons of CO₂e/year.

iii. CAEM

Another key 2014 achievement for our Program was the signature of a MoU with the Bogota Chamber of Commerce (CCB) and the Business Environment Corporation (CAEM) for the implementation of a 2-year project to install clean energy solutions and achieve substantial emission reductions in the Colombian brick sector. Under this USD \$1.17 million initiative, USAID, CCB and CAEM are supporting 20 small and medium scaled artisanal brick factories located in three clusters of Bogota, Cundinamarca and Boyaca (Mochuelo, Patio Bonito and Pantanitos) in the replacement of old coal feeding technologies used in brick beehive kilns with modern and efficient pulverized coal feeding systems. With an estimated reduction potential of approximately 16,700 tons of CO₂e per year, this project will have a powerful environmental impact, improving the air quality and living conditions for 120 factory workers and adjacent communities, and raising awareness among the private/public sectors and brick manufacturers about the importance of taking immediate action to mitigate climate impacts caused by inefficient brick production.

The project is being implemented in four phases. In a preliminary phase, currently under development, USAID and the implementing partners are constructing the base line of the project, by gathering data in each production facility to measure productive volumes and fossil fuel consumption rates. This phase is also focused on collecting information to determine the number of workers and staff to be directly benefited from the solutions installed. The second phase will advance to develop rounds with technology providers and brick manufacturers and install efficient pulverized coal feeding dosifiers in three demonstrative projects (one per selected geographical cluster). Finally, the third and fourth phases will socialize the experiences and results achieved in the three demonstrative projects and will proceed to install equipment and perform training and monitoring activities in the other participating brick industries. The first three dosifiers are scheduled to be implemented by end of 2014, and the rest during 2015.

Figure 22 First poster announcing the CCEP/CAEM/CCB project to optimize combustion in beehive and Hoffman kilns in 20 SME brick manufacturing plants



f. Projects under preparation for technical and financial structuring through the PPF Mechanism

By the end of year three, the first dozen project proposals eligible for funding of detailed engineering and financial designs through the PPF mechanism were being prepared by companies involved in the Yumbo industrial corridor program, the UPME/ANDI and UPME/Incombustion pipelines, the case-by-case pipeline

and our ESCO allies. The following companies, representing a broad spectrum of industrial subsectors and scales of production, were preparing requests for PPF funding for studies to be implemented as of 4Q 2014:

- **Arcillas de Colombia**– This brick manufacturer approved undertaking EE interventions in its plant No. 1, involving the implementation of a heat recovery project and the construction of more efficient brick drying chambers. The company is also participating in the CAEM project.
- **Granos y Cereales.** – In August, Granos y Cereales, owned by the Olimpica business group, delivered a formal request manifesting its interest in the implementation a co-generation project involving the use of rice husk to produce energy for this company and two neighboring industries (Acondesa S.A. and Olimpica S.A.) with high steam and refrigeration needs. According to preliminary assessments, the integration of these three productive plants would achieve a reduction of at least 1,000 tons of CO₂e per year, making this project an attractive opportunity. The mode of implementation and financial facilitation of this project will be defined in 4Q 2014.
- **Acerias de Colombia ACESCO S.A.S** - A formal request was also submitted on September 1st by ACESCO for the development of a project aimed at optimizing the performance of the company's kiln by incorporating heat recovery systems in the combustion of natural gas. The project may be implemented in less than a year and achieve a reduction of approximately 600 tons of CO₂e per year.
- **IMAL S.A.**- Also in September, CCEP was contacted by the company Industrias Metalicas Asociadas (IMAL S.A.), requesting financial support to develop engineering studies and designs for a project involving the optimization of natural gas furnaces used for the production of auto parts.
- **Bavaria S.A.** – Design of a trigeneration system based on absorption technology at its Barranquilla plant.
- **Sidoc S.A.** – Design of a residual heat recovery system from its electric kilns to preheat raw material and reduce electricity consumption.
- **Carvajal Pulpa y Papel S.A.** – Engineering design of biomass residue drying system to optimize co-combustion of coal/biomass to decrease fossil fuel consumption and CO₂ emissions at its Yumbo plant.
- **Ceramica Italia** – Design of a residual heat recovery system to partially or totally feed clay atomizers. This is a separate, spin-off project from the Garper Energy Solutions offer to optimize electricity consumption at the Cucuta plant.
- **MGM Energy Services** – By September, this ESCO had submitted draft agreements to be approved and signed by four companies for the engineering and financial design of specific EE/RE projects, as follows
 - Carvajal Pulpa y Papel – cogeneration plant based on biomass residues in the Caloto plant, a project identified through our Yumbo corridor and the UPME/ANDI alliance.
 - Coltejer – replacement of numerous electric motors with efficient models in its textile plant.
 - Colanta – Second phase of the San Pedro dairy biogas project, requiring four times to the investment to biodigest whey and transform the biogas obtained into several energy services.
 - Colombina – biogas transformation from the water treatment plant of this candy manufacturer.

