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COLOMBIA CLEAN ENERGY PROGRAM

FOURTH YEAR WORK PLAN

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COLOMBIA CLEAN ENERGY PROGRAM

Fourth Year Work Plan

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LIST OF ACRONYMS AND ABBREVIATIONS

ANDI	National Industrialists Association (<i>Asociación Nacional de Industriales</i>)
ANLA	National Environmental Licensing Agency (<i>Autoridad Nacional de Licencias Ambientales</i>)
ASE	Exclusive Service Areas (<i>Áreas de Servicio Exclusivo</i> – service area concessions)
AWP3	Third Annual Work Plan (October 2014 – September 2015)
AWP4	Fourth Annual Work Plan (October 2015 - September 2016)
BIO-REDD	Reduced Emissions from Deforestation and Degradation (USAID Program)
C&O	Communications and Outreach
CAEM	Environmental Business Corporation (<i>Corporación Ambiental Empresarial</i>)
Cancillería	Colombian Ministry of Foreign Affairs (<i>Ministerio de Asuntos Exteriores</i>)
CCEP	Colombia Clean Energy Program (USAID Program)
CERI	Regional Indigenous Educational Center (<i>Centro Educativo Regional Indígena</i>)
CI	Conservation International
CREG	Power and Gas Regulatory Commission (<i>Comisión de Regulación de Energía y Gas</i>)
CVC	Valle del Cauca Regional Environmental Authority (<i>Corporación Autónoma Regional del Valle del Cauca</i>)
DNP	National Planning Department (<i>Departamento Nacional de Planeación</i>)
DO	Development Objective
DPS	National Prosperity Department (<i>Departamento para la Prosperidad Social</i>)
EE	Energy Efficiency
EPM	<i>Empresas Públicas de Medellín</i>
EPSA	<i>Empresa de Energía del Pacífico</i>
ESCO	Energy Services Company
FAER	Support Fund for Rural Electrification Support Fund (<i>Fondo de Asistencia a Electrificación Rural</i>)
FAZNI	Support Fund for the Non-Interconnected Zones Support Fund (<i>Fondo de Apoyo Financiero para la Energización de las Zonas No Interconectadas</i>)
FCGI	<i>Fundación Cerrejón Guajira Indígena</i>
FENOGE	Renewable Energy and Energy Efficiency Management Fund (<i>Fondo de Energías Renovables y Gestión Eficiente de la Energía</i>)
FONADE	Financial Fund for Development Projects (<i>Fondo Financiero de Proyectos de Desarrollo</i>)
FY 2016	Fiscal Year 2016 (corresponding to the period October 2015 - September 2016)
GHG	Greenhouse Gases
GIS	Geographic Information System
GOC	Government of Colombia
IPS	Health Services Institute (<i>Instituto Prestador de Salud</i>)
IPSE	Institute of Planning and Promotion of Energy Solutions in the ZNI (<i>Instituto de Planificación y Promoción de Soluciones Energéticas para las ZNI</i>)
IQC	Indefinite Quantity Contract
IR	Intermediate Result
JASE	Local Community Board for Energy Services Management (<i>Junta Administradora de Servicios de Energía</i>)
JBB	Bogota Botanical Garden (<i>Jardín Botánico de Bogota Jose Celestino Mutis</i>)

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KfW	German Development Bank (<i>Kreditanstalt für Wiederaufbau</i>)
KW	Kilowatt
MHP	Micro hydroelectric power generator
MIDAS	<i>Más Inversión para el Desarrollo Alternativo Sostenible</i> (USAID Program)
MME	Ministry of Mines and Energy (<i>Ministerio de Minas y Energía</i>)
MW	Megawatt
NGO	Non-governmental Organization
P1	Portfolio 1
P2	Portfolio 2
P3	Portfolio 3
P4	Portfolio 4
P5	Portfolio 5
P6	Portfolio 6
PERS	Sustainable Rural Energization Plans (<i>Planes de Energización Rural Sostenible</i>)
PESENCA	Atlantic Coast Special Energy Program (<i>Programa Especial de Energía de la Costa Atlántica</i>)
PEZNI	Energy Plan for Non-Interconnected Areas (<i>Plan de Energización para Zonas no Interconectadas</i>)
PIEC	Indicative Electricity Coverage Expansion Plan (<i>Plan Indicativo de Expansión de Cobertura</i>)
PIMPESCA	<i>Asociación de Pescadores y Piangueras del Río Cajambre</i>
PMP	Performance Monitoring Plan
PPF	Clean Energy Project Preparation Facility (known in Spanish as <i>Mecanismo para la Estructuración de Proyectos de Energía Limpia</i> – Clean Energy Project Structuring Mechanism)
PROURE	Program of Rational and Efficient Use of energy and Other Forms of Non-Conventional Energy (<i>Programa de Uso Racional y Eficiente de Energía y Fuentes No Convencionales</i>)
PV systems	Photovoltaic systems
PY2	Second program year (October 2013 - September 2014)
PY3	Third program year (October 2014 - September 2015)
PY4	Fourth program year (October 2015 – September 2016)
Q1 FY 2016	First Quarter, Fiscal Year 2016 (corresponding to the period October - December , 2015)
Q2 FY 2016	Second Quarter, Fiscal Year 2016 (corresponding to the period April - March, 2016)
Q4 FY 2015	Fourth Quarter, Fiscal Year 2015 (corresponding to the period October - December, 2014)
RE	Renewable Energy
SECO	Swiss State Secretariat for Economic Affairs
SIN	National Interconnected System (<i>Sistema Interconectado Nacional</i>)
SELF	Solar Electric Light Fund (USAID Program)
SME	Small and Medium Enterprises
T1	Task 1- Renewable energy and energy efficiency enabling environment and institutional capacity development
T2	Task 2- Expanding access to renewable energy sources in currently unserved areas
T3	Task 3 - Energy efficiency and renewable energy investment promotion
Tt	Tetra Tech (Prime Contractor)
UDENAR	Nariño University (<i>Universidad de Nariño</i>)

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UNAL	<i>Universidad Nacional de Colombia</i>
UPME	Mining and Energy Planning Unit (<i>Unidad de Planeación Minero Energética</i>)
USAID	United States Agency for International Development
ZNI	Non-Interconnected Zones (Zonas no Interconectadas)

1. INTRODUCTION

1.1 OBJECTIVE OF THIS DOCUMENT

The fourth annual work plan (AWP4) of the Colombia Clean Energy Program (CCEP) presents updates and revisions to various aspects of CCEP's implementation strategy based on Program experience accumulated over the last three years, progress achieved, and lessons learned from project implementation and working with government and private sector allies. CCEP finalizes its third year with great challenges ahead: preparing ground work to turn over Task 1 (T1) achievements to government allies and assist in their institutionalization, such as the national strategy to develop Sustainable Rural Energization Plans (*Planes de Energización Rural Sostenible – PERS*) in different regions and the regulatory, financial and institutional development of key areas of the Renewable Energy and Energy Efficiency Law 1715 passed in 2014; implementing a significant number of projects with substantial investments and multiple allies in relatively large populations under Task 2 (T2); and building momentum to encourage greater private sector buy-in of the Clean Energy Project Preparation Facility (PPF) developed by CCEP and the Mining and Energy Planning Unit (*Unidad de Planeación Minero Energética - UPME*), as well as other energy efficiency (EE) initiatives promoted by Task 3 (T3), Colombian government (GOC) agencies and international donors.

The overall objectives of CCEP's AWP4 are to focus on (a) completing implementation of at least 90% of all renewable energy (RE) and EE investment projects designed and underway in the respective pipelines by mid-2016, and fully finalizing all of them by end of Program Year 4 (PY4); and (b) documenting and institutionalizing Program achievements, turning over project follow-up and further development to competent partners, and preparing an orderly "exit strategy" to enable Colombian public and private sectors to carry on clean energy developments without CCEP support. According to current project implementation schedules, CCEP's Incentive Fund will be spent by the end of September 2016.

This document presents in chapter 2 Program work by task: Task 1 - Renewable energy and energy efficiency enabling environment and institutional capacity development; Task 2- Expanding access to renewable energy sources in currently unserved areas; and Task 3 - Energy efficiency and renewable energy investment promotion. Each section includes workstreams to better describe how individual projects aim to reach expected results, program goals and objectives.

Chapter 3 is a general overview of communications and outreach (C&O) activities that support Program and project implementation. A more detailed C&O Plan is presented along with AWP4. Lastly, AWP4 closes with chapter 4, a general overview of performance during the last three years and expected performance during the program year.

This work plan reflects the current vision and approach to move CCEP projects forward, based on current data and information which might evolve during the actual implementation. As such, this document should be taken as a guide to direct activities with a certain degree of flexibility to allow CCEP to react to a number of major policy developments currently being designed by the GOC regarding EE and RE, as Law 1715/2014 continues to be regulated, as well as changes in the country's political landscape. Changes to be considered refer not only to new departmental and municipal authorities sworn into office in January 2016 but more significantly to the impending signature of a peace pact between the GOC and FARC forces. All these developments will impact the manner in which CCEP will

need to interact with national and regional organisms particularly regarding the institutionalization of T1 initiatives.

Flexibility is also required in order to react to unexpected changes in the USD exchange rate, which might lead CCEP to carry out quick start and rapid implementation projects, either by increasing Program participation in terms of funding and level of effort in current projects or new interventions with existing allies, to mention two options. As discussed with the United States Agency for International Development (USAID) a few months ago, CCEP had already factored in exchange rate differentials and increased levels of activity and new initiatives in the portfolio being developed and expected to be implemented during AWP4 – at a 6-month average exchange rate of COP 2320 per USD (October 2014 – March 2015). However, the Peso has continued to devalue and if current exchange rates topping COP 3300 per USD were to continue or increase, the existing portfolio would have to be bolstered significantly to meet budget targets, a possibility CCEP is prepared to confront by increasing levels of activity or scopes of work that are being discussed in existing projects or by implementing rapidly deployable projects involving solar systems, combustion optimization systems and the PPF portfolio through contractual mechanisms already put into action by the Program to enable rapid implementation of these specific types of projects, as discussed in following sections. Any and all new activities will be completed before the end of the program.

Based on project structuring, administrative and contractual procedures and actual pace of field execution experienced in previous years, circumstances outside CCEP's or USAID's control such as those mentioned could cause future implementation delays and therefore we request USAID an additional degree of flexibility to make adjustments in our work streams as we continue moving forward to achieve Program objectives.

1.2 PROGRAM GOALS AND OBJECTIVES

CCEP is a five-year (January 2012-January 2017) project designed by USAID to increase access to RE sources and EE practices in Colombia through a combination of project development support, technical assistance, and enabling environment reforms. CCEP is USAID/Colombia's flagship clean energy activity, funded under the Presidential Initiative on Climate Change. The overall goals of USAID's environment program are strengthening environmental governance, low carbon growth, conservation of significant biodiversity, and support to adapt to climate change.

USAID's Country Development Cooperation Strategy 2014-2018¹ for Colombia is in line with the U.S. Presidential Initiative for Global Climate Change. The Country Development Cooperation Strategy identifies four Development Objectives (DOs) to achieve the Mission's higher level goal. These updated DOs are reflected in this work plan. In this context, CCEP works to advance the fourth DO, "Environment resiliency and low-emissions development strengthened" which it is supported by the following three updated intermediate results (IR):

- IR 4.1 – Natural resource management improved
- IR 4.2 – Mitigation of greenhouse gas emissions increased

¹ Country Development Cooperation Strategy 2014-2018, A Path to Peace, June 13, 2014

- IR 4.3 – Increased resilience to the consequences of a changing climate

CCEP directly supports Intermediate Result 4.2.

1.3 SCOPE OF WORK

CCEP contract modification, dated January 2014, refocused the program, as follows:

Task 1: Renewable energy and energy efficiency enabling environment and institutional capacity development. (IR 4.2 – Mitigation of greenhouse gas emissions increased). CCEP will work with the GOC and the private sector to reform and/or address policy enabling environment barriers that block successful implementation of clean energy sector investments, particularly T2 and T3 projects. Program interventions focus on technical assistance to the Ministry of Mines and Energy (*Ministerio de Minas y Energía* – MME) or appropriate energy sector entities to develop renewable energy requirements for rural service area concessions or other energy service providers; support the MME in the promoting EE policies; technical assistance for UPME for technical and economic analysis of options for achieving and updating the Program of Rational and Efficient Use of ene3rgy and Other Forms of Non-Conventional Energy (*Programa de Uso Racional y Eficiente de Energía y Fuentes No Convencionales* – PROURE) energy efficiency targets; among other topics.

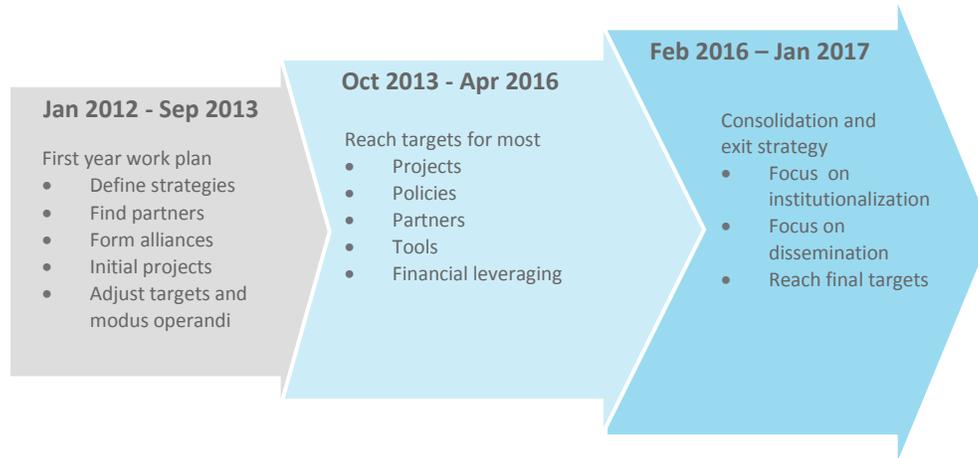
Task 2: Expanding access to renewable energy sources in currently unserved areas. - (IR 4.2 – Mitigation of greenhouse gas emissions increased). T2 stimulates innovative, commercially viable RE projects with rural entrepreneurs and, as such, works to support the implementation of four GOC objectives: (1) drastically reduce extreme poverty in rural areas; (2) provide basic services to resettled populations; (3) increase private sector participation in rural electrification efforts; and (4) increase utilization of cost effective, low carbon renewable energy resources to replace expensive diesel generation in rural communities. CCEP T2 projects take into account availability of renewable energy resources; co-location with other USAID projects; potential for development of productive uses of electricity; ability to attract third party investment (public, private, or community); and willingness and ability of communities to operate and maintain systems.

Task 3: Energy efficiency and renewable energy investment promotion - (IR 4.2 – Mitigation of greenhouse gas emissions increased). Recent studies have shown that significant commercially-viable opportunities for RE/EE exist in Colombia, but these opportunities have not been capitalized on to date for various reasons. Major barriers include lack of access to comercial financing (as commercial banks are not geared for lending for RE/EE) and lack of information and awareness about energy efficiency by end-users. RE/EE opportunities exist across sectors, with substantial opportunities in the industrial sector in which improved motors, pumps, and boilers; use of co-generation; and improved industrial systems/processes could substantially reduce energy consumption. Interventions in T3 focus on catalyzing industry/enterprise investments in RE/EE through a combination of project development, financing facilitation, and business advisory services/ technical assistance.