4.2.3 Work Stream 3.3 Technical and financial facilitation of selected projects

All projects currently under development have been presented to the Green Credit Line or to ESCO funding alternatives, as summarized in the following table. CCEP expects that when the PPF starts operating, projects can benefit from more diverse international fund sources and other banks or international institutions.

Project	Green Credit Line Investments	MGM + Incentive Fund (studies)	Garper Energy + Incentive Fund (studies)
Ladrillera Los Cerros	x		
Durango & CIA Helados Tonny	x		
Ladrillera Santa Rita	x		
Sugres	x		
Pueblo Viejo	x		
IDEA	x		
COLANTA		x	
PELDAR		x	
Centro Comercial Gran Estacion			x
Ceramica Italia			x

4.2.4 Work Stream 3.4 Training, outreach, and advisory services

a. Technical Guides:

CCEP has been working on content definition and development of the technical guides for an efficient use of energy in the brick industry and industrial applications of biogas as a RE source, expected to serve as a technical benchmark for industries, developers and business associations in the promotion of investment in RE projects. Preliminary versions of these guides are being subjected to peer-review examination and will be published and distributed during the next fiscal year.

5. MOVING FORWARD IN SPITE OF CHALLENGES

During the last year, USAID's Colombia Clean Energy Program continued to make headway and radiate positive impact on the viability and sustainability of efficient energy use, renewable energy penetration and climate change mitigation throughout an impressive array of institutional, business and community partners. National agents such as MME, CREG, UPME, IPSE, Chancellery, DPS; regional actors such as governorships, environmental authorities, regional universities and municipalities; private sector foundations, power companies, banks and industries; community organizations such as indigenous and Afro-Colombian authorities (Resguardos Indigenas and Consejos Comunitarios, respectively) or even local community organizations – have heightened awareness, *action and budgets* towards these ends. As evidenced by the national on-line PROURE survey responded by over 300 professionals in government, business and academic circles involved in EE/RE and reported in section 2.2.3, USAID scored highest in recognition of effectiveness among programs and projects in energy efficiency and renewable energy being implemented by international agencies in Colombia, followed by those with longer presence in the field such as the IADB, UNDP, CAF, IFC, SECO and KfW, in that order.

Despite these positive inroads, the challenges faced by CCEP in fielding and culminating transformative clean energy projects are daunting. Simply put, CCEP projects are complex and therefore time consuming, not just because they introduce technologies or practices not yet widespread, but because they involve many different actors, decision-making instances and administrative procedures.

Task 2 field projects focus on isolated, generally impoverished, off-grid communities, often located in areas of strategic environmental importance and inhabited by ethnic groups, commanding special legal rights intended to protect vulnerable populations and ecosystems. These circumstances not only require assuring compliance and obtaining corresponding permits, but taking all kinds of technical, social and administrative measures to assure long-term sustainability of RE solutions installed once CCEP leaves the particular community after completing pre-investment and investment phases. To add to the complexity, CCEP projects promote or include not only RE installations but complementary investments in energy-use technology, equipment or installations to add value and generate additional income streams for operation and maintenance based on local productive activities. In order to ensure sustainability, CCEP has not only sought community involvement and appropriation of RE solutions, but also co-sponsorship from national and regional actors, public or private, committed to achieving development objectives in those communities. And each of these actors has internal administrative procedures which require the scarcest of all resources: time.

Task 3 field projects also face numerous hurdles, since CCEP acts more as a project facilitator or promoter than investor, seeking to convince companies to invest their own resources, obtain bank loans or incur in long-term contracts with ESCOS or other investors. Investment in energy efficiency or renewable energy must compete with often more pressing financial needs or other investment opportunities faced by companies. Another challenge is the complexity of decision making within individual companies, particularly in those larger companies with larger potential impact in terms of energy savings and emissions reduction.

Through hard work and persistence, CCEP has been able to overcome many of these hurdles to the point that by the end of this fiscal year projects worth nearly USD \$10M, with an average leverage of

70%, were under implementation or ready to be implemented during year three. In addition to 11 ZNI projects assured, benefiting 11,000 people, CCEP formalized an alliance with CAEM and 20 participating brick manufacturers to implement technologies to reduce coal consumption by 30% and emissions by nearly 17,000 tCO₂e per year.

Despite all the challenges mentioned, the prospects for accelerating the pace of implementation are great, since at the same time that we were surpassing the obstacles to enable take-off of projects previously formulated, we kept preparing new ones to add to the pipeline during year three – such as 12 proposals by major companies for PPF funding or the hybrid solutions for Punta Soldado with EPSA/CELSIA and Vigia del Fuerte and Bojaya with EPM.

Each project has a life of its own, and will continue to require lots of work and time to materialize and reap impacts. But year two positioned CCEP to do so.

6. PERFORMANCE INDICATOR RESULTS AGAINST TARGETS

In this Chapter we present CCEP's Indicators as detailed in the Performance Management Plan (PMP) and included in MONITOR. The results CCEP achieved for the second program year is shown for the program's indicators. The results show that beginning in third year CCEP is on track to meet its overall goals.

USAID Indicators	Indicator	Unit	Output Target	Year ending sept 2014	Projects input	Total advance since the program started	Projects input
DO4 007	Quantity of greenhouse gas (GHG) emissions, measured in metric tons of CO2 equivalent (CO2e), reduced or sequestered as a result of USG assistance.	Tons of CO2e.	Tons of CO2e reduced or avoided	6375	Ecofuego 806 Cerros 808 Tonny 1017 San Antonio 11,08 Santa Rita 3719 + Santa Rita 926,85 not included during year 2013 Arusi 2,74	7.216	Ecofuego 1210 Cerros 1211 Tonny 135,7 San Antonio 11,08 Santa Rita 4.645,85 Arusi 2,74
4.8.2-28 DO4 005a	Number of laws, policies, agreements and/or regulations addressing clean energy (climate change) drafted as a result of USG assistance	Law, Policy, Agreement	Number of policy initiatives - national level	3	CREG ZNI Tariff Resolution PERS Nariño Ley de EE y RE	4	EE Tax Incentive CREG ZNI Tariff Resolution
Number of policy initiatives - national level			4				PERS Nariño Ley de EE y RE
4.8.2-28 DO4 005b	Number of laws, policies, agreements and/or regulations addressing clean energy (climate change) officially presented to the government as a result of USG assistance	Law, Policy, Agreement	Number of policy initiatives - national level	3	CREG ZNI Tariff Resolution PERS Nariño Ley de EE y RE	4	EE Tax Incentive CREG ZNI Tariff Resolution
Number of policy initiatives - national level			4				PERS Nariño Ley de EE y RE
4.8.2-28 DO4 005c	Number of laws, policies, agreements and/or regulations addressing clean energy (climate change) adopted by the government as a result of USG assistance	Law, Policy, Agreement	Number of policy initiatives - national level	3	CREG ZNI Tariff Resolution PERS Nariño Ley de EE y RE	4	EE Tax Incentive CREG ZNI Tariff Resolution
Number of policy initiatives - national level			4				PERS Nariño Ley de EE y RE
4.8.2-28 DO4 005d	Number of laws, policies, agreements and/or regulations addressing clean energy (climate change) implemented by the Government as a result of USG assistance	Law, Policy, Agreement	Number of policy initiatives - national level	3	CREG ZNI Tariff Resolution PERS Nariño Ley de EE y RE	4	EE Tax Incentive CREG ZNI Tariff Resolution
Number of policy initiatives - national level			4				PERS Nariño Ley de EE y RE
DO4 011	Number of people who now have access to modern energy services as a result of renewable energy technologies through USG assistance.	Person	Number of people	137	Utria 12 Santa Rosa de Guayacan 125	408	San Antonio 271 Utria 12 Santa Rosa de Guayacan 125
4.8.2-14 DO4 004	Number of institutions with improved capacity to address climate change issues as a result of USG assistance	Institution	Institutions PUBLIC SECTOR	4	UDENAR UPME IPSE PNN	4	UDENAR UPME IPSE PNN
Institutions PRIVATE ENTERPRISES			1	Santa Rita	4	Ecofuego Cerros Durango y CIA Santa Rita	
Institutions COMMUNITY GROUPS			2	Mano Cambiada ACIVA	3	Pastoral Social Dibulla Mano Cambiada ACIVA	
DO4 006a	Number of mitigation and/or adaptation tools, technologies and methodologies developed.	Tools	Number of tools, technologies and methodologies	6	PERS Nariño 2 (energy demand surveys and strategic energy plan) Utria 1(Photovoltaic) CREG ZNI 1(levelized cost of energy) HOMER 1(Microgrid software) Santa Rosa 1 (sustainability)	8	San Antonio 2 (Wood stove and Energy Crop) PERS Nariño 2 (energy demand surveys and strategic energy plan) Utria 1(Photovoltaic) CREG ZNI 1(levelized cost of energy) HOMER 1(Microgrid software) Santa Rosa 1 (sustainability)