2. WORK PLAN BY TASK

Based on the lessons learned, preparatory work and progress made to date, particularly during the previous year, CCEP's overarching implementation vision will remain much as presented in last year's work plan, with a slight overlap in timing between the second and third main phases illustrated in Figure 1 below.

Figure 1: CCEP's consolidated implementation vision



The immediate focus during PY4 is to carry out the RE and EE investment projects that are already under implementation or in contractual processing in the pipeline, with particular focus on assuring completion before mid-2016. The key message is that CCEP has been focusing and will continue to focus on implementing and reaching most of its targets by April 2016 (revised from last year, which was January 2016) in order to allow sufficient time for consolidating and carrying out an orderly exit strategy, still planned to start by February 2016. This consolidation period, which is scheduled for the last twelve months of the Program starting during AWP4, seeks to ensure widespread dissemination and institutionalization of methodologies, technologies, policies and instruments (sustainable technical solutions; community development, entrepreneurship and business models for rural energy service providers; financial and regulatory incentives, PPF, etc.).

It is critical to the success of the Program to be able to demonstrate the viability and sustainability of clean energy solutions through concrete projects. This has been the focus of CCEP's work in project structuring, partnership development and incentive fund mobilization. To achieve its PY4 project implementation objectives, CCEP finalized PY3 with Incentive Fund disbursements of USD 1.56 million and a strong portfolio of subcontracts and grants already under execution, adjudicated or structured for contracting by end of 2015 or beginning of 2016, all of which should commit the remainder of our USD 5 million Incentive Fund. Having all those projects underway will allow CCEP to concentrate operational efforts on supervising and monitoring project construction and implementation phases rather than on project structuring, leveraging and take-off as has absorbed so much time and effort on the part of CCEP teams to date.

Nonetheless, the USD equivalent of these project budgets – which total close to COP 12 billion to be disbursed over the course of AWP4 – is highly sensitive to exchange rates at times of disbursement, as clearly demonstrated in the following table:

Table 1 – Exchange rate differentials considered for Incentive Fund disbursements during PY4

	COP to USD Exchange Rate	COP 2.341	COP 2.585	COP 2.562	COP 3.058
Total disbursements through Q4 FY 2015	COP 3.823.553.350	USD 1.578.611	USD 1.578.611	USD 1.578.611	USD 1.578.611
Contractual commitments through Q4 FY 2015	COP 1.631.316.527	USD 696.846	USD 631.070	USD 636.736	USD 533.459
Contracts to adjudicate by October 2015	COP 5.306.814.509	USD 2.266.901	USD 2.052.926	USD 2.071.356	USD 1.735.387
Projects structured to adjudicate by December 2015	COP 3.276.168.693	USD 1.399.474	USD 1.267.377	USD 1.278.754	USD 1.071.344
Arusí (TBD)	COP 620.000.000	USD 264.844	USD 239.845	USD 241.998	USD 202.747
INCENTIVE FUND ESTIMATED TOTAL	COP 14.657.853.079	USD 6.209.017	USD 5.772.414	USD 5.810.018	USD 5.124.605

	COP to USD Exchange Rate	COP 2.341	COP 2.585	COP 2.562	COP 3.058	COP 3.328
Total disbursements through Q4 FY 2015	COP 3.806.483.350	USD 1.556.399				
Contractual commitments through Q4 FY 2015	COP 2.734.384.923	USD 1.168.041	USD 1.057.789	USD 1.067.285	USD 894.174	USD 821.630
Contracts to adjudicate by Q1 FY2016	COP 2.067.540.271	USD 883.187	USD 799.822	USD 807.002	USD 676.109	USD 621.256
Projects structured to adjudicate by Q2 FY 2016	COP 6.440.044.633	USD 2.750.980	USD 2.491.313	USD 2.513.679	USD 2.105.966	USD 1.935.110
Arusí (TBD)	COP 620.000.000	USD 264.844	USD 239.845	USD 241.998	USD 202.747	USD 186.298
INCENTIVE FUND ESTIMATED TOTAL	COP 15.668.453.177	USD 6.625.793	USD 6.147.754	USD 6.188.926	USD 5.438.453	USD 5.124.021

Note: Disbursements through Q4 FY 2015 (Fourth Quarter, Fiscal Year 2014 - 2015, corresponding to July - September 2015) are in USD at actual rates of exchange experienced; scenarios for PY4 consider end-of-quarter averages during FY 2015 and latest December 16, 2015 rate published, as follow:

Average exchange rate	COP to USD
December 1 - 31, 2014	\$ 2.340,58
March 1 - 31, 2015	\$ 2.585,36
June 1 - 30, 2015	\$ 2.562,48
September 1 - 21, 2015	\$ 3.058,58
December 16, 2015	\$ 3.328,00

This poses a major challenge to the Program, especially because it is entering its final year and has limited time to react to constantly changing conditions. In Program Year 3 (PY3), most T2 projects were scheduled to start and end in the course of one year. However, CCEP faced complex contractual processes, long legal consultations and licensing procedures, as well as consensus building with communities and partner institutions, which delayed scheduled start dates and implementation times. Nonetheless, by the end of PY3 most obstacles had been surpassed, projects were rolling and several mechanisms had been put in place by the Program to facilitate roll-out of these and foreseeable additional ones. One such mechanism is an Indefinite Quantity Contract (IQC) for the supply and installation of numerous solar photovoltaic (PV) systems during PY4 in specific T2 projects worth up to USD 2 million, which was competed among 39 interested proponents and adjudicated to an experienced

local firm in November 2015. The winning bidder has already placed orders to import equipment for all remaining T2 projects requiring solar installations, all to be completed by mid-2016. This blanket subaward, and an additional one for technical audits of the installations required, also allows quick implementation of additional solar systems if certain conditions occur, including for example, if the exchange rate continues to increase or the budget reserved for the Arusí project until Q2 FY2016 (Second Quarter, Fiscal Year 2015 - 2016), is freed up.

Though the Arusi budget was assigned contingent upon GOC completion of the micro hydroelectric plant (MHP) by end of Q1 FY2016 (First Quarter, Fiscal Year 2015 - 2016, corresponding to October - December 2015), and it has already been confirmed that this will not happen, the transfer of responsibility for the project to GOC has only been verbally approved by community and GOC representatives at a meeting with community representatives on December 12, 2015. At the time of this update, this has not been formally perfected in writing and must remain in our projections until such time as officially communicated. CCEP budget allocation for this project is still included in Incentive Fund projections, as per instructions received by USAID on September 2015. Funds will be freed up after March 2016, allowing CCEP to allocated funds to other interventions.

In order to accelerate focus on program implementation each project has been internally assigned an individual project manager responsible for tracking progress and resolving day-to day issues with subcontractors and implementing partners. These project managers are supported by a program specialist as needed and when necessary raise flags to top program management to intervene as required.

Thus, CCEP is ready to focus during PY4 on completing all projects currently underway in all tasks and – in strict agreement with USAID – will only embark on new projects with known strong allies with demonstrated capacity to deploy the resources necessary for efficient project structuring and implementation, such as the Colombian Ministry of Foreign Affairs (*Ministerio de Asuntos Exteriores / Cancillería*), *Empresas Públicas de Medellín* (EPM), previous partners (such as UPME or PERS Nariño), or replicas of successful projects (such as solar systems for fishing cold chains, remote health centers, boarding schools, etc.) with well-known, competent implementers.

The following three sections describe the activities planned under each of CCEP’s three tasks during PY4 showing the implementation schedule for all CCEP activities this year. These schedules must be read as an indicative roadmap of the Program’s quarterly goals for each particular project or activity.

Given that some projects from previous years have been completed and others have taken or should take on new emphases as CCEP consolidates projects and move forward towards the institutionalization and exit phase, previous work streams have been regrouped to reflect current priorities.

2.1 TASK 1- RENEWABLE ENERGY AND ENERGY EFFICIENCY ENABLING ENVIRONMENT AND INSTITUTIONAL CAPACITY DEVELOPMENT

2.1.1 Overall approach

Task 1, Renewable Energy and Energy Efficiency Enabling Environment and Institutional Capacity Development, seeks to enhance institutional capacity of the MME and other GOC institutions to

enhance institutional capacity in three fronts: encourage policies for sustainable rural energization and leverage public and private sector investment; formulate and implement EE and RE projects; and develop and implement clean energy and low emissions strategies. CCEP T1 expected results are:

- Enhanced capacity of MME, UPME, the Institute of Planning and Promotion of Energy Solutions in the Non-Interconnected Zones (*Instituto de Planificación y Promoción de Soluciones Energéticas para las Zonas no Interconectadas* - IPSE), energy companies, and pertinent regional institutions to formulate and implement renewable energy policies, programs, and projects;
- Revised policies for utilizing public sector rural electrification funds to attract private sector investment;
- Enhanced capacity of GOC entities to develop energy sector specific components of a low emissions development strategy;
- Financial mechanisms and incentives established to promote public and private investment in EE/RE projects;
- RE and EE technologies and applications demonstrated and diffused to policy makers and general population through CCEP educational, awareness, and outreach program; and
- 2,000 people gaining or improving employment, directly or indirectly, as a result of clean energy program interventions.

During PY3 and previous years, CCEP T1 worked to develop tools to promote RE and EE strategic planning and policy; design and implement RE and EE methodologies, technologies, and tools to facilitate project preparation and information management processes; provide technical assistance to achieve, complete, and monitor energy efficiency targets in the PROURE; support to establish financial mechanisms for EE and RE investment in industrial, commercial, or other sectors; design policies to overcome regulatory, financial, and market barriers to EE/RE power generation, distribution, and use; and educate on RE and EE.

All these developments, and strengthened CCEP interaction with high level policy makers during the design and discussion of new regulations and instruments, derived both from Law 1715 and concurrent studies and GOC initiatives to promote energy efficiency, renewable energy and rural energization, require T1 to focus PY4 efforts on completing the work initiated during the third year and seek to institutionalize Program achievements by assisting GOC institutions in taking over new and/or revised responsibilities on public policy components for EE and RE development in Colombia. With the MME, for example, CCEP has been assisting the design of regulatory decrees and technical specifications regarding tax incentives, expansion of electricity coverage in off-grid areas (particularly isolated individual household solar systems), technologies and standards for delivery of surplus electricity produced by self- and co-generators to power distribution grids and distributed generation, some published and others scheduled for publication by February or March 2016. Moving forward, CCEP expects to assist the Ministry and related bodies (UPME, IPSE, the Power and Gas Regulatory Commission / *Comisión de Regulación de Energía y Gas* -CREG) to roll out, operationalize and foster their implementation throughout the country, as we did with UPME tax resolution in 2013.

On a separate institutional front, UPME and CCEP have been working jointly on:

- Engaging the the National Planing Department (*Departamento Nacional de Planeación* –DNP), IPSE and other agencies in the consolidation of PERS as a national strategy between regions and central GOC to spur sustainable rural energy development in different territories;

- Integrating results and recommendations of CCEP’s consultancy work on the Energy Plan for Non-Interconnected Areas (*Plan de Energización para Zonas no Interconectadas* - PEZNI) within the coming version of the Indicative Electricity Coverage Expansion Plan (*Plan Indicativo de Expansión de Cobertura* - PIEC) by March 2016, given that PIEC is an official policy that guides public investment budgets over up to five year periods.
- Accompanying private businesses engaged in PPF project structuring to reach investment implementation and assure successful examples to demonstrate the benefits of the Mechanism, as well as design and assure a transition towards longer term consolidation of the PPF, most likely to be led by UPME itself.

Thus, T1 first work stream for PY4 focuses on “RE and EE strategic planning and policy”, building upon last year’s work to consolidate and institutionalize the preceding clean energy initiatives. A second work stream focuses on developing demonstration projects to promote RE and EE applications meeting strategic objectives, given the valuable spin-off effects experienced at a policy, educational and technological level by the RE project already implemented at the Bogota Botanical Garden (*Jardín Botánico de Bogota Jose Celestino Mutis* - JBB).

2.1.2 Planned activities

During PY4, CCEP plans to focus on the activities described in this section:

a. Workstream 1.1: RE and EE strategic planning and policy

CCEP will continue to provide technical assistance and support to UPME in formulating and consolidating regional PERS. The Program will place particular focus on following up results in Nariño, Tolima, and Guajira; support PERS development in Chocó and Cundinamarca; present PERS strategy and plans to new governors and political actors; and work with UPME and IPSE on institutionalizing PERS methodology at the national and regional levels as a medium and long-term planning tool to promote sustainable rural development through deployment of clean energy technologies.

In PY4, CCEP will continue working with GOC institutions on implementing Law 1715/2014, "Integration of Non-Conventional Renewable Energy Sources to the National Energy System." This bill promotes the development and use of RE in the national grid by integrating renewable and non-conventional sources to the electricity grid; encourages alternative energy sources participation in energy provision in off-grid areas to foster sustainable development; and aims to reduce Greenhouse Gas (GHG) emissions. The law also promotes rational use of energy, in terms of energy efficiency and in response to energy demand. Overall, PY4 builds upon PY3 activities, such as the technical regulation for delivery of excess electricity generated by self- and co-generators into the existing distribution grids, and the energization strategy for Non-Interconnected Zones (*Zonas no Interconectadas* – ZNI) that CCEP worked on with IPSE which produced the PEZNI.

Law 1715/2014 also created the Renewable Energy and Energy Efficiency Management Fund (*Fondo de Energías Renovables y Gestión Eficiente de la Energía* - FENOGE). In theory, this fund would be the natural successor of CCEP's PPF; in practice, MME is still evaluating on how to set it up and who should be responsible for running it. This year MME contracted a USD 2 million consultancy study to suggest institutional arrangements and strategies to increase EE activity, including structuring the FENOGE and providing guidelines for its implementation; results were expected by October 2015 but have still to be released. Given this lack of evolution, CCEP and UPME have approached DNP to set up a separate

UPME/DNP mechanism with up to USD 10 million in funding over a five year period to assure PPF continuity. CCEP will therefore continue to offer technical assistance to the MME or UPME/DNP towards institutionalizing PPF methodologies and achievements through the FENOGE or other appropriate mechanisms.

In August, 2015, MME Decree 1623 established new policy guidelines for expansion of electricity service to unserved households, both in the off-grid ZNI areas and in areas of the National Interconnected System (*Sistema Interconectado Nacional - SIN*) under operation by established distribution companies. For the first time, this decree encompasses both the Rural Electrification Support Fund (*Fondo de Asistencia a Electrificación Rural – FAER*), aimed at financing investment in expanding coverage in the SIN; and the Non-Interconnected Zones Support Fund (*Fondo de Apoyo Financiero para la Energización de las Zonas No Interconectadas – FAZNI*), aimed at financing investment in expanding coverage in the ZNI. At the time of writing, CCEP is designing (by MME request) the quality standards for individual isolated photovoltaic systems (PV systems) to guarantee service delivery and, in the case these investments are made with public funds, the minimum technical standards for the equipment involved. The Ministry has also asked UPME and CCEP to assist in designing rules and procedures for expansion of electricity coverage in unserved areas of both types (ZNI, SIN) through entrepreneurial schemes such as Exclusive Service Areas (*Áreas de Servicio Exclusivo – ASE*), probably through an investment bank.