USAID Indicators	Indicator	Unit	Output Target	Year ending sept 2014	Projects input	Total advance since the program started	Projects input
DO4 006b	Number of mitigation and/or adaptation tools, technologies and methodologies tested.	Tools	Number of tools, technologies and methodologies	6	PERS Nariño 2 (energy demand surveys and strategic energy plan) Utria 1(Photovoltaic) CREG ZNI 1(levelized cost of energy) HOMER 1(Microgrid software) Santa Rosa 1 (sustainability meth)	8	PERS Nariño 2 (energy demand surveys and strategic energy plan) Utria 1(Photovoltaic) CREG ZNI 1(levelized cost of energy) HOMER 1(Microgrid software) Santa Rosa 1 (sustainability) San Antonio 2 (Wood stove and Energy Crop)
DO4 006c	Number of mitigation and/or adaptation tools, technologies and methodologies adopted.	Tools	Number of tools, technologies and methodologies	6	PERS Nariño 2 (energy demand surveys and strategic energy plan) Utria 1(Photovoltaic) CREG ZNI 1(levelized cost of energy) HOMER 1(Microgrid software) Santa Rosa 1 (sustainability meth)	8	PERS Nariño 2 (energy demand surveys and strategic energy plan) Utria 1(Photovoltaic) CREG ZNI 1(levelized cost of energy) HOMER 1(Microgrid software) Santa Rosa 1 (sustainability) San Antonio 2 (Wood stove and Energy Crop)
4.8.2-10	Amount of investment leveraged in U.S. dollars, from private and public sources, projected for climate change as a result of USG assistance.	US Dollars	US Dollars	3.923.931	Colanta 1111 Utria 35492 Arusi 1124773 Santa Rosa 1491 Yucal 197312 Cerrejon 14491 Fenaltindas 59783 OIPeldar 22810 CAEM 635122 HOMER 17484 Ceramica Italia 47632 PERS Tolima 263287 PERS Guajira 370885 Sugres 747010 JBB 205574 Gran estación 42674	6.414.410	Ecofuego Cerros 432096 Tonny 691800 San Antonio 18818 PERS Nariño 528806 Santa Rita 123285 Colanta 1111 Utria 35492 Arusi 1124773 Palmor (inc IP SE Grid adequation) 695674 Santa Rosa 1491 Yucal 197312 Cerrejon 14491 Fenaltindas 59783 OIPeldar 22810 CAEM 635122 HOMER 17484 Ceramica Italia 47632 PERS Tolima 263287 PERS Guajira 370885 Sugres 747010 JBB 205574 Gran estación 42674
DO4 010a							
4.8.2-10	Amount of investment leveraged in U.S. dollars, from private and public sources, executed for climate change as a result of USG assistance.	US Dollars	US Dollars	927.145	PERS Nariño 65251 Santa Rita 124190 Utria 28715 Santa Rosa 1491 HOMER 17329 Sugres 508076 JBB 182093	2.531.882	Ecofuego 216048 Cerro 216048 Tonny 691800 San Antonio 17286 PERS Nariño 528806 Santa Rita 124190 Utria 28715 Santa Rosa 1491 HOMER 17329 Sugres 508076 JBB 182093
DO4 010b							
Custom	Quantity of operational renewable electricity generation as a result of USG assistance, disaggregated by solar, hydro, wind, biomass and mix	Thousands of KWh	Thousand kilowatt-hours equivalent	13,712	San Antonio 10,801693 Utria 2,563 Santa Rosa 0,065 JBB 0,283	20.150	San Antonio 10848.61 Utria 2563 Santa Rosa 6455 JBB 283.68

USAID Indicators	Indicator	Unit	Output Target	Year ending sept 2014	Projects input	Total advance since the program started	Projects input
Custom	Energy saved due to energy efficiency/conservation projects as a result of USG assistance	Thousands of KWh	Tons of Carbon equivalent	344.025	Tonny 33284145 Santa Rita 11184	344.062	Tonny 332878.45 Santa Rita 11184
Custom	Number of workshops and capacity building activities for national, regional and local level public and private institutions	Events	Events	57	San Antonio 8 Tax Incentive 10 PERS Nariño 11 JBB 1 Utria 1 EE seminarios 5 Santa Rosa 16 PERS Tolima 1 PERS Guajira 3 HOMER 1	82	San Antonio 8 Tax Incentive 10 PERS Nariño 11 JBB 1 Utria 1 EE seminarios 30 Santa Rosa 16 PERS Tolima 1 PERS Guajira 3 HOMER 1
Custom	Number of participants attending workshops and capacity building activities as a result of USG assistance	Persons	People	1645	San Antonio 221 Tax Incentive 801 PERS Nariño 84 Utria 6 EE seminarios 224 Santa Rosa 245 PERS Tolima 6 PERS Guajira 36 HOMER 22	2.588	San Antonio 221 Tax Incentive 801 PERS Nariño 84 Utria 6 EE seminarios 1167 Santa Rosa 245 PERS Tolima 6 PERS Guajira 36 HOMER 22
Custom	Number of CCEP pre-investment activities	Activities	Activities	53	San Antonio 3 Tax Incentive 1 PERS Nariño 2 Arusi 4 Bunkwimake 2 Yucal 4 Utria 4 IPSE 1 CREG 1 Santa Rosa 4 Pepitas 4 JBB 2 Palmor 7 Cerreon 4 CAEM 5 Sabana de Crespo 3 PERS Tolima 1 PERS Guajira 1 HOMER 1 PIMPESCA 3	57	San Antonio 3 Tax Incentive 1 PERS Nariño 2 Arusi 4 Bunkwimake 2 Yucal 4 Utria 4 IPSE 1 CREG 1 Santa Rosa 4 Pepitas 4 JBB 2 Palmor 7 Cerreon 4 CAEM 5 Sabana de Crespo 3 PERS Tolima 1 PERS Guajira 1 HOMER 1 PIMPESCA 3
Custom	Number of people gaining employment or better employment as a result of the program.	Persons	People	186	Ecofuego y Cerro 52 Tonny 77 San Antonio 7 Santa Rita 4 Utria 12 Snata Rosa 15 Sugres 21	188	Ecofuego y Cerro 52 Tonny 77 San Antonio 7 Santa Rita 4 Utria 12 Snata Rosa 15 Sugres 21

7. SUCCESS STORIES

7.1 SUSTAINABLE RURAL ENERGIZATION PLAN FOR NARIÑO



CASE STUDY

Sustainable Rural Energization Plan for Nariño

USAID supports the development of sustainable rural energization projects to supply energy needs in Nariño



Thanks to PERS Nariño, rural communities and policy planners have been provided with a public and accurate source of information on the department's socioeconomic composition as well as a detailed account of available energy sources, uses and productive opportunities in each of the 13 sub-regions.