As mentioned in the Introduction, there are certain public policy enactments expected by December 2015 or early 2016 that could affect CCEP, either by suggesting new lines of action, renew Program participation in old projects, or review its contribution in activities that might no longer be considered priorities for GOC. For instance, at the time of writing, the MME is working on the design of the next PROURE Action Plan 2016 – 2020, as called for by Law 1715, scheduled for dissemination before March 2016. This presents an opportunity for CCEP to review past contributions and offer additional assistance for Action Plan implementation.

On a separate front, CCEP and UPME made significant progress rolling out the PPF transition phase during PY3, designed to gain experience and make headway in stimulating private sector investment in clean energy while the GOC, multilateral organisms and business associations develop more permanent mechanisms to carry on EE/RE project structuring and finance. The CCEP/UPME PPF team will continue this work, focusing on building greater capacity within GOC institutions and identifying or helping design an appropriate partner that can take over PPF work by end of PY4. In preparation to institutionalize the PPF Mechanism, CCEP and UPME have developed methodologies, operational manuals and full documentation of PPF's experience to date in promoting, identifying, evaluating, co-financing, supervising, and monitoring basic engineering and financial structuring of private sector investment projects worth nearly USD 100 million. During PY4, CCEP and UPME have prioritized:

- (a) Developing a second tier of project structuring studies through a public call for proposals which attracted over 50 prospective projects in October 2015, of which up to 10 will be selected for implementation during the first semester of 2016;
- (b) Assisting companies involved in the first tier of nine project designs implemented during 2015 in reaching financial closure and implementation of at least three projects during 2016. Bringing projects to concrete implementation is necessary to demonstrate the success of the PPF mechanism in spurring private sector investment in clean energy initiatives;
- (c) Assuring financial resources and institutional mechanisms to consolidate and project the PPF for coming years beyond CCEP's involvement.

The current options under consideration for institutionalizing the PPF are:

- Enable UPME to continue leading the PPF Mechanism on behalf of the GOC, by channeling new resources and legal mechanisms to co-finance private sector initiatives². UPME and DNP have recently subscribed a 5-year cooperation agreement to structure and finance a number of UPME initiatives regarding smart grids, energy efficiency, energy modeling and clean transportation. Among them, UPME is requesting USD 10 million for the PPF (\$2 million per year), which would be channeled through a trust fund.
- With assistance from the German Development Bank (*Kreditanstalt für Wiederaufbau* - KfW), the MME has been designing the new energy efficiency and renewable energy fund FENOGE (created by Law 1715/2014), which should start operations towards the third quarter of 2016. An international consultancy financed by KfW is currently underway to design its operational structure and manuals. Though FENOGE will be a public fund with similar restrictions of funding private sector initiatives as UPME also has, the MME is studying whether and how the PPF experience can be incorporated into FENOGE’s operations.

Given UPME’s significant role in backing and implementing the transition phase of the PPF, and the delays experienced in designing the FENOGE fund, any option with UPME as main driver would make for the smoothest transition. However, the whole energy sector institutionality is currently under adjustment to accommodate the significant impulse required to RE/EE actions under Law 1715/2014, which also calls for generating financial mechanisms such as initiated by the PPF. It is anticipated that institutional designs should be completed by March 2016 and the future role of the PPF will be clarified by then. The main results and milestones of the specific activities under this subtask are presented in the following table.

Table 2 – RE and EE strategic planning and policy

Project	Description	FY 2016			
		Q1	Q2	Q3	Q4
PERS	The PERS consist of a replicable set of rural and renewable energy planning, policy-making, project evaluation, and development methodologies, as well as technological tools for information management by integrating, updating and modernizing geographic, statistical and other information systems on rural and ZNI areas to be shared among UPME, IPSE and local actors.				
	Main Results: Rural renewable energy planning methodology that includes project evaluation and development approaches, and technological tools for information management and policy making at regional and national levels for five departments.				
	Milestones				
	1. Nariño PERS team presents final plan by March 2016.	■			
	2. Tolima PERS team presents final plan by March 2016.	■			
3. Guajira PERS teams presents final plan by June 2016.		■			
4. Chocó PERS team presents products produced with CCEP support (baseline, demand characterization, data collection methodology) by March 2016.				■	

² As a public entity, UPME’s funding of private sector initiatives is restricted but legally feasible depending on the mechanism defined to channel its funds, such as international cooperation agreements or specific endowments. For example, UPME was allowed to channel PPF funds during the current transition phase given its international cooperation agreement with CCEP.

Project	Description				
	5. Cundinamarca PERS team presents products produced with CCEP support (baseline, demand characterization, data collection methodology) by September 2016.				
	6. Tools to collect primary data completed and transferred to National PERS by March 2016.				
	7. Two meetings where PERS teams present results and projects by September 2016.				
	8. PERS methodology reviewed with UPME by December 2015.				
	9. Databases reviewed with UPME and IPSE by March 2016.				
	10. Geographic Information System (GIS) design proposal and support application developed with UPME and IPSE, as part of the knowledge transfer process by March 2016.				
	11. One workshop with GOC agencies involved in other national development strategies such as Plan Pazifico, Contratos Plan, etc. to present and seek synergies with PERS methodology and regional PERS by March 2016.				
	12. Knowledge transfer and training sessions with UPME and IPSE completed by June 2016.				
	13. One event to fully turn over PERS methodology to UPME by September 2016.				
	14. Four working sessions where PERS regional teams present results to governors by June 2016.				
	15. C&O material produced on PERS by September 2016 or when applicable.				
	16. C&O promotional pieces produced to promote PERS strategies and projects by September 2016 or when applicable.				
	17. PERS promoted in regional and/or national media by September 2016 or when applicable.				
Legal and regulatory developments on RE and EE	Law 1715/2014 aims to regulate the integration of non-conventional RE into the National Energy System and assigns GOC roles and responsibilities regarding RE and EE promotion. CCEP support to implement this bill and other legislation and policies on RE and EE is crucial to Program institutionalization efforts.				
	Main Results: Parameters to operate some of the RE systems and institutional tools included in Law 1715 and other legislation and policies related to RE and EE.				
		Milestones			
		FY 2016			
		Q1	Q2	Q3	Q4
	1. Technical standards for household photovoltaic systems presented to MME, UPME, and IPSE by December 2015.				
	2. Document with recommendations on technical standards that allow small-scale distributed generation systems to provide energy to the national distribution grid presented to MME by December 2015.				
3. Case studies on fiscal and economic impacts of Law 1715 RE and EE tax incentives presented to MME by December 2015.					
4. Tax incentive impact evaluation completed by June 2016.					
5. Agreement with UPME, IPSE and/or MME to continue supporting rural energization planning (PERS, PEZNI, etc.) reached by December 2015.					

Project	Description				
	6. Rural energization planning (PERS, PEZNI, etc.) elements incorporated in UPME's and/or IPSE's mid- and long-term strategic planning processes by June 2016 ³ .				
	7. Technical assistance to MME regarding FENOGE structure and operational procedures based on PPF experience by March 2016.				
	8. Support to MME, UPME, and/or IPSE on complementary activities to support roll out of Law 1715/2014 and ZNI by September 2016 ⁴ , as required.				
	9. C&O material produced on RE/EE legislation by September 2016 or when applicable.				
	10. C&O promotional pieces produced to promote RE/EE legislation by September 2016 or when applicable.				
	11. CCEP work on RE and EE legislation promoted in at least one national media by September 2016 or when applicable.				
PPF institutionalization	CCEP and UPME have promoted the PPF as an independent mechanism focused on overcoming barriers and facilitating private sector investment in EE and RE. GOC has the capacity and the responsibility to take over and build upon the initiative, either through an existing fund or agency, such as UPME itself, or a new entity or fund created with compatible mandate, such as FENOGE or an eventual National Energy Efficiency Agency. See narrative above for current options for PPF institutionalization. Main Results: Consolidate PPF as a financial and technical mechanism to promote private sector investment in RE and EE.				
			FY 2016		
			Q1	Q2	Q3
			Q4		
	Milestones				
	1. PPF strategies, methodologies, and project results reviewed with UPME by December 2015.				
	2. PPF strategies, methodologies, and project results presented to Program allies and potential successors mentioned in narrative above by April 2016.				
	3. Institutionalization strategy and methodology transfer designed, including tools and projects and a communications and outreach component, by June 2016.				
	4. Institutionalization and transfer plan begins implementation by July 2016.				
	5. Institutionalization and transfer plan completed by September 2016.				
	6. C&O material produced on PPF by September 2016 or when applicable.				
	7. C&O promotional pieces produced to promote PPF by September 2016 or when applicable.				
	8. CCEP work on PPF promoted in at least one national media by September 2016 or when applicable.				

b. Work stream 1.2: Demonstration Projects to Promote RE and EE

CCEP will complete the RE project in JBB by installing the biomass drying system and supporting educational component through communication pieces and tools, to complete the cycle. For instance,

³ Contingent on CCEP signing an agreement with UPME and/or IPSE to continue supporting PEZNI.

⁴ Contingent on CCEP signing an agreement with MME to support FENOGE structure, roles, and responsibilities.

Universidad Nacional de Colombia (UNAL), which is currently remotely monitoring the biomass and solar generation systems installed by CCEP at the JBB, is interested in expanding its monitoring activities to include energy projects in rural areas, such as CCEP's intervention in Punta Soldado, Buenaventura, Valle del Cauca (more information about this project in T2). The monitoring process at JBB is providing information to project developers related with integrated energy sources connected to grid and gasification performance, considering the national biomass use potential, mainly in rural areas. On the other hand, Punta Soldado is a hybrid system (solar/diesel) and battery bank with pre-paid meters which offers certain advantages that need to be considered in remote monitoring to set up a comparative baseline for RE projects in ZNI, according with Law 1715/2014 and its purpose to make a transition from fossil fuels to renewable energies.

CCEP activities planned for PY3 regarding development of markets for RE technologies to benefit rural households, particularly with solar lanterns, will be continued in PY4. Individual solar powered lamps and charging systems solve basic needs for night lighting and cell phone charging in remote and off-grid communities. This technology is sufficiently low-cost to be affordable by rural households; however, commercial distribution and market development is extremely limited. Companies and distributors of solar technology prefer to commercialize larger, higher-cost, higher-profit PV systems, accessible only to higher-income populations and institutional programs in off-grid areas. In addition, distribution costs of reaching isolated rural markets present a challenge. According to the renewable energy microfinance earmark, CCEP works to promote the use of solar lanterns through three approaches that to identify best practices on distribution models for a Colombian context. Thus, the Program works with several distribution channels such as ASOCIT, an indigenous association working out of Valledupar and Sabana de Crespo, where solar lanterns could be distributed to impact this community and potential Arhuaco users in the Sierra Nevada de Santa Marta; craftswomen associations in La Guajira, supported by partner *Fundación Cerrejón Guajira Indígena (FCGI)*, where the gender approach provides the opportunity to empower women and barter of bags, goats, money, among others; and lantern sellers willing to directly propose the business model with any community organization/person located in Palmor, with potential market in Pueblo Bello and other locations. The analysis and results of this project will be presented to GOC and interested entities as recommendations for implementation programs and policy guidelines.

Lastly, at the time of writing, CCEP is contemplating developing one or more RE/EE demonstration projects with scientific, educational or recreational facilities, similar to initiatives in place in JBB to demonstrate RE/EE potential. The number and scope of these projects is contingent on continued trends in exchange rate differentials and a rapid assessment of counterpart interest during Q1 FY2016. The assessment will take into consideration not only an open invitation, but also a comprehensive review of projects developed by PERS regional teams working with local universities. Project implementation and dissemination will take place during Q2 and Q3 FY2016. The educational RE/EE projects seek large influx of people to have a wide pedagogical impact and stimulate the interest and knowledge in clean energy.

Also for demonstrational purposes, CCEP continues to work to identify potential projects for implementation by end of PY4 with existing allies and well-established environmental Non-governmental Organizations (NGOs). Among the additional project ideas received and filtered during PY3, CCEP will continue to work to structure and fully define demonstration projects by end of Q1 PY4 for implementation during 2016. One project under consideration, that does not require long environmental permit or social consultation processes, is a solar refrigeration project for fish cold chain in the *Consejo Comunitario Esfuerzo Pescador*, Santa Bárbara de Iscuandé, Nariño, with PERS Nariño team at Nariño University (*Universidad de Nariño - UDENAR*), the community council and possibly *Fondo*

Acción and ECOGOURMET, modeled after the solar refrigeration project developed by CCEP in Cajambre during PY3. The PERS Nariño team is currently installing solar PV systems in several schools pertaining to this fishermen’s community in the northern Pacific Coast region of Nariño, with funding from COLCIENCIAS national science foundation. In the course of its field work, the *Consejo Comunitario* presented its need to set up and maintain the cold chain while the fish is being sent to Buenaventura, facilitated by *Fondo Acción* (with resources provided by Conservation International – CI – and ECOGOURMET restaurateur association). CCEP is currently analyzing technological solutions such as set up in Cajambre and seeking partnership with *Fondo Acción* to handle the responsible fishing and commercialization components for this group of 270 fishermen in six villages, members of *Consejo Comunitario Esfuerzo Pescador*. The demonstration potential of this project provides an opportunity to replicate in other communities where *Fondo Acción* implements ECOGOURMET II, such as ASPEPU – Purricha (Bajo Baudó), Chocó and PIQUEROS – El Valle, Chocó and other fishing communities along the Pacific Coast within Plan Pazcífico.

Table 3 – Demonstration projects to promote RE and EE

Project	Description																																																																
RE/EE demonstration projects	CCEP seeks to design and implement high-impact demonstration projects to showcase RE and EE technologies, raise awareness among the general public and policymakers and promote clean energy solutions to development challenges. CCEP attempts to conduct market trials and analysis to encourage RE and EE penetration have proven unsuccessful to date, but the potential benefits of spurring market development of at least solar lanterns and battery chargers merits further efforts during PY4. By identifying, implementing, monitoring, and evaluating pilot projects that encourage RE and EE, CCEP will prepare recommendations to GOC institutions on whether or not to replicate these experiences. Main Results: RE and/or EE demonstration projects implemented in three locations.																																																																
	<table border="1"> <thead> <tr> <th rowspan="2">Milestones</th> <th colspan="4">FY 2016</th> </tr> <tr> <th>Q1</th> <th>Q2</th> <th>Q3</th> <th>Q4</th> </tr> </thead> <tbody> <tr> <td>1. JBB gasifier pilot project completed, including educational component by April 2016.</td> <td>■</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2. JBB pilot project results presented to interested audiences by May 2016.</td> <td></td> <td>■</td> <td></td> <td></td> </tr> <tr> <td>3. Agreement with UNAL to implement remote monitoring systems for rural RE projects signed by March 2016.</td> <td>■</td> <td></td> <td></td> <td></td> </tr> <tr> <td>4. Remote monitoring systems installed by May 2016⁵.</td> <td></td> <td>■</td> <td></td> <td></td> </tr> <tr> <td>5. Remote monitoring system results reviewed and presented to interested audiences by July 2016.</td> <td></td> <td></td> <td>■</td> <td></td> </tr> <tr> <td>6. Identification of providers and communities to implement solar lanterns by December 2015.</td> <td>■</td> <td></td> <td></td> <td></td> </tr> <tr> <td>7. Solar lantern demonstration project completed in two locations by April 2016.</td> <td></td> <td>■</td> <td></td> <td></td> </tr> <tr> <td>8. Solar lantern demonstration project results reviewed by June 2016.</td> <td></td> <td></td> <td>■</td> <td></td> </tr> <tr> <td>9. Recommendations based on solar lantern project results presented to GOC institutions and other audiences by June 2016.</td> <td></td> <td></td> <td>■</td> <td></td> </tr> <tr> <td>10. Identification of highly visited scientific, educational or recreational facility in a major city willing to deploy RE/EE pilot project cofinanced by CCEP, by February 2016.</td> <td>■</td> <td></td> <td></td> <td></td> </tr> <tr> <td>11. Design and formalization of RE/EE pilot project(s) with above-</td> <td></td> <td>■</td> <td></td> <td></td> </tr> </tbody> </table>	Milestones	FY 2016				Q1	Q2	Q3	Q4	1. JBB gasifier pilot project completed, including educational component by April 2016.	■				2. JBB pilot project results presented to interested audiences by May 2016.		■			3. Agreement with UNAL to implement remote monitoring systems for rural RE projects signed by March 2016.	■				4. Remote monitoring systems installed by May 2016 ⁵ .		■			5. Remote monitoring system results reviewed and presented to interested audiences by July 2016.			■		6. Identification of providers and communities to implement solar lanterns by December 2015.	■				7. Solar lantern demonstration project completed in two locations by April 2016.		■			8. Solar lantern demonstration project results reviewed by June 2016.			■		9. Recommendations based on solar lantern project results presented to GOC institutions and other audiences by June 2016.			■		10. Identification of highly visited scientific, educational or recreational facility in a major city willing to deploy RE/EE pilot project cofinanced by CCEP, by February 2016.	■				11. Design and formalization of RE/EE pilot project(s) with above-		■		
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⁵ Contingent on CCEP signing an agreement with UNAL.

Project	Description
	identified institution(s) by April 2016 ⁶ .
12.	Demonstration project(s) implemented reviewed by September 2016 ⁷ .
13.	Identification of locations to implement solar refrigeration solutions to support cold chain with <i>Fondo Accion</i> by February 2016.
14.	Implementaion of solar refrigeration solutions to support cold chain with <i>Fondo Accion</i> by April 2016 ⁸ .
15.	Regional events to disseminate demonstration results by September 2016 ⁹ .
16.	C&O material produced on RE/EE pilot projects by September 2016 or when applicable.
17.	C&O promotional pieces produced to promote RE/EE pilot projects by September 2016 or when applicable.
18.	CCEP work on RE and EE pilot projects printed/broadcasted in regional and national media by September 2016 or when applicable.

2.2 TASK 2- EXPANDING ACCESS TO RENEWABLE ENERGY SOURCES IN UNSERVED AREAS

2.2.1 Overall approach

In Task 2 – Expanding Access to Renewable Energy Sources in Unserved Areas – CCEP encourages the development of innovative and commercially viable renewable energy projects in off-grid communities by promoting and constructing sustainable energy applications in rural communities that set the foundation for long-term social and economic development. The key to sustainability in often impoverished off-grid communities is to combine technologically solid, environmentally sound, and socially and economically feasible energy solutions, and in striving to meet all these conditions CCEP, partner institutions and beneficiary communities have invested much time and drive throughout the project cycle, from identification through implementation, monitoring and ensuing stages of impact evaluation.

Expected results in T2 include:

- Database of rural renewable resources and population centers established and managed by appropriate government, NGOs, or academic institution.
- Sustainable business models developed and implemented for rural renewable energy systems.
- Sustainable community scale rural renewable energy and ZNI municipal seat electrification projects benefiting 16,000 beneficiaries.

⁶ Contingent on potential partner for RE/EE pilot projects meeting project criteria (visibility, viability, replication potential, etc.)

⁷ Contingent on potential RE/EE pilot projects meeting project criteria (visibility, viability, replication potential, etc.)

⁸ Contingent on CCEP reaching an agreement with *Fondo Accion* and other project allies.

⁹ Contingent on RE/EE pilot project success.

- Productive use activities developed in rural areas stimulating rural economic development, for example, cold-chain development or value-added product development utilizing clean energy.
- 20 rural energy service providers or community cooperatives trained in technical and business requirements for operating a community scale rural utility.
- Quantitative impact evaluation completed highlighting impact of rural electrification programs.

CCEP is working to achieve these results by assuring commercial viability and overall sustainability of rural energy solutions in ZNI communities. CCEP projects promote 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 – such as ice production and cold storage for fishing communities; water pumping and irrigation, grain milling or other agricultural produce processing for farming communities; carpentry and handicrafts tools for artisans; ecotourism facilities; energy supply for social infrastructure (education and health centers); to name a few. Emphasis is placed on strengthening technical, managerial and commercialization capacities of local small and medium enterprises (SMEs) that will operate and maintain the RE and productive use installations. Furthermore, to ensure long-term 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.

CCEP started PY3 with a strong portfolio of 11 off-grid renewable energy projects. The Program's third annual work plan (AWP3) estimated that these projects would be close to completion during the third year, but only four were actually completed, two were nearing completion, five had delayed starts and are under implementation for completion by Q2 PY4, and one has experienced significant stagnation of the GOC counterpart components and can only be implemented in PY4 contingent upon completion of those components. Delays have obeyed different causes which are mostly attributable to issues associated with project partners' performance, included:

- Difficulty in coordinating administrative and contracting procedures of subcontractors with project partners (four projects behind schedule);
- Logistical or technical contingencies (in one project completed; one nearing completion);
- Delay in obtaining final environmental and indigenous religious leader permits (case of Sabana de Crespo); and
- Significant procrastination and excess costs by partner institution contractors (case of Arusí), among others.

These obstacles encountered during actual project start up and implementation have all added unexpected burdens to projects and added much-needed time to an already tight implementation schedule. Nonetheless, the vast majority of these problems are solved as they arise and projects end up being implemented as designed.

Given that CCEP is nearing its projected end-date, program management has taken measures to react and carry out corrective actions to avoid significant delays in implementation. At the time of writing of this document, most pre-operational inconveniences have been resolved and CCEP is cautiously optimistic that all projects already contracted or structured for contracting included in the current PY4 pipeline will be completed by April 2016 – giving ample time to solve any unforeseen delays and assure that the end targets and estimated project closure must be met by end of PY4. CCEP closely monitors progress of each project, both technically and administratively, to deal with contingencies as they arise

and take action to keep projects on track or, in worse-case scenarios, alert USAID and determine whether or not Program objectives can be met by expanding work already identified in projects underway.

In PY3, CCEP worked on cost analysis of renewable and hybrid options; project identification, implementation, and sustainability; and capacity building for rural energy SMEs. PY4 will focus more on project implementation and complementary capacity building and training to assure long-term project sustainability than on project identification; prioritize project monitoring and evaluation activities; and perform or update comprehensive baseline surveys or statistical analysis in preparation for impact evaluations to be performed six to twelve months after project implementation, which allows time for communities and/or SMEs to take ownership and use the new energy systems on their own.

In this section, T2 projects are presented as units, where three elements address key issues in long-term sustainability. The promotion and construction of a RE application, whatever it may be, must take into account technological, environmental, and socioeconomic aspects. Technology is a major concern, since energy solutions must respond to availability of renewable resources, prove sufficiently robust and easy to operate with little outside technical assistance under off-grid community contexts, such as social and economic conditions, among many other factors. The environment poses a great concern, mainly because RE depends on a constant supply of available resources and adequate resource management. Lastly, social and economic issues are also considered, since project design must reflect whether or not communities or rural energy SMEs are capable of maintaining energy solutions and if productive activities can support operations and maintenance costs. To achieve this, CCEP will work with project partners to train community representatives and leaders on EE practices, technical aspects related to the RE application, and build the foundation for solid technical and communal capacities that will take over once the Program and its allies turn the project to community organizations.

a. *Work Stream 2.1: Project identification, implementation, and sustainability*

The following paragraphs present a general overview of each T2 project: objective, location, components, allies, funding, status, and milestones scheduled during PY4.

- **MHP in Palmor, Sierra Nevada de Santa Marta.** Palmor, in Ciénaga, Magdalena, is a regional economic center for coffee growers in Sierra Nevada de Santa Marta. Twenty five years ago, the Atlantic Coast Special Energy Program (*Programa Especial de Energía de la Costa Atlántica - PESENCA*), funded by the German government, built a MHP and assisted the community in forming a community-based rural energy service provider responsible for local power generation, distribution and commercial management, currently known as ElectroPalmor. To date, the 25-year old MHP produces 100 kilowatts (KW), insufficient for a vibrant commercial town, currently with more than 400 households in the urban center and another 600 scattered in the rural area. During CCEP's second Program Year (PY2), the Program and IPSE performed technical studies to refurbish the existing MHP and expand energy provision to an additional 150 KW by building an additional MHP. Construction began in February 2015 and is scheduled to end by February 2016. CCEP is also working to technically and administratively strengthening ElectroPalmor to enable the company to provide better services to a rapidly growing town. Business strengthening for ElectroPalmor is focused on general administrative and accounting practices, tariff design and fee collection strategies (such as pre-paid metering) and annual investment planning, as well as consensus building processes and accountability, expected from a community-based public service provider.

Table 4 – MHP in Palmor, Ciénaga, Magdalena					
Objective	Refurbish an 150 KW MHP and install second turbine to cover increasing energy demand				
Location	Magdalena: Ciénaga (Palmor / Sierra Nevada de Santa Marta)				
Components	<ul style="list-style-type: none"> • Technology: MHP, medium and low tension power lines in urban and rural areas (IPSE) • Environmental: training on good environmental practices and rational energy use • Socioeconomic strengthening: ElectroPalmor (community-based rural energy service provider), training on RE and EE 				
CCEP Ally	IPSE				
Investment	USAID: USD 528,508	Counterpart leverage: USD 741,855			
Status	Underway				
	Milestones	FY 2016			
		Q1	Q2	Q3	Q4
1.	Infrastructure work completed and MHP in operation and inaugurated by February 2016.				
2.	Infrastructure inspection reports completed and presented by February 2016.				
3.	Assist ElectroPalmor and community representatives in extraordinary assembly by February 2016. In this meeting, CCEP expects that ElectroPalmor will inform participants about company finances, the rural expansion plan in rural areas, kilowatt cost and billing model.				
4.	ElectroPalmor and community representatives hold ordinary annual assembly by April 2016. In this meeting, CCEP expects that participants will elect new authorities, approve or modify rural expansion plan and approve or reject billing model, including connection tariffs, cost per kilowatt for residential and commercial sectors, the annual budget, and year-end financial report.				
5.	ElectroPalmor business strengthening component completed by March 2016.				
6.	ElectroPalmor and community members trained on RE and EE practices by February 2016.				
7.	One local event to disseminate results by June 2016.				
8.	M&E visits completed by March 2016.				
9.	C&O material produced by June 2016 or when applicable.				
10.	C&O promotional pieces produced to enhance project components by June 2016 or when applicable.				
11.	Press coverage promoted with regional and/or national media by September 2016 or when applicable.				

- **Solar and mechanically-assisted pumps in indigenous Wayuu communities of La Guajira.**
Water is a precious resource in La Guajira: thousands of rural dwellers receive between 100 and 500 mm of rain per year. In some locations, cistern trucks deliver water, for a price. In others, women and children must walk long distances back and forth to artisanal wells or rain-fed artificial lakes (*jagueyes*), to collect the resource for human consumption, animal herding, and crop irrigation. CCEP is working with FCGI to help Wayuu indigenous communities improve access to water by installing PV and mechanically-assisted pumping systems in 42 *rancherías* in three municipalities in the department. This project, which benefits over 4,000 people, includes installing both types of clean energy technologies in FCGI's extension farm to train project beneficiaries and other interested communities on PV and pump operation, maintenance, and repair.

Table 5 – Solar and mechanically-assisted pumps in La Guajira	
Objective	Install PV and mechanically-assisted pumping systems to guarantee access to clean water for Wayuu indigenous communities
Location	La Guajira: Maicao, Manaure, and Uribia
Components	<ul style="list-style-type: none"> • Technology: well casings, PV and mechanically-assisted pumping systems

Table 5 – Solar and mechanically-assisted pumps in La Guajira					
	<ul style="list-style-type: none"> Environmental: training on good environmental practices and water management Socioeconomic strengthening: PV and pump operation, maintenance, and repair 				
CCEP Ally	FCGI				
Investment	USAID: USD 180,985	Counterpart leverage: USD 203,287			
Status	Underway				
	Milestones	FY 2016			
		Q1	Q2	Q3	Q4
1.	23 mechanically-assisted pumps installed by March 2016.	■			
2.	19 PV pumps installed by December 2015.	■			
3.	FCGI and community leaders trained on PV and pump operation, maintenance, and repair by December 2015.	■			
4.	One regional event to disseminate results by March 2016.		■		
5.	M&E visits completed by June 2016.			■	
6.	C&O material produced by September 2016 or when applicable.	■	■	■	■
7.	C&O promotional pieces produced to enhance project components by September 2016 or when applicable.	■	■	■	■
8.	Press coverage promoted with regional and/or national media by September 2016 or when applicable.	■	■	■	■

- MHP in El Yucal.** The *Cabildo Indígena Rio Pangüí El Yucal* is an indigenous community located in Nuquí, Chocó. A small diesel power plant provides sporadic energy to 90 Emberá families living in the area. In PY2, CCEP and IPSE identified this location as a suitable place to build an 18 KW MHP to replace the old diesel plant and support productive activities that could generate earnings to the *cabildo* and provide excess income for MHP maintenance. In PY3, CCEP initiated and finalized the construction of the power plant, and undertook the business strengthening component. CCEP and IPSE will also form and strengthen a local community board for energy services management (*Junta Administradora de Servicios de Energía - JASE*) who will be responsible for MHP management and maintenance and the productive solutions installed in the community.

Table 6 – MHP in El Yucal					
Objective	Construction of an 18 KW MHP for Cabildo Indígena Rio Pangüí El Yucal				
Location	Chocó: Nuquí (<i>Cabildo Indígena Rio Pangüí El Yucal</i>)				
Components	<ul style="list-style-type: none"> Technology: MHP, household electric installations, public lighting Environmental: training on good environmental practices, with emphasis on water and forestry management for MHP infrastructure maintenance Socioeconomic strengthening: JASE; EE training; community and entrepreneurial strengthening for communal rice and corn mill and carpentry workshop 				
CCEP Ally	IPSE				
Investment	USAID: USD 288,278	Counterpart leverage: USD 149,761			
Status	Underway				
	Milestones	FY 2016			
		Q1	Q2	Q3	Q4
1.	MHP and power grid infrastructure in stable operation and inaugurated by November 2015.	■			
2.	Infrastructure inspection reports completed and presented by November 2015.	■			
3.	JASE formed and members trained on MHP management and maintenance by March 2016.	■	■		
4.	Business strengthening and productive processing infrastructure component for indigenous <i>cabildo</i> completed by April 2016.			■	

Table 6 – MHP in El Yucal	
5. JASE and community leaders trained on EE practices by March 2016.	
6. One local event to disseminate results by March 2016.	
7. M&E visits completed by June 2016.	
8. C&O material produced by September 2016 or when applicable.	
9. C&O promotional pieces produced to enhance project components by September 2016 or when applicable.	
10. Press coverage promoted with regional and/or national media by September 2016 or when applicable.	