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CHALLENGE Nariño is a predominantly rural department of 1.7 million inhabitants located in southwestern Colombia. With over 50% of its population living in rural and impoverished areas, the department has one of the highest rurality and vulnerability indexes in the country. Like other rural communities in Colombia and Latin America, geographic isolation, weak physical and institutional infrastructure and historically rooted socioeconomic inequalities have made access to electricity and other basic services a pressing and unsolved challenge. Currently, 86% of the rural households are interconnected to the grid. However, the government still faces critical hurdles in guaranteeing a permanent flow of electricity for all connected areas, and providing alternative energy solutions for more than 15,000 households, which remain completely deprived of electricity and are located in zones where interconnection is costly and technically unviable. At the same time, the predominance of wood fuel for cooking and electricity consumption primarily for illumination purposes reveals that available energy sources are not being used to stimulate a sustainable rural development path.

INITIATIVE USAID, working with the Colombia's Mining and Energy Planning Unit (UPME), the Institute for the Planning and Promotion of Energy Solutions for the Non-Connected Zones (IPSE) and an interdisciplinary team from the University of Nariño, supported the design of a 17-year Sustainable Rural Energization Plan (PERS Nariño 2013-2030). This initiative involved the application of geo-referenced surveys in 2,479 rural households, 510 commercial establishments and 198 industries and institutions, which provided key primary information to develop a comprehensive energy and socioeconomic diagnose of the region, establish focalized energy policy guidelines, and propose an innovative methodology for the formulation of economically, technically, environmentally and socially sustainable productive projects involving the use of clean energy sources.

RESULTS Almost immediately after the completion of PERS Nariño, 4 of the 13 productive projects structured and presented by PERS received public funding worth over USD \$3 million for implementation throughout 2014. These projects include a detailed study of clean energy alternatives to benefit 225 families living in off-grid areas with energy coverage below 80%, and the installation of photovoltaic systems, clean refrigeration solutions and public lighting in 6 under-served educational institutions. According to Andres Pantoja, coordinator of the PERS within the University of Nariño, "the immediate success of this strategy is linked to its distinctive methodological approach, which focuses on gathering non-existent and reliable primary data and formulating initiatives with regional impact that incorporate local resources and that are sustainable over time". Precisely, due to PERS Nariño's success, the methodology gained the status of national policy in the Renewable Energy Law approved on May 2014, and other PERS are being replicated in Tolima and La Guajira and planned in Choco, Cundinamarca and Boyaca, as part of a national rural energization strategy for the non-connected zones. Additionally, all project databases and results have been incorporated in the geo-referenced and open platform <http://sipersn.udenar.edu.co:90/sipersn/>, which provides users and policy planners with high quality information, and integrates the department's energy supply with its specific productive opportunities.

7.2 ON THE ROAD TO A CLEANER BRICK PRODUCTION



SUCCESS STORY

On the road to a cleaner brick production



Colombia Clean Energy Program

From left to right: Jorge Mario Diaz (Governance Vice-president of the BCC); Margaret Sullivan (USAID Chief of Staff); Peter Natiello (USAID/Colombia Mission Director)

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On June 5th 2014, USAID signed a Memorandum of Understanding with the Bogota Chamber of Commerce (BCC) and its affiliate, the Environment Business Corporation (CAEM), to promote the adoption of clean technologies and reduce the emission of greenhouse gases in the Colombian brick sector.

The signing ceremony was attended by USAID Chief of Staff (Margaret Sullivan); USAID/Colombia Mission Director (Peter Natiello) and Environment Office Director (Chris Abrams); BCC's Executive Vice-president (Luz Marina Rincon) and Governance Vice-president (Jorge Mario Diaz); CAEM's Director (Fabiola Suarez); and representatives from the beneficiary brick industries.

USAID's Chief of Staff, Margaret Sullivan acknowledged this project as a major achievement of the Mission and the implementing partners in promoting alliances with the private sector and materializing initiatives with concrete and measurable impacts in the environment.