- PIMPESCA/Cajambre solar refrigeration project.** Afro-Colombian communities located along the Colombian Pacific Coast traditionally live off fishing, river-based gold mining, and timber exploitation. Environmental concerns led community leaders of *Consejo Comunitario del Rio Cajambre* to take on fishing as their main activity, protect forest areas from commercial timber use and water sources from heavy metals frequently used in gold mining activities. Traditionally, fishing provides sustenance for families and communities; excess fish is sold in neighboring towns but, in general, community members do not see its every-day productive activity in terms of income generation. In 2014, the municipal government donated a small 75 KW diesel plant that is not able to provide an adequate source of energy to support the cold chain in this fishing community. The *Consejo Comunitario del Rio Cajambre* and its fishing association, PIMPESCA (*Asociación de Pescadores y Piangueras del Rio Cajambre*), have previously participated in several USAID programs such as MIDAS (USAID Program *Más Inversión para el Desarrollo Alternativo Sostenible*) and BIO-REDD+ (USAID Program Reduced Emissions from Deforestation and Degradation). For several years, the *Consejo* and PIMPESCA received technical assistance and training on sustainable fishing practices and commercial and business aspects. CCEP joined this project to help resolve the community's and the association's energy needs by installing PV systems and solar-powered refrigerators during PY3. Energy is required to guarantee the fish cold chain and, thus, improve commercial and income generation opportunities to PIMPESCA. The project also includes training on operation, maintenance, and repair to PV systems and solar refrigerators, which will continue through March 2016.

Table 7 – PV for cold chain in Punta Bonita																																			
Objective	Install PV systems for fish refrigeration systems with PIMPESCA (fishing association)																																		
Location	Valle del Cauca: Buenaventura (Punta Bonita / <i>Consejo Comunitario del Rio Cajambre</i>)																																		
Components	<ul style="list-style-type: none"> Technology: PV systems, solar refrigerators Environmental: training on good environmental practices in fishing coop, focused on water conservation and management Socioeconomic strengthening: training on technical issues, operation and maintenance for solar refrigerators 																																		
CCEP Ally	NA																																		
Investment	USAID: USD 140,125 Counterpart leverage: NA																																		
Status	Underway																																		
	<table border="1"> <thead> <tr> <th rowspan="2">Milestones</th> <th colspan="4">FY 2016</th> </tr> <tr> <th>Q1</th> <th>Q2</th> <th>Q3</th> <th>Q4</th> </tr> </thead> <tbody> <tr> <td>1. Project participants trained on technical issues, operation and maintenance for PV systems and solar refrigerators by December 2015.</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>2. PIMPESCA and community leaders trained on EE practices by December 2015.</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>3. One local event to disseminate results by March 2016.</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>4. M&E visits completed by March 2016.</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>5. C&O material produced by June 2016 or when applicable.</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Milestones	FY 2016				Q1	Q2	Q3	Q4	1. Project participants trained on technical issues, operation and maintenance for PV systems and solar refrigerators by December 2015.					2. PIMPESCA and community leaders trained on EE practices by December 2015.					3. One local event to disseminate results by March 2016.					4. M&E visits completed by March 2016.					5. C&O material produced by June 2016 or when applicable.				
Milestones	FY 2016																																		
	Q1	Q2	Q3	Q4																															
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4. M&E visits completed by March 2016.																																			
5. C&O material produced by June 2016 or when applicable.																																			

Table 7 – PV for cold chain in Punta Bonita

6.	C&O promotional pieces produced to enhance project components by June 2016 or when applicable.		
7.	Press coverage promoted with regional and/or national media by June 2016 or when applicable.		

- MHP in Sabana de Crespo (hybrid solar/hydro system)** The *Comunidad Indígena Arhuaca de Sabana de Crespo*, in Valledupar, Cesar, is made up of more than seven thousand people, of which over 4,000 have received health services from the clinic run by the Arhuaco health provider Wintikua (*instituto prestador de salud – IPS*). Basic public services are scarce: the community does not have access to energy, aqueduct, sanitation, nor water treatment. CCEP will build an 18 KW MHP to provide energy for the school, the health clinic, the community meeting hall, and community stores located in the town. The MHP will be interconnected to form a hybrid RE system with the 12 KW solar system recently installed by the Solar Electric Light Fund (SELF) under a separate USAID project in this community. Project long-term sustainability contemplates strengthening the indigenous IPS to operate, manage and maintain the MHP, training on EE practices to the institution, the *resguardo* and community members. Wintikua and the indigenous *cabildo* will be responsible for long-term management and operation of the energy solution provided by the program.

Table 8 – MHP in Sabana de Crespo

Objective	Build MHP to provide power for social infrastructure (health center, school, teacher residence center, community store)				
Location	Cesar: Valledupar (<i>Resguardo Indígena Arhuaco / Sierra Nevada de Santa Marta</i>)				
Components	<ul style="list-style-type: none"> Technology: MHP, distribution lines, household installations Environment: training on good environmental practices, with emphasis on water and forestry management for MHP infrastructure maintenance Socioeconomic strengthening: EE training, MHP operation and maintenance, training on electric grid maintenance and operation 				
CCEP Ally	NA				
Investment	USAID: USD 426,692		Counterpart leverage: NA		
Status	Contracting process				
	Milestones	FY 2016			
		Q1	Q2	Q3	Q4
1.	Infrastructure work completed and MHP in operation by April 2016.				
2.	Infrastructure inspection reports completed and presented by May 2016.				
3.	IPS formed and trained on MHP management and maintenance by June 2016.				
4.	Cabildo and community leaders trained on EE practices by June 2016.				
5.	One local event to disseminate results by June 2016.				
6.	M&E visits completed by September 2016.				
7.	C&O material produced by September 2016 or when applicable.				
8.	C&O promotional pieces produced to enhance project components by September 2016 or when applicable.				
9.	Press coverage promoted with regional and/or national media by September 2016 or when applicable.				

Up through PY3, solar installations required for individual CCEP projects were individually procured. Given the amount of solar systems involved in projects formulated for PY4, CCEP began the bidding

process for an IQC for the supply and installation of home and social infrastructure solar systems, solar street lighting and solar refrigeration throughout the country, and for the technical auditing or inspection of the installations. After receiving 39 expressions of interest and five formal proposals for the solar installations foreseen to be installed within the next six months, CCEP selected the winning proponent. CCEP also selected – and negotiated the fees of – the proponent who will undertake technical inspections and audit the correct specifications, installation and performance of the solar systems commended to the company hired, which is why in each project an “inspection report” is expected shortly after each installation is delivered. Thus, CCEP finalized PY3 ready to administratively process the two agreements by the beginning of PY4. These agreements cover the solar PV systems required in the following projects, except the projects whose procurement were previously charged to partner institution *Empresa de Energía del Pacífico* (EPSA).

- PV systems for Indigenous Community of Chachajó, Buenaventura District, Valle del Cauca.**
 During PY3, CCEP designed five projects with Valle del Cauca’s regional environmental authority (*Corporación Autónoma Regional del Valle del Cauca - CVC*) for 50/50 co-funding and implementation during PY4. Consensus building, contracting procedures, and preoperational activities were finalized by CCEP in order to begin project implementation in the five communities by July and finalize by December 2015, given that CVC’s counterpart funding was approved by its Board of Directors for this calendar year. However, CVC was forced to halt all its contracting procedures with indigenous and Afro-Colombian community associations due to an investigation opened by the National Controller’s Office (*Contraloría General de la Nación*) to follow up on bidding and contracting processes amongst regional environmental authorities. CVC representatives have not been formally accused of transgressions but the institution’s contractual processes were signaled out as potential pitfalls and pose a risk to the corporation. After assessing the situation internally, CCEP met with CVC and decided to continue on its own with only one of the projects, designed for the installation of PV systems in Chachajó, located in Buenaventura, Valle del Cauca, the largest and most sustainable of the five communities, home to more than 400 people. At the time of writing of this work plan, CCEP is redesigning the socioeconomic component and sustainability strategy, since CVC will not participate in project implementation.

Table 9 –PV systems in Chachajó					
Objective	Install PV systems in school and houses, public lighting, and community center in <i>Resguardo Indígena de Chachajó</i>				
Location	Valle del Cauca: Buenaventura (<i>Resguardo Indígena de Chachajó</i>)				
Components	<ul style="list-style-type: none"> Technology: PV systems, public lighting, solar-powered refrigeration system for school and pre-paid meters to assure financial sustainability Environmental: training on good environmental practices Socioeconomic strengthening: JASE, EE training, PV operation and maintenance 				
CCEP Ally	<i>Resguardo Indígena Wounaan de Chachajó</i>				
Investment	USAID: USD 180,000	Counterpart leverage: NA			
Status	Contracting process				
	Milestones	FY 2016			
		Q1	Q2	Q3	Q4
1.	PV systems installed by March 2016.		■		
2.	Pre-paid meters installed by June 2016.		■		
3.	Inspection reports completed and presented by June 2016		■		
4.	JASE formed and trained on PV operation and maintenance by August 2016.			■	
5.	JASE and community leaders trained on EE practices by August 2016.			■	

Table 9 –PV systems in Chachajó			
6.	One local event to disseminate results by September 2016.		
7.	M&E visits completed by September 2016.		
8.	C&O material produced by September 2016 or when applicable.		
9.	C&O promotional pieces produced to enhance project components by September 2016 or when applicable.		
10.	Press coverage promoted with regional and/or national media by September 2016 or when applicable.		

- PV Systems for Community Infrastructure in Arquía.** The *Resguardo Indígena Arquía* is home to more than 600 Kuna Tule in Unguía, Chocó. This community participates in a national program with the Social Prosperity Department (*Departamento para la Prosperidad Social – DPS*) to improve and expand education, health and other social and productive infrastructure in the town: the indigenous government hall, an artisan workshop for artisan women, two new school classrooms, a school restaurant, and a development center for early childhood. In late 2013, DPS formed an alliance with Unguía Mayor’s Office and *Pastoral Social* to build and/or reconstruct facilities at Arquía, assigning a budget for the architectural designs and infrastructure construction. In July 2014, DPS invited CCEP to identify RE solutions that could provide energy services to the proposed infrastructure, consisting of three existing buildings and four more to be built. The Program recommended PV systems for seven buildings that would provide services to the community, and adjusted their dimensions as work by DPS architects slowly evolved. Each building houses an organization that provides a particular service; each institution will be responsible for PV operation, maintenance, and repair. CCEP will also work to strengthen traditional productive activities in the community (cacao production and artisan products) by installing PV systems that supply energy to the collection center and the artisan workshop center. Due to its lengthy procurement procedures, until the end of August 2015, DPS had been unable to provide an estimated start and end date for construction work, led by the Mayor’s Office and *Pastoral Social*, delaying CCEP intervention. The Program was informed that construction would begin by the end of August and be completed in mid-December, 2015. CCEP will monitor construction progress and program its intervention, consisting of installing PV systems in up to seven buildings by April 2016.

Table 10 – PV systems for social infrastructure in Arquía					
Objective	Install PV systems for social infrastructure facilities				
Location	Chocó: Unguía (<i>Resguardo Indígena de Arquía</i>)				
Components	<ul style="list-style-type: none"> Technology: PV systems Environment: training on good environmental practices Socioeconomic strengthening: EE training, PV operation and maintenance 				
CCEP Ally	DPS, Municipality of Unguía and Pastoral Social				
Investment	USAID: USD 85,000	Counterpart leverage: USD 430,000			
Status	Planned				
	Milestones	FY 2016			
		Q1	Q2	Q3	Q4
1.	PV systems installed by April 2016.				
2.	Inspection reports completed and presented by May 2016.				
3.	One local event to disseminate results by June 2016.				
4.	M&E visits completed by September 2016.				
5.	C&O material produced by September 2016 or when applicable.				
6.	C&O promotional pieces produced to enhance project components by September 2016 or when applicable.				

Table 10 – PV systems for social infrastructure in Arquía

7. **Press coverage promoted with regional and/or national media by September 2016 or when applicable.**

- PV Systems for the Educational Institute of Bunkwimake, Sierra Nevada de Santa Marta.** The Educational Institute of Bunkwimake is a boarding school pertaining to the *Resguardo Indígena Arhuaco de la Sierra Nevada de Santa Marta*, located in Magdalena. As a regional center, Bunkwimake provides education and health services to more than one thousand Arhuaco children from four communities (Ati Gumuke, Bunkwimake, Jiwa, and Seykwanamake). The town has two power generators (gasoline and diesel) that barely produce enough energy for classrooms, school kitchen, and public lighting. The school also has a 20-year old PV system that powers computers. There is an abandoned solar refrigerator at the health center. Community leaders requested CCEP support to help solve the energy demand and thus strengthen education and health services in the region. The original project designed in 2013, in alliance with IPSE, included an 8 KW MHP and several productive facilities, which was cancelled in PY3 due to the requirement of a costly and complex environmental license by the National Environmental Licensing Agency (*Autoridad Nacional de Licencias Ambientales - ANLA*), due to its location within a National Park (*Sierra Nevada de Santa Marta*), not to the scale of the project. Upon persistent request by the educational institution and Arhuaco leadership, the Program designed a project where PV systems provide solar lighting for school facilities (school restaurant/study hall and boys and girls dormitories and respective bathrooms). It also includes the donation of 200 solar lanterns that will help children complete their homework and studies when out of school premises.

Table 11 – PV systems and solar lanterns in Bunkwimake

Objective	Install PV system in school and provide solar lanterns to school community				
Location	Magdalena: Santa Marta (<i>Institución Educativa de Bunkwimake / Resguardo Indígena Arhuaco / Sierra Nevada de Santa Marta</i>)				
Components	<ul style="list-style-type: none"> Technology: PV systems, solar lanterns Environmental: training on good environmental practices Socioeconomic strengthening: EE training and PV operation and maintenance 				
CCEP Ally	Bunkwimake Indigenous School				
Investment	USAID: USD 31,623		Counterpart leverage: USD 533		
Status	Contracting process				
	Milestones	FY 2016			
		Q1	Q2	Q3	Q4
1.	PV systems installed by May 2016.				
2.	Inspection reports completed and presented by June 2016.				
3.	Solar lanterns transferred to school by June 2016.				
4.	Resguardo and community leaders trained on EE practices by June 2016.				
5.	One local event to disseminate results by June 2016.				
6.	M&E visits completed by June 2016.				
7.	C&O material produced by September 2016 or when applicable.				
8.	C&O promotional pieces produced to enhance project components by September 2016 or when applicable.				
9.	Press coverage promoted with regional and/or national media by September 2016 or when applicable.				

- Hybrid solar/diesel power system in Punta Soldado.** Like many other population centers located along the Colombian Pacific Coast, Punta Soldado lacks continuous energy services.

Productive activities are limited to fishing with restricted commercial opportunities since the lack of energy or cold storage facilities force the community to sell its produce in Buenaventura. Community development and education are also restricted to daylight. It is proven that access to energy sources helps communities raise their living standards and improves community life in terms of income, health, and education. EPSA, one of the country’s large electricity companies, approached CCEP in 2013 to identify structure and implement renewable energy solutions for communities in its area of influence, specifically Punta Soldado, with which it had social responsibility pacts. Progress in the formulation and roll out of renewable energy options were slow due to lack of experience and hesitance by the company to finance this type of “costly” installation (compared to its more familiar urban installations). During the course of site visits, community discussions and project design, however, RE/EE Law 1715 was passed in 2014 and stimulated national interest in the installation of hybrid energy systems in the ZNI, and prodding EPSA and corporate owner CELSIA presidency to want to develop and install a hybrid solar/diesel system for Punta Soldado (a community of 140 households and institutional and commercial establishments) as a pilot project – despite surpassing conventional cost limits per residential installation which had made the company hesitate to cofinance the project. CCEP and EPSA agreed to carry out complementary work: this project includes the installation of pre-paid meters, funded by CCEP, that will help reduce long-standing debt and encourage greater energy efficiency and rational use of energy, and enable EPSA and CELSIA to remotely monitor each client’s consumption patterns as called for by recent regulations for the ZNI derived from Law 1715/2014. For CCEP, the opportunity to involve a major player in the electricity market in this type of project is also strategic not only to assure technical backing for the operation of the hybrid and solar systems in the future, but as part of its RE institutionalization efforts.

Table 12 - Hybrid (solar/diesel) system in Punta Soldado					
Objective	Install hybrid (solar/diesel) system in Punta Soldado				
Location	Valle del Cauca: Buenaventura (<i>Consejo Comunitario Punta Soldado</i>)				
Components	<ul style="list-style-type: none"> • Technology: PV systems, civil works (storage room for batteries and inverters), public lighting, replace traditional lighting LEDs, pre-paid meters; diesel-powered electric generator and household electric installations funded by EPSA • Environmental: training on good environmental practices, covered by EPSA • Socioeconomic strengthening: JASE, EE training, hybrid PV/diesel system operation and maintenance, paid for by EPSA 				
CCEP Ally	EPSA				
Investment	USAID: USD 227,087		Counterpart leverage: USD 227,087		
Status	Contracting process				
	Milestones	FY 2016			
		Q1	Q2	Q3	Q4
1.	Infrastructure work required for PV installation completed by December 2015.	■			
2.	PV systems installed by March 2016.	■			
3.	Inspection reports completed and presented by March 2016.		■		
4.	Pre-paid meters installed by June 2016.		■		
5.	One local event to disseminate results by April 2016.			■	
6.	M&E visits completed by June 2016.			■	
7.	C&O material produced by September 2016 or when applicable.				■
8.	C&O promotional pieces produced to enhance project components by September 2016 or when applicable.				■
9.	Press coverage promoted with regional and/or national media by September 2016 or when applicable.				■

- PV Systems in “Telemedicine” Frontier Health Centers.** *Telemedicina* is a GOC program in which communities located in border municipalities have remote access to timely, high quality, and efficient health services via telecommunications. However, this is possible only if energy service is constant and sufficient to provide power for medical and telecommunications equipment in remote and isolated places. CCEP is working with *Cancillería* to take this program to 11 locations around the country, through solar PV systems. The telemedicine program counts with regional hospitals to attend remitted patients and specialists who attend the patients by means of this technology from “reference centers” in Bogotá, Barranquilla, Medellín and other cities. Regional hospitals in charge of frontier health posts but located at department capitals or municipal urban areas will be responsible for the operation, maintenance, and repairs of the energy applications installed, and *Cancillería* will provide operational assistance and monitoring through annual contracts.

Table 13 – PV systems in Telemedicine frontier health centers

Objective	Install PV systems in 11 off-grid health centers to provide basic health services through "tele-medicine" program involving 70 hospitals and rural health centers				
Location	Amazonas: La Pedrera, El Encanto Cesar: Chimichagua Chocó: Juradó La Guajira: Uribia (Siapana, El Paraíso), Dibulla Nariño: Tumaco Putumayo: Puerto Leguízamo (Piñuña Negra) Vaupés: Mitú Vichada: Cumaribo				
Components	<ul style="list-style-type: none"> Technology: PV systems (panels, batteries, invertors, vaccine refrigerators, etc.) Environmental: training on good environmental practices, with particular emphasis on strict implementation of health post environmental management plans, done by <i>Cancillería</i> Socioeconomic strengthening: to assure proper PV systems maintenance and worn-out component replacement, a monthly management and savings plan will be developed and monitored at each health facility involved, by <i>Cancillería</i> 				
CCEP Ally	<i>Cancillería</i>				
Investment	USAID: USD 182,675		Counterpart leverage: USD 138,623		
Status	Contracting process				
	Milestones	FY 2016			
		Q1	Q2	Q3	Q4
1.	PV systems installed by June 2016.				
2.	Inspection reports completed and presented by September 2016.				
3.	One national event to disseminate results by September 2016.				
4.	M&E visits completed by September 2016.				
5.	C&O material produced by September 2016 or when applicable.				
6.	C&O promotional pieces produced to enhance project components by September 2016 or when applicable.				
7.	Press coverage promoted with regional and/or national media by September 2016 or when applicable.				

- PV Systems for Street Lighting and Water Pumping in Vigía del Fuerte and Bojayá, and the CERI of Necoclí.** Communities in Vigía del Fuerte, Antioquia and Bojayá, Chocó lived first-hand the atrocities of illegal armed actors for too long. Now people look forward to a positive and optimistic future, powered by regional development, where energy is key. CCEP, the Antioquia Governor’s Office, and

EPM will work together to provide solar energy for the water treatment plant, the pumping system for the aqueduct, electricity to a Rural Indigenous Educational Center (*Centro Educativo Rural Indígena* – CERI) in Necoclí, and public lighting in both Vigía del Fuerte and Bojayá. Due to their mandates as regional government and public utility company of Antioquia, CCEP allies will channel their funds to the water treatment plant and aqueduct in Vigía del Fuerte and the CERI educational center whose construction was not completed in time to include in PY3’s CERI project; while CCEP will cover the public lighting components and socioeconomic strengthening in both locations.

Table 14 – PV systems for various public service utilities in Vigía del Fuerte, Bojayá and Necoclí

Objective	Install PV systems to provide energy to public lighting in Vigía del Fuerte and Bojayá, water treatment plant and pumping service to aqueduct in Vigía del Fuerte, and a CERI educational institution in Necoclí				
Location	Antioquia: Vigía del Fuerte and Necoclí Chocó: Bojayá				
Components	<ul style="list-style-type: none"> • Technology: PV systems, pre-paid meters, household electric installations, solar-powered refrigerator for school • Environmental: good environmental practices • Socioeconomic strengthening: Local electricity distributors, EE training, PV operation and maintenance 				
CCEP Allies	EPM and Antioquia Governor’s Office				
Investment	USAID: USD 198,964		Counterpart leverage: USD 367,178		
Status	Contracting process				
	Milestones	FY 2016			
		Q1	Q2	Q3	Q4
1.	134 solar-powered public lighting installed in Bojayá and Vigía del Fuerte by May 2016.				
2.	Inspection reports completed and presented by June 2016.				
3.	One regional event to disseminate results by September 2016.				
4.	M&E visits completed by June 2016.				
5.	C&O material produced by September 2016 or when applicable.				
6.	C&O promotional pieces produced to enhance project components by September 2016 or when applicable.				
7.	Press coverage promoted with regional and/or national media by September 2016 or when applicable.				

- **MHP for Arusí, Partadó and Termales, Municipality of Nuquí, Chocó.** During PY3, CCEP invested great efforts towards the construction of a 100 KW MHP in Arusí and conduction lines to provide energy services for Arusí, Partadó, and Termales, in Nuquí, Chocó. The project also includes the construction of an ice production facility for fishing cold chain, training on EE, and infrastructure work to update household electric installations. CCEP allies included Presidencia, DPS, and IPSE. The six-month project, initially estimated at USD 1.3 million (USD 950,000 in counterpart leverage; USD 350,000 in USAID/CCEP funding) faced delays from the start. Ten months later, the project budget was almost twice as much as initially estimated and only the 10.5 km power line had been installed, with no advance at all in the hydro energy civil works and electromechanical equipment. On June 24, 2015, USAID sustained a meeting with CCEP and all allies and expressed its concern over the delays as well as the need for independent engineering verification of completion of 75% of GOC-funded infrastructure prior to additional CCEP investment in the project. The Financial Fund for Development Projects (*Fondo Financiero de Proyectos de Desarrollo* - FONADE), the GOC fund manager, committed to completing all infrastructure by October 2015. In August 2015, CCEP informed allies that (a) it had completed its Forestry Management Plan component; (b) the results of an independent engineering audit

demonstrated zero construction progress since the June meeting and impossible completion by end of year; and (c) the Program would only participate further if a technical inspection performed in December 2015 confirmed that all construction work was completed and that the MHP is operating. For CCEP to intervene in Arusí, there must be power supply: an ice factory cannot operate with no electricity, household installations and pre-paid meters would be moot, as would the socio entrepreneurial strengthening of a local energy service company, etc. CCEP has kept USAID informed on project developments (and lack of progress) and provided technical assistance to participating GOC entities throughout the year. CCEP’s continued participation in this project has been contingent on project completion, both of the MHP (DPS/Presidencia) and the power lines (IPSE). By end of August 2015, construction work had been suspended while designs were reviewed for possible modification, if warranted. At the time of this update, agreements have been reached between Presidency, DPS, IPSE, FONADE, constructors and auditors to resume work in January 2016 as originally designed by CCEP and complete the project by May or June 2016. For Program purposes, USAID and CCEP established March 2016 as the final cut off and pull out date.

- Though the current schedule ratifies the impossibility of CCEP to embark on further investment by March, the transfer of responsibility for environmental permits and *consulta previa* from CCEP to GOC and/or the Riscales Council will be formalized prior to pull out.

Table 15 – MHP for Arusí, Partadó, and Termales					
Objective	Build a 100 KW MHP for Arusí, Termales, and Partadó				
Location	Chocó: Nuquí (Arusí, Partadó, Termales)				
Components	<ul style="list-style-type: none"> • Technology: MHP, household electrical installations, public lighting • Environmental: good environmental practices, forestry management plan • Socioeconomic strengthening: JASE, EE training, SME for ice production (contingent upon verified 100% completion of infrastructure work and MHP operation) 				
CCEP Allies	IPSE, DPS, <i>Presidencia</i>				
Investment	USAID: USD 344,844		Counterpart leverage: USD 957,471		
Status	Underway (counterpart funding and activities)				
	Milestones	FY 2016			
		Q1	Q2	Q3	Q4
	1. Transfer of agreements included in consulta previa to DPS by March 2016.				
	2. Transfer of environmental permits to Riscales Community Council by March 2016.				
	3. Technical assistance provided to Presidency, DPS, IPSE, and FONADE to reach project completion by June 2016.				
	4. M&E visits completed by September 2016.				

- During Q4 PY3, CCEP worked with *Cancillería* to identify and formulate a second associative renewable energy project for Upper Guajira and the *Serranía del Perijá* in Cesar and La Guajira, for which *Cancillería* has already appropriated counterpart funding and assigned a project implementer for the duration of 2015, extensible to 2016. Several components are fully designed (e.g., installation of PV systems to provide energy to an 850-student/40-staff boarding school in Siapana, Uribia, La Guajira) and some partially (e.g., solar systems for coffee growing farms in Cesar but not yet La Guajira). The components of this new USD 470 thousand project to be implemented over the course of the first three quarters of PY4, are:
 - **PV Systems for the Educational Institute of Siapana, north Guajira.** The *Educational Institute of Siapana* is a Wayuu boarding school located in La Guajira, in the northernmost part of that peninsula. Siapana provides educational services to more than 850 children from Siapana and other communities as far south as Uribia. The

school has two diesel power generators (40 and 60 KW) that produce energy for classrooms, school kitchen, and other needs on a daily basis for a period of only four to six hours. CCEP intervention in Siapana has been designed to provide energy on a continuous basis through solar PV systems for currently unattended services: solar refrigeration for perishable foods, solar power for 20 laptop computers and audiovisual aids, solar lighting for auditorium and student study area, and the installation of a solar thermal parabolic oven to bake bread.

Table 16 – PV systems in Northern Guajira				
Objective	Install PV systems in Siapana boarding school			
Location	La Guajira: Uribia (Siapana / <i>Institución Educativa de Siapana / Resguardo Indígena Wayuu</i>)			
Components	<ul style="list-style-type: none"> • Technology: PV systems for lighting, computers and refrigeration in Siapana • Environmental: training on good environmental practices • Socioeconomic strengthening: EE training and RE equipment operation and maintenance 			
CCEP Allies	Siapana Indigenous School and <i>Cancillería</i>			
Investment	USAID: USD TBD		Counterpart leverage: USD TBD	
Status	Contracting process			
	Milestones	FY 2016		
		Q1	Q2	Q3
				Q4
1.	PV systems installed in Siapana by June 2016.			
2.	Inspection reports completed and presented by September 2016.			
3.	Community leaders trained on EE practices and RE equipment operation and maintenance by September 2016.			
4.	One or more local events to disseminate results by September 2016.			
5.	M&E visits completed by September 2016.			
6.	C&O material produced by September 2016 or when applicable.			
7.	C&O promotional pieces produced to enhance project components by September 2016 or when applicable.			
8.	Press coverage promoted with regional and/or national media by September 2016 or when applicable.			

- **Solar systems for coffee growing farms in Serranía del Perijá, Cesar.** The Guajira and Cesar Coffee Growers' Committee (*Comité de Cafeteros de Guajira y Cesar*) is implementing improvements to productive infrastructures of small coffee farms in *Serranía del Perijá* that include solar dryers, coffee processing machines and other housing and crop improvements. So far, the *Comité* has implemented 70 solutions and began a new stage to implement 350 additional ones. The project for Perijá involves the installation of at least 50 small PV systems to provide energy to drive DC motors to power the small individual coffee processing machines and to provide basic household electricity for lighting , TV and cell phone charging.

Table 17 – PV systems in Serranía de Perijá	
Objective	Install PV systems in coffee farms in <i>Serranía del Perijá</i>
Location	Cesar: Urumita, Villanueva (<i>Serranía del Perijá</i>)
Components	<ul style="list-style-type: none"> • Technology: PV systems for basic household needs and to drive DC motors for small individual coffee processing machines • Environmental: training on good environmental practices

Table 17 – PV systems in <i>Serranía de Perijá</i>				
	• Socioeconomic strengthening: EE training and RE equipment operation and maintenance			
CCEP Allies	<i>Comité de Cafeteros de Guajira y Cesar and Cancillería</i>			
Investment	USAID: USD TBD	Counterpart leverage: USD TBD		
Status	Contracting process			
Milestones	FY 2016			
	Q1	Q2	Q3	Q4
9. PV systems installed in <i>Serranía del Perijá</i> by July 2016.				
10. Inspection reports completed and presented by September 2016.				
11. Community leaders trained on EE practices by September 2016.				
12. One or more local events to disseminate results by September 2016.				
1. M&E visits completed by September 2016.				
13. C&O material produced by September 2016 or when applicable.				
14. C&O promotional pieces produced to enhance project components by September 2016 or when applicable.				
15. Press coverage promoted with regional and/or national media by September 2016 or when applicable.				

- **Other T2 projects.** CCEP continues to work to identify potential projects for implementation by end of PY4 with existing allies. Additional projects will be considered after strict consultation with USAID. Characteristics: solar; socio-entrepreneurial component is some else's responsibility.

b. Work Stream 2.2: Monitoring and evaluation activities

During the prefeasibility studies for each RE system, CCEP performs baseline studies regarding not only energy demand but also socioeconomic conditions. Impact evaluations are scheduled to take place between six to 12 months after the end of each project, once communities and SMEs have had a chance to take ownership and use the new systems, to determine whether targets have been achieved and changes in the socioeconomic conditions found during these studies can be analyzed. The following table presents scheduled dates for follow-up and monitoring visits.