Through this 2-year, USD \$1.2M project, USAID, BCC and CAEM are assisting and co-financing 20 small and medium scaled artisanal brick factories located in the departments of Cundinamarca and Boyaca in the replacement of old manual coal feeding technologies used in brick beehive kilns with modern and efficient pulverized coal feeding systems to assure complete combustion, reducing coal consumption, emissions and baking times.

With an estimated reduction potential of 16,700 tons of CO₂e per year, this project will have a powerful environmental and economic impact, improving the air quality and living conditions for 120 factory workers and adjacent communities, as well as increasing production, productivity and competitiveness of the participating producers.

7.3 SOLAR ENERGY FOR UTRIA NATIONALPARK



SUCCESS STORY

Solar Energy for Utria National Natural Park

USAID provides clean energy solutions to support ecotourism activities in Utria National Natural Park



Utria National Natural Park (Chocó)

Photo: CCEP



Installed solar panel

Photo: CCEP

USAID's CCEP creates awareness on the viability and benefits of RE solutions in isolated and underserved areas.

On February 2014, USAID, through the Colombia Clean Energy Program (CCEP), finalized the installation of photovoltaic (PV) systems for the generation of clean energy in Utria National Natural Park, located in the municipality of Bahía Solano (Chocó). With more than 54,000 hectares and hosting four of the most endangered ecosystems (tropical rainforest, mangrove, marine and coral reef), Utria is considered as one of the most diverse natural parks in Colombia and the world. This was the first project to be completed by USAID, the Institute of Planning and Promotion of Energy Solutions in the Non Connected Zones (IPSE) and Patrimonio Natural as part of a broader agreement signed by USAID and IPSE in August 2013 to co-finance and implement sustainable renewable energy solutions in four underserved areas located in the Pacific (Utria and El Yucal) and Sierra Nevada de Santa Marta (Palmar and Bunkwimake).

With the ongoing participation of Unidad Administrativa Especial del Sistema de Parques Nacionales Naturales, USAID performed technical visits and identified key energy shortages affecting the park's organizational and technical capacities. USAID's evaluation determined that due to limited resources, the park was able to supply only 58% of its required infrastructure. Furthermore, lack of clean and stable energy sources constituted a critical barrier for the development of its mission and goals. Thus, USAID proposed to install solar energy components as a viable and sustainable solution to guarantee permanent and clean energy supply for the park's facilities and to support tourism and educational activities developed by the local operator NGO Mano Cambiada. Installed components include: PV systems to provide LED illumination in 3 tourist bungalows and 1 administrative bungalow for Unidad de Parques; two PV systems for LED illumination in the Auditorium and the Interpretation Center; two solar refrigeration systems to ensure proper food conservation in restaurant facilities; and the optimization of the park's telecommunications infrastructure through the refurbishment of a damaged solar system.

Thanks to this project, USAID has generated important environmental and operational benefits for the park's staff and visitors. By replacing fossil fuel consumption with solar energy, the project has significantly reduced GHG emissions as well as the costs associated with fuel transportation. Additionally, it has provided a reliable energy infrastructure with reduced operational and maintenance costs, fostering energy efficient practices and supporting the park's administrative staff in their endeavor to stimulate ecotourism in the region, provide a quality service for visitors and promote clean energies as a viable alternative for the conservation of biodiversity.

APPENDIX A: CCEP in the media

CCEP's collaborative effort with USAID and the GOC has received coverage through various local and international publications as described below:

National Level:

- Article published in Portafolio.co – “Energía renovable para algunos lugares del Chocó y Magdalena” – October 29, 2013 <http://www.portafolio.co/economia/energia-renovable-colombia>
- Article published in ElTiempo.com - “El Jardín Botánico de Bogotá producirá energía” October 8, 2013 - <http://www.eltiempo.com/archivo/documento-2013/DR-104387>
- Article published in Colombia.co – “Parque Nacional Natural Utría, Con Certificación En Turismo Sostenible” - <http://www.colombia.co/medio-ambiente/region-pacifico/parque-nacional-natural-utria-con-certificacion-en-turismo-sostenible.html>

International level:

Frontlines article - Renewable Energy for Rural Colombia - January/February 2014

<http://www.usaid.gov/news-information/frontlines/energy-infrastructure/renewable-energy-rural-colombia>