Final impact evaluations will take place during PY5 (October 2016 – January 2017).

Table 18 – CCEP T2 monitoring and evaluation visits				
Milestones	FY 2016			
	Q1	Q2	Q3	Q4
1. PV systems in Santa Rosa de Guayacán, Buenaventura, Valle del Cauca.				
2. MHP rehabilitation, installation of water purification system, and improved cook stoves in San Antonio, Dibulla, La Guajira.				
3. PV systems in Utría National Park, Bahía Solano, Chocó.				
4. PV systems in CERIS in Antioquia (in alliance with Antioquia Governor's Office and EPM).				
5. MHP in Palmor, Ciénaga, Magdalena (in alliance with IPSE).				
6. Solar and mechanically-assisted pumping systems in rancherías in Maicao, Manaure, and Uribia, La Guajira (in alliance with FCGI).				
7. MHP in <i>Cabildo Indígena Río Pangüí El Yuca</i> , Nuquí, Chocó (in alliance with IPSE).				
8. PV systems for cold chain in <i>Consejo Comunitario del Río Cajambre</i> , Buenaventura, Valle del Cauca.				
9. MHP in <i>Resguardo Indígena Arhuaco Sabana de Crespo</i> , Valledupar, Cesar.				
10. PV systems for social infrastructure in Arquía (in alliance with DPS, Unguía Mayor's				

Table 18 – CCEP T2 monitoring and evaluation visits			
	Office, and <i>Pastoral Social</i>).		
11.	PV systems and solar lanterns in <i>Resguardo Indígena Bunkwimake</i> , Santa Marta, Magdalena (in alliance with Bunkwimake Indigenous School).		
12.	Hybrid system in <i>Consejo Comunitario Punta Soldado</i> , Buenaventura, Valle del Cauca (in alliance with EPSA).		
13.	PV systems in <i>Territorio Colectivo Bajo Calima</i> , Buenaventura, Valle del Cauca (in alliance with EPSA).		
14.	PV systems in 11 “telemedicine” health centers (in alliance with <i>Cancillería</i>).		
15.	PV systems in Vigía del Fuerte, Antioquia and Bojayá, Chocó (in alliance with Antioquia Governor’s Office and EPM).		
16.	MHP in Arusí, Partadó, and Termales.		
17.	PV systems in Norther Guajira.		
18.	PV systems in <i>Serranía de Perijá</i> .		
19.	Other M&E visits, as required.		

c. Workstream 2.3: Strategy and outreach plan for cost-share funds

CCEP will not embark in new projects from scratch during PY4; therefore, no additional activities are planned to encourage cost-share funds. In strict agreement with USAID, the Program will embark on new projects with known strong allies with demonstrated capacity with technical and financial resources required to guarantee project completion.

2.3 TASK 3 - ENERGY EFFICIENCY AND RENEWABLE ENERGY INVESTMENT PROMOTION

2.3.1 Overall approach

Task 3 – Energy efficiency and renewable energy investment promotion – focuses on implementing interventions to catalyze industry and business sector investment in EE and RE by combining project development, financial facilitation, and technical and business advisory services and technical assistance. Expected results are:

- Projects will facilitate energy savings, energy cost savings and renewable generation;
- 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.

Under this component CCEP provides technical assistance to enable companies to develop clean energy projects and support project sustainability and replication. This component is focused primarily on SMEs, but also considers large facilities that have significant replication and CO₂e emissions mitigation potential and EE projects in areas of interest to USAID and the GOC.

During PY3 CCEP focused on industries and companies that represented : (i) economic viability of EE/RE investments; (ii) potential impact of EE/RE investments in terms of energy reduction and cost-savings; (iii) potential for a demonstration effect, information-sharing, and replication among similar facilities/companies (e.g., through an industrial association; with industries that are physically clustered); and (iv) complementarity with other donor activities or with specific financial credit lines for EE/RE investments available through national banks and other organizations.

Following these lines, CCEP T3 worked on several concrete and distinct project portfolios during PY3: (Portfolio 1 - P1) case by case project applications; (Portfolio 2 - P2) industries located in the Yumbo industrial corridor; (Portfolio 3 - P3) EE/RE project initiatives with Energy Service Companies (ESCOs); (Portfolio 4 - P4) coal dosifier systems with small brick manufacturers; and (Portfolio 5 - P5) industries with process steam and heat combustion based on coal and natural gas boiler and kiln systems. The sixth line (Portfolio 6 - P6) was composed of the project pipeline under design through the PPF mechanism, mentioned in T1, where the Program worked with UPME and companies representing different sectors on structuring engineering and financial components of a first tier of nine EE/RE projects and the identification and formulation of additional company proposals. Four of these portfolios (P1, P2, P3 and P5) were scheduled to finalize project structuring and take-off or continuation under remaining portfolios by the end of PY3, albeit subject to project monitoring to document energy savings and CO₂ emissions reductions through the end of CCEP Program life.

In practice, throughout PY3 evolution, T3 work merged into three main lines, which form the basis for the PY4 work streams planned: continue assisting in the installation of coal dosifier systems in small and medium brick manufacturers under an umbrella project with the Environmental and Business Corporation (*Corporación Ambiental Empresarial – CAEM*) (work stream 3.1 - formerly P4); promote adoption of combustion optimization technologies in boilers and kilns powered by fossil fuels in industries with process steam and heat combustion powered by coal and natural gas (work stream 3.2 - formerly P5); and consolidate opportunities for private sector investment in clean energy through CCEP’s PPF (work stream 3.3 – formerly P6).

2.3.2 Planned activities under each Work Stream

A description of the various work streams under Task 3 area is included below.

a. *Workstream 3.1: Assist in the installation of coal dosifier systems in SME brick manufacturers*

Programs and studies sponsored by international cooperation, public institutions and private foundations prove that low-cost technological solutions can significantly reduce fossil fuel consumption and CO₂ emissions per unit of output in brick kilns and industrial boilers. In order to motivate broader adoption of a specific technology, during PY2 CCEP partnered with CAEM, the environmental business affiliate of the Bogota Chamber of Commerce, to implement pulverized coal dosifiers in 20 SME brick manufacturers in Cundinamarca and Boyacá.

During PY3 CAEM did not perform as expected nor delivered as many brick manufacturers as originally scheduled. The project initially focused on companies that were interested in improving their coal-fired kilns through the introduction of coal dosifiers which pulverize and inject coal particles for complete combustion, but which lacked technical and financial capacity to invest in engineering studies or access formal bank loans. CCEP and CAEM analyzed various scenarios to improve and accelerate this technology’s adoption and will focus PY4 implementation on working with SME brick manufacturers that either have the financial muscle to cover the investment or that are eligible for private funding, thus recovering time elapsed and reaching project targets by mid-2016.

Table 19 – Coal dosifier systems in SME brick manufacturers

Project	Description
CAEM	CCEP, through CAEM, works with SME brick manufacturers to improve feeding and combustion systems for brick drying kilns. This two-year USD 1.7 million project expects to reduce fuel

Project	Description	FY 2016			
Milestones		Q1	Q2	Q3	Q4
	consumption by 30% and 16,000 annual tons of CO ₂ emissions by improving combustion systems in 20 brick factories.				
	Main Results: Automatic solid fuel (coal and/or coffee husk) combustion systems installed in 20 SME brick manufacturers.				
1.	8 dosifiers installed in SME brick manufacturers by December 2015.	■			
2.	8 dosifiers installed in SME brick manufacturers by March 2016.		■		
3.	3 dosifiers installed in SME brick manufacturers by June 2016			■	
4.	Lessons learned on clean energy for SME brick manufacturers prepared and presented to interested audiences by September 2016.				■
5.	Annual technical audit completed by September 2016.				■
6.	Regional and national events to disseminate project results by September 2016.				■
7.	C&O material project produced by September 2016 or when applicable.	■	■	■	■
8.	C&O promotional pieces produced to enhance project components and visibility by September 2016 or when applicable.	■	■	■	■
9.	Press coverage promoted with regional and/or national media by September 2016 or when applicable.	■	■	■	■

b. Workstream 3.2: Promote adoption of combustion optimization technologies in boilers and kilns

The group of “Industrial Use Energy Combustion Optimization Systems” projects, which for simplicity’s sake we refer to as “Boiler and Kiln” projects within CCEP, seek to promote and co-sponsor project initiatives that implement energy efficiency technologies for industrial combustion equipment, such as boilers, kilns, driers and other thermal energy use apparatus. CCEP’s “boiler and kiln projects” demonstrate how the adoption of low-cost, high-savings combustion improvement technologies require little engineering work, take advantage of financial structuring through cost-share schemes and show emissions reduction and energy savings results in the short term. In a nutshell, this workstream on boiler energy optimization in industrial combustion systems consists of co-financing the technical assistance and engineering components of travelling grates for coal boilers, electronic control systems for natural gas boilers and coal dosification systems for brick kilns, while the companies themselves pay for the necessary equipment. The financial investment is recovered well within a three year period – even a few months –, mostly through cost savings. “Boiler and kiln projects” take advantage of T3 team’s involvement in a project initiated eight years ago by the Swiss Cooperation Agency (SECO), where small and medium size companies receive up to 25% reimbursement of the total energy efficiency credit incurred for the corresponding investment as a subsidy, and the team has established working relations with both the SME companies involved and their technology suppliers.

The high potential for energy savings and emissions reductions of these projects resides in the fact that many of the industrial combustion equipment that exist in Colombia have been in operation for many years and are thus susceptible to be submitted to technological updating processes which improve their efficiency and reduce their fuel consumption, thereby reducing their CO₂e emissions.

CCEP has made special emphasis on combustion systems dependent on mineral coal – just as in the above-mentioned CAEM brick combustion optimization workstream – because these generally demonstrate the greatest technological lags and the most elevated GHG emissions factors (compared to other fuels such as diesel or natural gas). This enables the coal combustion optimization projects identified under this workstream to contribute high CO₂ emissions reductions, which is one of the main performance indicators for CCEP, as reflected in the Performance Monitoring Plan (PMP).

Thus, the boiler and kiln projects under this workstream are designed to contribute significantly to achieve the target defined for this PMP indicator, as evidenced in the individual projects already implemented and which, in all cases, have reached or surpassed the emissions reductions targets anticipated during the preliminary evaluations of each of them. A summary of results achieved to date after the first year of implementation of this portfolio, and the potential emissions reductions of subprojects initiating implementation or under structuring and evaluation by CCEP’s technical team, is presented in the following table.

Table 20 – Expected emissions reductions from boiler & kiln projects

	Company	Emissions Reduced (Ton CO ₂ /year)
Boiler and Kiln Projects Implemented PY3	AMTEX	72
	WASH	1,949
	PUNTO FLEX	565
	CRYSTAL	3,274
	SUGRES	702
	PROCABLES	885
	TOTAL	7,447
Projects Under Implementation	LADRILLERA MELENDEZ	1,000
	TERMIMODA	200
	TOTAL	1,200
Projects Identified and in Process of Approval for PY4	COLTEJER	7,000
	BIO D	800
	LADRILLERA AMBALÁ	4,000
	TOTAL	11,800
Expected Emissions Reductions from Boiler & Kiln Projects:		20,447 Ton CO₂/year

Given the success of the projects implemented during PY3, CCEP decided to continue working on boiler and kiln combustion optimization during PY4, aiming for rapid adoption of relatively low-cost combustion control systems that can guarantee a minimum verifiable reduction of 500 tons of CO₂ emissions per year per participating company. Participating companies will be identified from inventories made by CCEP allies and partners, such as UPME, equipment manufacturers, and other knowledgeable actors.

Table 21 – Boiler and Kiln Combustion Optimization project

Project	Description	FY 2016			
“Boiler/kiln project”	Boiler and kiln energy optimization in industrial combustion systems consists of replacing or improving travelling grates for coal boilers and electronic control systems for natural gas boilers, or introducing pulverization and dosification systems in coal-fired kilns. Each low-cost combustion control system represents a reduction of at least 500 tons of CO ₂ / year.				
	Main Results: Improved industrial combustion systems in ten companies.				
	Milestones	Q1	Q2	Q3	Q4

Project	Description		
	1. 4 companies implement boiler or kiln optimization systems by December 2015.		
	2. 6 companies implement boiler or kiln optimization systems by March 2016.		
	3. M&E visits completed by September 2016.		
	4. CCEP presents individual results and lessons learned from “boiler and kiln project” to participating companies during closing event by April 2016.		
	5. Technical and engineering staff trained on technical issues regarding in industrial combustion systems based on “boiler and kiln project” results and lessons learned by June 2016.		
	6. Document on CCEP’s experience in “boiler and kiln project” case studies, and success stories prepared and presented by June 2016.		
	7. Annual technical audits completed by September 2016.		
	8. C&O material project produced by September 2016 or when applicable.		
	9. C&O promotional pieces produced to enhance project components and visibility by September 2016 or when applicable.		
	10. Press coverage promoted with regional and/or national media by September 2016 or when applicable.		

c. Workstream 3.3: Consolidate opportunities for private sector investment in clean energy through CCEP’s PPF

CCEP’s PY3 saw the formalization and start-up of the PPF operational unit during the last quarter of 2014, which enabled the Mechanism to initiate immediate implementation of a few basic EE/RE engineering projects for preselected industrial and commercial in partnership with UPME. UPME agreed to channel up to COP 600 million to cofinance PPF studies from its 2014 budget, while CCEP prepared to cofinance up to COP 700 million for the first tier, for a total of COP 1.2 billion (approximately USD 570,000 at going exchange rates of December 2014). Viable engineering projects were taken from existing lists of project proposals and engineering firms identified through UPME industrial energy use characterizations, the alliance formed by UPME and the National Industrialists Association (*Asociación Nacional de Industriales – ANDI*) alliance for EE in major industrial consumers, and CCEP project prospects under discussion with ESCOs and Yumbo industrial cluster businesses. Eight studies were commissioned with the budget allocated to UPME for its first tier of PPF projects, and a ninth quickly followed suit through USAID funding, as presented in the following table.

Table 22 — First Tier of PPF Engineering and Financial Structuring Designs (2015)

Project No.	Sector	Estimated Investment (USD M)	Estimated emission reduction tons	
1	Chemical industry	40	30.740	
2	Metalwork	0,5	1.000	
3	Steel	3	5.000	
4	ESCO Model	Pulp and paper	16	16.400
5		Retail 1	2	400
6		Retail 2	1	197
7		Food and beverages	0,5	1.240
8		Textile	1,3	2.129
9	Pulp and paper	2,3	45.625	
	TOTAL	66,6	102.731	

Though originally conceive to take up to six months in development, the studies required more time to mature and produce basic engineering designs and project budgets. The engineering designs were closely supervised by CCEP in close interaction with beneficiary companies and engineering companies designed, to assure high quality and reliable results, As anticipated, however, the technical components of these studies were not accompanied with equally strong financial analysis, which is why CCEP hired a strong financial team to work with companies as part of the PPF work unit in Bogotá. The financial information provided by the engineering firms and beneficiary establishments to CCEP’s financial structuring team over the last few months of PY3 was insufficient to reach “financial closure” of projects designed, for Board of Directors, top management and financial institution decisions, but recipient companies cooperated with our team to strengthen budgets and accounting and tax models.

Rather than discouraging UPME, CCEP, participating companies and “observing institutions” such as MME and ANDI from promoting the PPF Mechanism or further designing project finance, tax incentive and engineering designs, enthusiasm has grown as all these agents view the Mechanism as a major contributor to developing solid EE/RE investment projects to “*take clean energy into the real economy.*” The nine initial projects are estimated to require USD 67 million in investment and generate over 100,000 tons of CO₂e emissions reductions per annum. The lessons learned, guidelines and procedures developed, and experience gathered by the PPF project coordination unit and CCEP/UPME staffs involved will allow the PPF to enter a more productive phase during PY4.

As mentioned above, CCEP T3 portfolio activities merged into the PPF, mostly due to the unique opportunity offered by the Mechanism: co-finance and develop final engineering and business plans for technical and financial closure, required by companies and financial institutions to make decisions regarding EE and RE. At the time of writing, the two cogeneration projects combining renewable energy (residual biomass) and coal designed under the PPF with paper and pulp company *Carvajal* have passed initial company approvals, requiring investments close to USD 20 million and reducing CO₂e emissions by over 60,000 tons per annum – once completed. Two other projects structured with chemical sector manufacturer SUCROAL and metallurgical sector IMPAL have also required permanent interaction between company and CCEP financial staff, and are close to management approvals. Other projects, structured by MGM Energy Services with which CCEP had previously structured projects such as the *Colanta* dairy manufacturer biogas-to-steam project ESCO contract recently signed, have been completed by Q1 PY4.

Finally, a second tier of PPF projects is being structured for co-finance by USAID and UPME as of PY4, both through direct technical assistance to projects identified through companies participating previous CCEP/UPME project portfolios, companies participating in EE workshops held during PY3 and through an public call for bids published on August 24, 2015 and open through October 15, 2015, which resulted in receiving 87 expressions of interest and over 50 study proposals from all types of enterprises.

During Q1 PY4, CCEP and UPME have evaluated and prioritized project proposals and, after thorough analysis, and are ready to initiate contracting procedures to co-finance selected initiatives, for which the PPF project unit already has established procedures.

Table 23 – Clean Energy Project Preparation Facility PPF

Project	Description	FY 2016			
	Milestones	Q1	Q2	Q3	Q4
PPF	The PPF mechanism offers companies the opportunity to co-finance and develop final engineering and business plans required by corporate boards and financial institutions to make decisions regarding investment in EE, RE, and clean energy production.				
	Main Results: Detailed engineering studies and financial models developed for six companies.				
	1. Financial models for first tier projects completed by December 2015.	■			
	2. Engineering work in first tier projects that received board approval and financial support to carry out project by started by June 2016.	■			
	3. Engineering studies for first tier projects completed by September 2016.	■			
	4. Interested participants present technical proposals by October 2015.			■	
	5. Proposals evaluated and selected by December 2015.			■	
	6. Agreements with new companies interested in joining PPF signed by February 2016.		■		
	7. Engineering studies with new companies completed by September 2016.			■	
	8. Financial models completed by June 2016.			■	
	9. Working session with business leaders to discuss clean energy investments in industries; funding opportunities; appropriate technologies replicable in industrial production processes; and tax incentives by September 2016, when applicable.				■
	10. C&O material project produced by September 2016 or when applicable.				■
11. C&O promotional pieces produced to enhance project components and visibility by September 2016 or when applicable.				■	
12. Press coverage promoted with regional and/or national media by September 2016 or when applicable.				■	

3. CCEP PY4 COMMUNICATIONS AND OUTREACH PLAN

In PY3, the Program planned to expand public awareness about the Program and to consolidate communication tools as strategies to help support effective completion of CCEP projects. This focus will continue to be the focus during PY4. CCEP will work with a renewed and revamped C&O to ensure that Program audiences understand the results and impact of clean energy in three levels: public policy, off-grid communities' access to renewable energy, and energy efficiency.

During its fourth year, CCEP plans to focus on the activities described in this section using an updated framework. In the following sections we describe the general approach that will serve as the framework for implementation of the renewed C&O strategy. Additional details and information on CCEP's C&O objectives, audiences, messages, and products will be included in CCEP's Communications and Outreach Strategy "Clean Energy for Colombia," which will be submitted for review and approval once AWP4 is approved.

3.1.1 Produce high-impact events, communication pieces and press coverage

The success of a C&O plan depends on its content: audiences are attracted to innovative approaches and, thankfully, clean energy provides plenty of prime material to produce high-impact pieces and active interaction. CCEP will work to disseminate Program and project information to various audiences, creating greater awareness on RE and EE.

In PY4, CCEP will organize and host local, regional, and national events to disseminate Program results. The Program will also use these as venues to officially transfer Program methodologies and strategies to CCEP successors, as part of its institutionalization strategy. In addition, the Program will produce print and multimedia material to disseminate lessons learned working on public policy issues with GOC institutions, RE with communities in ZNI, and EE with the public and private sectors, as well as promotional pieces to enhance project components, such as manuals for PPF or a radio show to encourage JASE transparency and accountability through *rendición de cuentas*. Most communications material will be digital and available online, for wide distribution. Lastly, CCEP will also work with Program allies to receive press coverage in regional and/or national media. Special focus will be on in-depth coverage and production of multimedia material that can be accessed online, from its publication date onward. C&O activities and estimated schedules were included in each of the workstreams described in the previous chapters.

3.1.2 Enhance CCEP visibility

A key point in CCEP C&O work is focused on audiences recognizing Program activities and projects throughout their implementation process. Since PY4 is focused on implementing and completing projects, the Program will aim for high level of visibility and will take advantage of the following resources:

- **CCEP communications and branding kit** - CCEP's communications team will coordinate with USAID the design, production and distribution of a communications and branding kit comprised of: a branding and marking format to be co-developed with the implementing partner for each project; visibility banners; posters tailored to the characteristics and needs of each project; and marking plaques with USAID's standard identity. These materials will be used and distributed during project

implementation activities, related events and meetings, and will also be accessible via website. The CCEP communications and branding kit will be produced by March 2016.

- **CCEP website:** The website will be redesigned to present content and materials for each one of CCEP's selected projects. This information will also be available through other strategic digital distribution tools. Accordingly, each project will be displayed through a comprehensive profile that will include project basic information; downloadable PDF success stories; links to national and local press coverage; properly branded supporting documentation such as reports, technical documents, power point presentations and guides in PDF formats; and a project photo gallery. Additionally, efforts will be made to distribute and share these documents with partnering institutions and entities. The CCEP website will be ready by March 2016.
- **Clean Energy newsletter and website:** As part of CCEP's institutionalization strategy, scheduled for February 2016, the Program will produce monthly newsletters that will publicize information on clean energy in the country. Newsletter and website contents will present not only CCEP achievements and activities. Both tools will also serve to promote news from Program allies, with particular focus on giving a voice to communities that benefit from T2 projects. The idea is to use these tools to promote Clean Energy as a subject that is above USG or GOC interests. The first issue of the Clean Energy newsletter will be distributed in October 2015.

3.1.3 Consolidate communications distribution network

The main objective of this activity is to increase understanding of CCEP's impact and results by establishing appropriate distribution channels and maximizing the dissemination of information.

An effective communication strategy will need to address key target audiences and pool communication resources from other institutions and partners to guarantee a widespread dissemination and facilitate broad communication of the Program's achievements. This will be accomplished by building a comprehensive distribution network database and establishing contact points with communications offices from other organizations, institutions of the energy sector, companies, national and local media liaisons, universities, NGOs, and other potential interested parties.

4. CCEP PERFORMANCE

CCEP is a five-year contract (January 9, 2012 – January 9, 2017). Forty-five months have passed since contract signature, meaning that, proportionally, CCEP should have reached 75% of its targets. However, this is not the case and Tt is fully aware of this. As prime contractor, Tt has identified projects and activities that will enable CCEP to reach its goals by January 9, 2017.

The following table presents CCEP indicators, actual progress, and targets. It also includes CCEP goals for PY4 to meet expected targets in each indicator.

Table 24 — Indicators: GHG emissions / Expected lifetime energy savings

Indicator	Actual	Target	%		Goal PY4	Planned Total by end of PY4
GHG emissions, estimated in metric tons of CO₂e, reduced, sequestered, and/or avoided as a result of USG assistance	11,216.86	80,000	14%		70,460	81,611
GHG emissions, projected for the entire lifetime of projects estimated in metric tons of CO₂e, reduced, sequestered, and/or avoided as a result of USG assistance	128,368.95	495,000	26%		464,771	593,140
Expected lifetime energy savings from energy efficiency or energy conservation, as a result of USG assistance	273,786	1,500,000	18%		1,276,687	1,550,473

As mentioned earlier, CCEP is behind in its implementation for various reasons. During PY4, the Program will catch up with activities that have fallen behind schedule and will be able to report GHG emissions that were initially considered in PY3. T3 projects such as the dosifier systems with CAEM and combustion optimization in boilers and kilns will have a great impact in CCEP GHG indicators, as shown in the table above. In the PMP submitted along with this AWP, CCEP changed the reporting frequency from annually to quarterly to better keep track of progress and take necessary measures if required. This same logic applies to the Energy savings indicator, as GHG emissions are directly related to energy savings.

Table 25 — Indicator: Investment mobilized in USD

Indicator	Actual	Target	%		Goal PY4	Planned Total by end of PY4
Amount of investment mobilized (in USD) for climate change as supported by USG assistance	9,529,974	5,000,000	191%		0	9,529,974

As of Q4 FY2016, CCEP had exceeded the USD 5 million target for this indicator. The Program does not envision starting any large projects with significant counterpart contributions in PY4. CCEP staff will review funds mobilized to date and will determine whether or not to take into account counterpart contributions in projects that were suspended or cancelled during PY3 and PY4.

Table 26 — Indicator: Institutions with improved capacity

Indicator	Actual	Target	%		Goal PY4	Planned Total by end of PY4
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Number of institutions with improved capacity to address climate change issues as a result of USG assistance	29	47	62%	113	142
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This indicator is also affected by the delays in Program implementation. Many T1 allies participating in PERS will be reported during the program year, as PERS Tolima, Guajira, Chocó, and Cundinamarca present results to new governors in early 2016. T2 projects also contribute to program goals: 11 health centers in Telemedicina and 36 coffee farms in *Serranía del Perijá* will help CCEP reach and exceed Program targets.

Table 27 — Indicator: Laws, policies, strategies, plans or regulations

Indicator	Actual	Target	%		Goal PY4	Planned Total by end of PY4
Number of laws, policies, strategies, plans, or regulations addressing climate change (mitigation or adaptation) and/or biodiversity conservation officially proposed, adopted, or implemented as a result of USG assistance	5	10	50%		11	16

PY4 goal in this indicator shows clearly CCEP work in public policy in the past, as laws and policies are enacted and rolled out. Just to mention one example, the Program expects four decrees that regulate Law 1715/2014 by the end of Q2 FY 2016.

Table 28 — Indicator: Person hours of training

Indicator	Actual	Target	%		Goal PY4	Planned Total by end of PY4
Number hours of training completed in climate change supported by USG assistance	16,198	50,000	32%		24,278	40,476

Many CCEP project designs have changed in the course of Program implementation and due to strategic decisions made to ensure completion of activities by scheduled dates. In previous years, CCEP planned to carry out technical and socio-entrepreneurial training as part of project sustainability. However, modifications in project scopes (such as interventions Bunkwimake and Vigía del Fuerte/Bojayá) and agreements with project counterparts where these are responsible for these components (such as *Telemedicina*, with *Cancillería*, or Vigía del Fuerte/Bojayá, with EPM) will impede CCEP in reaching the 50,000 person-hours of training. PMP4, submitted along with this work plan, requests lowering the Program target to a total of 40,000.

Table 29 — Indicators: Clean energy generation capacity

Indicator	Actual	Target	%		Goal PY4	Planned Total by end of PY4
Clean energy generation capacity installed or rehabilitated as a result of USG assistance	0.095	0.500	19%		0.424	0.519
Clean energy generation capacity supported by USG assistance that has achieved financial closure	0	0.240	0%		0.240	0.240

During the first three quarters of PY4, CCEP expects that all T2 projects will be completed and thus the Program will be able to report clean energy generation capacity. Since this indicator is reported every time a project is completed, CCEP will be able to keep closer track of indicator progress and be better prepared to respond to contingencies.

"Clean energy generation capacity supported by USG assistance that has achieved financial closure" is a new standard indicator, considered by USAID since June 2015 and included in CCEP's PMP for FY2016. "Financial closure" makes reference to the moment when all relevant parties in the project sign the subaward. Since most CCEP implementation mechanisms were signed in previous years, only those scheduled to start after October 2015 were taken into account to estimate a target. Initial estimates led Program staff to consider a target of 0.320 megawatts (MW); however, after close examination and taking into account projects where CCEP intervention is suspended or cancelled, such as Arusí, CCEP proposed 0.240 MW for FY2016 and overall target.

Table 30 — Indicator: Beneficiaries

Indicator	Actual	Target	%		Goal PY4	Planned Total by end of PY4
Number of beneficiaries with improved clean energy services due to USG assistance	2,098	16,000	13%		17,937	20,035

As T2 projects are completed, CCEP will report beneficiaries related to these projects. During this program year, CCEP will report significant numbers in large T2 projects, such as solar water pumps in La Guajira with FCGI, the MHPs in Palmor and Sabana de Crespo, and PVS for Telemedicina health posts.

Table 31 – Indicator: Tools, technologies, and methodologies

Indicator	Actual	Target	%		Goal PY4	Planned Total by end of PY4
Number of mitigation and/or adaptation tools, technologies, and methodologies developed	15	10	150%		17	32

As of Q4 FY2016, CCEP had exceeded the target for this indicator. The Program will continue working on activities that contribute to this indicator and will report progress as done to date.

Table 32 – Indicator: Pre-investment activities

Indicator	Actual	Target	%		Goal PY4	Planned Total by end of PY4
Number of CCEP pre-investment activities	66	60	110%		11	77

As of Q4 FY2016, CCEP exceeded the target for this custom indicator. The Program will continue working on activities that contribute to this indicator and will report progress as done to date.

Table 33 – Indicator: Employment

Indicator	Actual	Target	%		Goal PY4	Planned Total by end of PY4
Number of people gaining or improving employment, directly or indirectly, as a result of clean energy program interventions	698	2,000	35%		1,323	2,021

As T3 projects are completed, particularly CAEM and activities with boilers/kilns, CCEP will report new and/or improved employment related to these projects. CCEP will keep close track of indicator progress as expected goal is very close to the Program target.

While preparing and reviewing the PMP for FY2016, CCEP reviewed the Global Climate Change (GCC) Indicator Handbook updated June 2015. One new indicator caught our attention: CCEP requests USAID authorization to keep track of "Projected GHG emissions reduced or avoided through 2030 from adopted laws, policies, regulations, or technologies related to clean energy as supported by USG assistance (4.8.2-34)" as it is directly connected to public policy work conducted by CCEP since 2012 and will enable USAID to keep better track of the impact of policy enactments in climate change, mitigation and adaptation. CCEP will prepare an indicator reference sheet and submit for review and approval during Q2 FY2016.